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FREQUENCY OF DERMATOPHYTES IN THE METROPOLITAN AREA OF PORTO ALEGRE, RS, BRAZIL(1)

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SUMMARY

In order to evaluate the distribution of dermatophytes in Porto Alegre, the capital of the state of Rio Grande do Sul, Brazil, they were isolated from the skin, hairs and nails samples and retrospectively analyzed from June 1981 to June 1995, in two different institutions in the city of Porto Alegre: (i) the Serviço de Micologia do Instituto de Pesquisas Biológicas Jandyr Maya Faillace, da Secretaria de Saúde e Meio Ambiente do Rio Grande do Sul which attends the low income population (low and middle classes) and, (ii) Laboratório Weinmann, a clinical pathology laboratory which attends predominantly the higher income population (middle and upper classes), both which attend in the metropolitan area of Porto Alegre. The dermatophyte predominance of *Trichophyton rubrum* was confirmed (55.33%) followed by *T. mentagrophytes* (21.46%). The data obtained were compared with the existing prevalence data which were collected in the interior of the state over a period of 32 years (1960-1992). *T. verrucosum*, *T. simii*, *Microsporum persicolor*, *T. schönleinii*, *M. nanum* and *M. cookei* were isolated in the interior and have not been found in the capital so far. On the other side, *T. violaceum* was, isolated in the capital and has not been found in the interior so far.

Keywords: Dermatophytes; Tineas; Distribution; Frequency.

INTRODUCTION

Dermatophyte is a group of fungal keratinophilic species, capable of invading the corneal tissue of the skin and its annexes (hair and nails) in man or animal. It is constituted of species distributed in three generic shapeless forms, taxonomically correlated as follows: *Trichophyton*, *Microsporum* and *Epidermophyton* that belongs teleomorphously to a unique gender - *Arthroderma*. As a result of

the tissue invasion, these fungi cause dermatitis named dermatophytosis or tinea^{1,18,29}.

The dermatophytes may be primarily parasites in man (anthropophilic), and animal (zoophilic) or soil saprophyte (geophilic), capable of invading man and animal tissue¹⁸.

We call regional spectrum of dermatophytes the number of species of dermatophytoses agents found in a certain region. The dermatophytes show variety in space and time, ie, some are geographic and universally distributed as the *Trichophyton rubrum*¹⁶ and others are limited to a continent or region as *T. concentricum* fungus¹¹. However, in a same area there are dermatophytes of common sporadic occasional or exceptional occurrence.

The knowledge of this spectrum is interesting so much to the clinical doctor as to microbiologists, because it allows the epidemic vision of the binomial dermatophyte/dermatophytosis.

Among the socioeconomic conditions, the urbanization process and the social classes with larger purchasing power, influence, for example the prevalence of *T. rubrum*, fact observed by some researchers^{10,12,22}.

The incidence of tinea level among us is widely influenced by other factors as age, genetic factors, and bioclimatic conditions, promiscuity, sweating, moving and/or human migration, the contact with domestic animals (cats and dogs), or contaminated floor of pools and risky close floors areas^{3,7,12,16,28}.

The clinical presentation of the dermatophytosis is generally suggestive, facilitating the diagnosis¹⁷.

The lesion caused by dermatophytes can be located in any of the skin, hair or nails. Depending on the location the dermatophytosis is classified in the following modalities: dermatophytosis of the scalp, glabrous skin, feet and hands, folded skin (inguinal/axilar), face or beard in the man, or nail dermatophytosis¹⁷.

A same clinical manifestation can determine be caused by several dermatophytes species just as a species can determine more than one clinical manifestation. However, great dermatophytes number shows preference for certain areas of the skin or for its enclosures, hair or nails¹⁷.

With the coming of the Syndrome of Acquired Immunodeficiency (SIDA), the anomalous forms of fungi infections increased, including the dermatophytosis. For example, the tonsured plaques caused by *M. canis* were detected in the scalp of adult people²⁶. Similar situations can happen to immunosuppressed individuals under special conditions where the dermatophytes may surpass the keratin frontier of the skin and its enclosures (hair or nails) and cause subcutaneous and/or systemic infections¹⁶.

