



GEOSCIENCES

Prevalence of psoriasis and cutaneous mycoses: A descriptive study in Paraná, Brazil

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Abstract: The epidemiology of psoriasis and cutaneous mycoses is scarce in Brazil. Thus, this cross-sectional study aimed to characterize the distribution of these diseases in Paraná. Data was obtained from the Outpatient Information System (SIA - Sistema de Informações Ambulatoriais), between 2016 and 2020. The procedures were filtered by the International Classification of Diseases (ICD). A total of 201,161 outpatient procedures were registered for psoriasis and psoriatic arthritis. The distribution concerning gender was similar (50.93% feminine; 49.07% masculine). The mean age was 51.55 years. The most frequent procedure was methotrexate dispensing (23.17%), followed by acitretin (14.29%) and adalimumab (12.55%). Adjusting to total population, the prevalence of procedures was 0.35%. Regarding cutaneous mycoses, 1,756 procedures were registered. 65% of them referred to females. White race/color was predominant (82.97%). The mean age was 37.6 years. The distribution concerning age varied according to the type of mycosis. Medical appointments (48.92%) and surgical pathology exam/biopsy (38.71%) were the most frequent procedures. The prevalence of procedures was 0.004%. This is the first epidemiological study using SIA about the population affected by psoriasis, psoriatic arthritis, and cutaneous mycoses in a Brazilian state. We believe that these findings allow relevant contribution to science and public policies in Brazil.

Key words: Candidiasis, chronic disease, epidemiology, fungi, psoriasis, tinea.

INTRODUCTION

In 2016, the World Health Organization (WHO) highlighted the epidemiology of psoriasis as a priority area of research of the disease (World Health Organization 2016). Then, studies of various countries evaluated the distribution of this illness around the world (Rachakonda et al. 2014, Shalom et al. 2018, Springate et al. 2017, Danielsen et al. 2019). In general, psoriasis and psoriatic arthritis have a ranged prevalence in different localizations; also, they are considered diseases with a considerable impact on patients' quality of life (Menter 2016, Boehncke & Schön 2015, Langley et al. 2005). Genetic and environmental factors are the probable reason for distribution variations (Parisi et al. 2013). To our knowledge, in Brazil there is only one study

available that addressed psoriasis epidemiology at a national level, in which the southeastern and the southern regions showed higher prevalence (Romiti et al. 2017).

In parallel, superficial and cutaneous mycoses are also distributed worldwide. Nearly a billion people are estimated to have skin, nail, and hair fungal infections (Bongomin et al. 2017). However, there are variations depending on characteristics such as geographic and climatic areas, people migrations, sports activities, lifestyle, age of patients, as well as drug therapy (Havlickova et al. 2008). These diseases have morbidity, which causes discomfort, social stigma, and upsetting day-to-day activities; this leads to negative effects on the patient's occupational, emotional, and

social status (Sharma & Nonzom 2021). Several studies evaluated the superficial and cutaneous mycoses distribution in Brazil's different regions (Chiacchio et al. 2014, Pires et al. 2014, Silva-Rocha et al. 2017, Calado et al. 2011). Yet, most of them were restricted to a single city with a low sample number; thus, they could not be extrapolated to other locations. Extensive research carried out in the databases shows that the situation in the state of Paraná is similar: there is only one study available published on the city of Maringá (Souza et al. 2007).

Given that, it is relevant to highlight that around 71.5% of Brazil's population relies exclusively on the Unified Health System (SUS - Sistema Único de Saúde) (Instituto Brasileiro de Geografia e Estatística 2020). All the registers of outpatient procedures done in the country via SUS are stored in the Outpatient Information System (SIA - Sistema de Informações Ambulatoriais), and the anonymized data is publicly available (Ministério da Saúde 2022a). Therefore, utilizing this system in the epidemiological study of predominantly outpatient conditions, such as psoriasis and cutaneous fungal infections, allows reaching a more general view of the actual distribution of the diseases. Thus, the objective of this study was to characterize the profile of procedures related to different forms of psoriasis and cutaneous mycoses in Paraná, aiming to estimate the distribution of these diseases.

MATERIALS AND METHODS

Study design

This is a cross-sectional, retrospective and descriptive study, which used secondary data from SUS, obtained from Department of Informatics of the Unified Health System - Departamento de Informática do Sistema Único de Saúde - DATASUS (Ministério da Saúde

2022a). SUS is the Brazilian public health system, ensuring universal, free, and integral assistance to the entire population of the country. It includes primary, secondary, and tertiary care, urgency and emergency services, actions and services of epidemiological, sanitary, and environmental surveillance, and pharmaceutical assistance (Ministério da Saúde 2022b).