The dermatophytes predominance varies from one to another region of the country. This fact can be confirmed in works done in different periods of time in São Paulo City^{9,22}.

The clinical data were collected from patients with dermatophytoses, diagnosed in the period from June, 1981 to June, 1993 and provided by the Serviço de Micologia do Instituto de Pesquisas Biológicas Jandyr Maia Faillace da Secretaria de Saúde e Meio Ambiente of Rio Grande do Sul, which attends in the metropolitan area of Porto Alegre, to be tabulated and analyzed.

The data obtained from patients with, dermatophytoses diagnosed at Laboratório Weinmann, which attends in the metropolitan area of Porto Alegre, in the period from January 1993 to June 1995 are presented in this work. This essay also brings the spectrum of dermatophytes found in Porto Alegre (RS) in the period between the years of 1981 to 1995 compared to the one found in the interior of the State from 1960 to 1992.

This work aims to characterize the spectrum of dermatophytes and its distribution in metropolitan area of Porto Alegre, comparing with the spectrum and distribution observed in the interior of the State.

MATERIALS AND METHODS

The diagnosis of dermatophytoses requires microscope exam to observe the fungus in the specimen in its parasitic morphology and the isolation in culture, for the agent generic and specific identification.

The direct exam of skin, nails and pulled out hair are observed between slide and coverglass, adding one drop of potassium hydroxide (KOH) 10-40%. The KOH clarifies the clinical specimen and makes it easier to visualize the fungae hyphae in the microscope⁸. The dermatophytes, under the microscope exam appear like fragmented hyphae (arthroconidia). This aspect is identical to all kinds of dermatophytes. There are two other helpful ways in the direct identification; like the ones that add Parker ink to KOH to color the hyphae blue¹⁵ and the Calcofluor White (Sigma Chemical Co., St Louis, MO), that gives fluorescence to the dermatophytes^{13,14}.

The culture identification of dermatophytes must be made using newly isolated colonies, in order to prevent the irreversible pleomorphism after successive replication, when sterile filaments are originated.

Samples of skin, hair nails were collected from dermatophytoses suspicious clinical cases for the present work. The asepsis in the place of the lesions was made both with alcohol 70% and/or sulfuric ether¹⁵. The materials were clarified with KOH 20%¹⁵ and, alternatively, with Calcofluor White¹³. The cutaneous and nails scrapings were examined in the optical or fluorescent microscope, searching for arthroconid hifae. We looked for endothrix and/or ectothrix fungi elements in hair analysis.

Part of the clinical material was smeared on Mycosel agar (BBL) or Micobiotic agar (Difco). The cultures were incubated at 30°C during 15 days. The identification was accomplished through the macro and microscope observation of the colonies, in agreement with

REBELL & TAPLIN criteria²⁵. The Urease test²³ was used to help to differentiate *T. rubrum* from *T. mentagrophytes*.

RESULTS

Results were evaluated concerning to the dermatophytes spectrum surveyed in Porto Alegre (RS) from 1981 to 1995 and compared to the one found in the interior of the State - from 1960 to 1992.

The frequency of fungi related to sex and affinity through various parts of human body was also evaluated and isolated at Laboratório Weinmann within the period of 29 months, from January 1993 to June 1995.

At laboratório Weinmann during this period 864 strains were isolated. Their distribution isolated according to different parts of human body are in [Table 1](#).

Table 1
Isolated dermatophytes in various sites of human body at Laboratório Weinmann (from January 1993 to June 1995)

Dermatophytes	Lesion sites							Total	
	Feet	Nails (foot and hand)	Hands	Inguinal axilar	Glabrous skin	Skin scalp	Various	Total	%
<i>T. rubrum</i>	270	182	13	27	59	0	39	590	68.29
<i>T. mentagrophytes</i>	91	53	1	4	4	1	8	162	18.75
<i>M. canis</i>	13	7	0	1	41	11	2	75	8.68
<i>E. floccosum</i>	14	0	1	2	3	0	1	21	2.43
<i>M. gypseum</i>	5	0	1	0	9	0	1	16	1.85
Total	393	242	16	34	116	12	51	864	-
%	45.49	28.01	1.85	3.94	13.42	1.39	5.90	-	100

The frequency found at laboratório Weinmann ([Table 1](#)) corresponds to *T. rubrum* (68.29%), *T. mentagrophytes* (18.75%), *M. canis* (8.68%) *E. floccosum* (2.43%) and *M. gypseum* (1.85%).

The frequency found at Laboratório Weinmann ([Table 1](#)) corresponds to *T. rubrum* (68.29%), *T. mentagrophytes* (18.75%), *M. canis* (8.68%) *E. floccosum* (2.43%) and *M. gypseum* (1.85%).

The dermatophytes distribution according to sex of the patients are listed in [Table 2](#).

Table 2
Isolated dermatophytes according to the sex of the patients at Laboratório Weinmann (from January 1993 to June 1995.)

Dermatophytes	Sex				Total
	Male		Female		
	No.	%	No.	%	
<i>T. rubrum</i>	311	52.71	279	47.29	590
<i>T. mentagrophytes</i>	81	50.00	81	50.00	162
<i>M. canis</i>	34	45.33	41	54.67	75
<i>E. floccosum</i>	17	80.95	4	19.05	21
<i>M. gypseum</i>	7	43.75	9	56.25	16

In the rising accomplished at Laboratório Weinmann ([Table 2](#)), *T. rubrum* (52.71%) and *E. floccosum* (80.95%) were predominant in male sex; this one with significant statistical difference using the same confidence interval limit. *M. canis* (54.67%) and *M. gypseum* (56.25%) were predominant in female sex. The dermatophytes *T. mentagrophytes* occurred in equal proportion in both sexes (50.00%).

The frequency and spectrum of dermatophytes isolated in the metropolitan area of Porto Alegre, as well as, the comparison with the ones found in the interior of the state are included in [Table 3](#).

Table 3
Comparison between the frequency and isolated dermatophytes spectrum in Porto Alegre (1981-1995) and in the interior of state (1960-1992).

Dermatophytes	Porto Alegre		Interior	
	No. Cases	%	No. Cases	%
<i>T. rubrum</i>	1,132	55.33	3,832	51.84
<i>T. mentagrophytes</i>	439	21.46	1,785	24.15
<i>M. canis</i>	264	12.90	638	8.63
<i>E. floccosum</i>	112	5.47	986	13.34
<i>T. tonsurans</i>	50	2.44	6	0.08
<i>M. gypseum</i>	40	1.96	76	1.03
<i>T. violaceum</i>	9	0.44	0	0.00
<i>M. nanum</i>	0	0.00	3	0.04

<i>T. simii</i>	0	0.00	2	0.03
<i>M. persicolor</i>	0	0.00	1	0.01
<i>T. schoenleinii</i>	0	0.00	4	0.05
<i>M. cookei</i>	0	0.00	1	0.01
Total	2,046	100	7,392	100

Porto Alegre: Data obtained by Serviço de Micologia from IPB-SSMA Laboratório Weinmann.
Interior: Data obtained by LONDERO & RAMOS, 1989; LOPES, ALVES, BENEVENGA, 1994.

[Table 3](#) demonstrates that obtained data in the capital (Porto Alegre) and in the interior don't present significant differences, within the confidence interval limit in a sample of n data, maintained the binominal distribution as reference and attributing to the greater and lesser values a confidence interval of 95% ($p < 0.05$).

The dermatophytes isolated in Porto Alegre by frequency order was: *T. rubrum* (55.33%), *T. mentagrophytes* (21.46%), *M. canis* (12.90%), *E. floccosum* (5.47%), *T. tonsurans* (2.44%), *M. gypsum* (1.96%) and *T. violaceum* (0.44%).

DISCUSSION

Dermatophytoses continue being the most common mycoses in man, all over the world and the *T. rubrum* dermatophyte the most frequent agent²⁸. In the hinterland of the State of Rio Grande do Sul^{17,19} along 32 years the species *T. rubrum* was predominant. Identical fact was observed in the metropolitan area of Porto Alegre ([Table 3](#)) and by MEZZARI et al.²¹.