The records of procedures performed via SUS are stored in different Health Information Systems (Sistema de Informação em Saúde - SIS). SIA was the SIS used, because it includes all outpatient procedures (medical appointments, procedures, and drug dispensation) performed via SUS (Ministério da Saúde 2022c), and both psoriasis and cutaneous mycoses do not usually cause hospitalizations or are fatal. In this system, all data is anonymized, therefore, Ethical Approval was waived by the University's Standing Committee on Ethics in Research with Human (Comitê Permanente de Ética em Pesquisa com Seres Humanos - COPEP/UEM). The microdata was obtained through a package for R, Microdatasus (Saldanha et al. 2019).

The analysis was carried out between the period 2016 to 2020 with data from state of Paraná. The state is located in the southern region of Brazil. It has a territorial area of 199,298,981 km² and an estimated population of 11,597,484 people in 2021, being the most populous state in the southern region and the fifth in the country. Paraná is divided in 22 Health Regions to coordinate health care (Secretaria da Saúde do Paraná 2023). Regarding social indicators, in 2021 its Human Development Index (HDI) was 0,769 and the life expectancy was 78,46 years; Gini's coefficient in 2022 was 4,75, and the number of health institutions – last gathered in 2009 - was 5,779. (Instituto Brasileiro de Geografia e Estatística 2021a, b, 2022).

For the selection of procedures related to psoriasis and psoriatic arthritis, the International

Classification of Diseases, 10th edition (ICD-10) (World Health Organization 2019) was used under codes L40 (L40.0 to L40.9) and M07 (M07.0 to M07.3), respectively. For cutaneous mycoses, codes B35 (B35.0 to B35.9) and B37 (B37.0, B37.2 to B37.4), referring to dermatophytosis and candidiasis, respectively, were utilized. The full description of each code is listed below (Table I). For candidiasis, only codes related to mucocutaneous infections were considered. All records under the codes described above were included.

Data analysis

The variables analyzed include: municipality where the procedure was performed, patient's home municipality, gender, race/color, age, main ICD code, and procedure performed according to the SIGTAP Table (Unified Table of Procedures, Medicine, Orthoses, Prostheses, and Synthesis Materials of SUS). The prevalence of procedures related to these diseases was calculated by city, considering the patient's home municipality. The following formula was used: (Median number of procedures per year) / (Median of total estimated population per year) * 100,000. The data obtained were tabulated in Excel® spreadsheets (Microsoft Office, Microsoft Corporation, USA) and analyzed using descriptive statistics. The QGIS software version 2.14.9 was used in the construction of the maps (QGIS 2020).

RESULTS

Psoriasis and psoriatic arthritis

Between 2016 and 2020, a total of 109,404 procedures were registered under ICD L40 and 91,757 under M07, equaling 201,161 procedures. The data of psoriasis and psoriatic arthritis were analyzed together. The prevalence in the state was 345 procedures per 100,000 inhabitants (0.35%).

Table I. ICD-10 codes used in the study.

ICD-10 code	Disease
B35	Dermatophytosis
B35.0	Tinea barbae and tinea capitis
B35.1	Tinea unguium
B35.2	Tinea manuum
B35.3	Tinea pedis
B35.4	Tinea corporis
B35.5	Tinea imbricata
B35.6	Tinea inguinalis (Tinea cruris)
B35.8	Other dermatophytoses
B35.9	Dermatophytosis, unspecified
B37	Candidiasis
B37.0	Candidal stomatitis
B37.2	Candidiasis of skin and nail
B37.3	Candidiasis of vulva and vagina
B37.4	Candidiasis of other urogenital sites
L40	Psoriasis
L40.0	Psoriasis vulgaris
L40.1	Generalised pustular psoriasis
L40.2	Acrodermatitis continua
L40.3	Pustulosis palmaris et plantaris
L40.4	Guttate psoriasis
L40.5	Arthropathic psoriasis
L40.8	Other psoriasis
L40.9	Psoriasis, unspecified
M07	Psoriatic and enteropathic arthropathies
M07.0	Distal interphalangeal psoriatic arthropathy
M07.1	Arthritis mutilans
M07.2	Psoriatic spondylitis
M07.3	Other psoriatic arthropathies

Among the total of procedures, 47.16% were related to psoriasis vulgaris, the most

common type of the disease, followed by other psoriatic arthropathies (29.23%) and distal interphalangeal psoriatic arthropathy (16.20%). The gender distribution was similar (50.93% female vs. 49.07% male). Regarding race/color, more than 93% of the records were unfilled, so it was not possible to analyze this variable. The mean age was 51.55±14.7 years, and the predominant age range was 40-59 years (49.49%). Figure 1 shows the distribution concerning age and sex.