T. tonsurans fungus, in Rio Grande do Sul, was isolated for the first time by ASSIS, 1929². In 1981 RAMOS et al.²⁴ described imported cases from the north of Brazil. New cases have been described separately²⁰ or in microepidemic surge^{4,5} in Rio Grande do Sul. According to BASSANES et al.⁶, the dermatophyte was definitely introduced in our State just as it happened in the United States of America.²⁷

T. rubrum was predominant in all parts of human body, except for the skin hair, where *M. canis* prevailed.

T. mentagrophytes was the second more frequent agent in all parts of human body, except for glabrous skin, where the dermatophytes *M. canis* prevailed.

The dermatophytes were isolated both in male and female with the same frequency, except for the *E. floccosum* agent that prevailed in male with significant statistical difference.

The occurrence of epidemic outbreaks and even isolated cases caused by geophilic, zoophilic and anthropophilic dermatophytes pointed out the need to diagnose etiologically the dermatophytoses, permitting the detection of infection sources and allowing the Public Health System to take measures against the transmission chain of the disease.

CONCLUSIONS

The dermatophytes isolated in Porto Alegre by frequency order was *T. rubrum* (55.33%), *T. mentagrophytes* (21.46%), *M. canis* (12.90%), *E. floccosum* (5.47%), *T. tonsurans* (2.44%), *M. gypseum* (1.96%) and *T. violaceum* (0.44%).

The spectrum found in the capital was compared to the one inside the state. It showed three main differences: a) third place position occupied by the *M. canis*, in the capital; b) presence of the species *T. verrucosum*, *M. nanum*, *T. simii*, *M. persicolor*, *T. schöenleinii* and *M. cookei*, in the interior; c) presence of the *T. violaceum* in the capital.

T. rubrum prevailed at all parts of the human body, except in the hairy leather, where the fungus *M. canis* prevailed.

T. mentagrophytes were the second more frequent agent in all parts of the human body, except in the skin glabra where the dermatophytes *M. canis* prevailed.

The dermatophytes was isolated from patients of the masculine and feminine sexes with similar frequency, except by the agent *E. floccosum*, that prevailed in the masculine sex with significant statistical difference. All the species of isolated dermatophytes prevailed in patients of white color.

T. rubrum, *T. mentagrophytes* and *E. floccosum* prevailed in the age group between 16 and 86 years. *M. canis*, *T. tonsurans*, *M. gypseum* and *T. violaceum* prevailed in the age group of 6 to 15 years.

T. rubrum had its constant prevalence along the years followed by the *T. mentagrophytes*. However, during the dermatophytes outbreak, the involved agents were *T. tonsurans*, *T. violaceum* and *M. canis*.

T. tonsurans, since the year of 1983, was isolated annually, of autochthonous cases characterizing its definitive introduction in the state.

The occurrence of epidemic surges and even of isolated cases caused by dermatophytes geophilic, zoophilic and antropophilic showed the need to diagnose etiologically the dermatophytoses to allow the detection of the infection sources and the measures to be taken by Public Health to interrupt the chain of disease transmissions.

RESUMO

Prevalência de dermatófitos na região metropolitana de Porto Alegre, RS, Brasil

A prevalência de dermatófitos na região metropolitana de Porto Alegre (RS), foi analisada de modo retrospectivo durante o período de junho de 1981 a junho de 1995. As espécies de dermatófitos foram isoladas de amostras de pele, pêlos e unhas, em duas instituições de Porto Alegre: Serviço de Micologia de Instituto de Pesquisas Biológicas Jandyr Maya Faillace, da Secretaria de Saúde e Meio Ambiente do Rio Grande do Sul, que atende predominantemente as classes sociais B e C e Laboratório Weinmann, que atende predominantemente as classes sociais A e B.

Observou-se o predomínio do dermatófito *Trichophyton rubrum* (55.33%) seguido pelo *Trichophyton mentagrophytes* (21.46%). Os dados coletados foram comparados com a prevalência observada no interior do estado num período de 32 anos (1960-1992). Os fungos *Trichophyton verrucosum*, *Trichophyton simii*, *Microsporum persicolor*, *Trichophyton schoenleinii*, *Microsporum nanum* e *Microsporum cookei* isolados no interior do estado não foram observados na capital. *Trichophyton violaceum*, isolado na capital não foi encontrado no interior.

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