Regarding procedures, most were related to the dispensation of drugs used in the treatment of psoriasis and psoriatic arthritis, which were topical (calcipotriol and clobetasol), oral (methotrexate, acitretin, cyclosporine, leflunomide, sulfasalazine, naproxen), or biologic (adalimumab, etanercept, infliximab, secukinumab, golimumab, ustekinumab).

Methotrexate was the most dispensed drug (23.17%). The complete list is available in Table II.

Curitiba was the city where most procedures were performed (36.08%) and it also was the most frequent patient's home municipality (22.86%), followed by Maringá (15.78% and 10.31%) and Londrina (7.18% and 4.98%). Considering the total population, the cities with the highest prevalence of procedures were Nossa Senhora das Graças (2.47%), Cruzeiro do Iguaçu (2.06%), and Porto Vitória (1.45%). The map with all with all prevalences by the municipality is shown in Figure 2.

Cutaneous mycoses

A total of 1,756 procedures were registered in the studied period, 1,231 of which were dermatophytosis (B35) and 525 were candidiasis (B37). The prevalence of these mycoses in the state was 4 cases per 100,000 inhabitants (0.004%). The

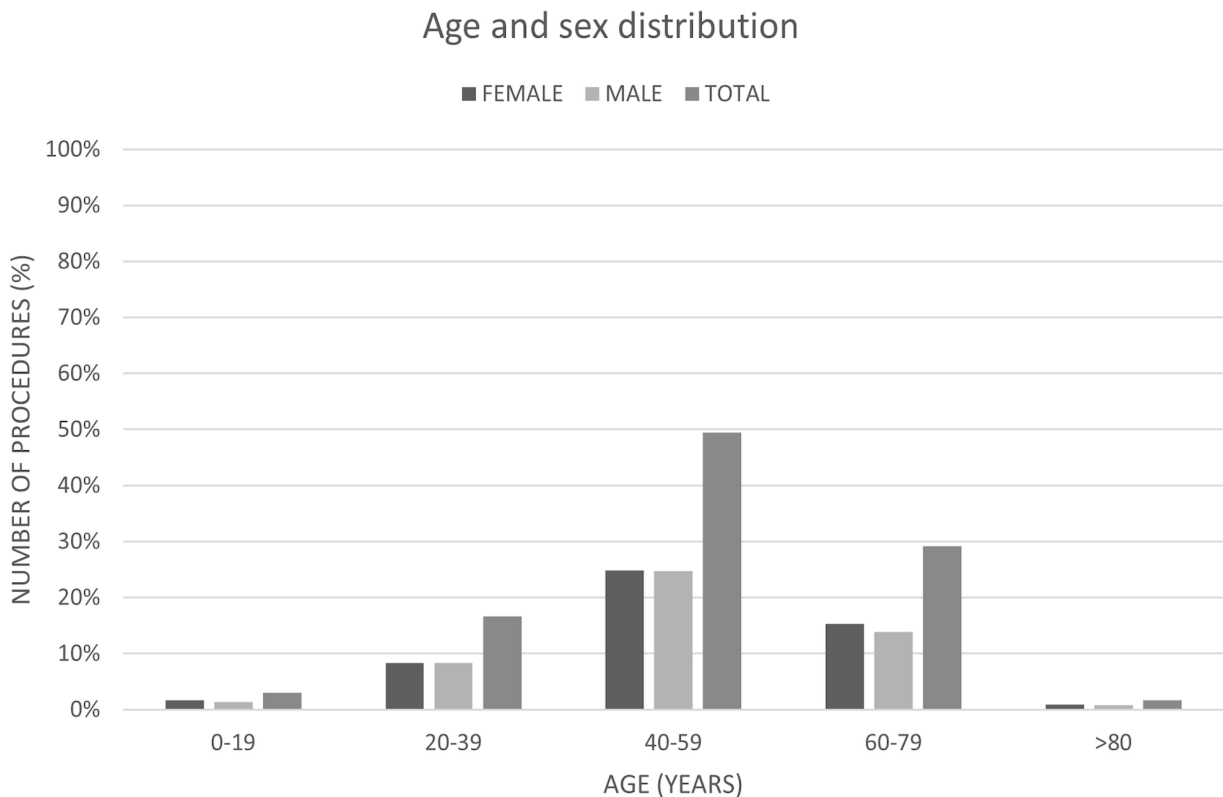


Figure 1. Number of procedures conducted for psoriasis/psoriatic arthritis according to age and sex of patients.

most frequent records refer to onychomycosis (34.62%) and vulvovaginal candidiasis (15.77%). 65% of the patients were female, and 35% were male. White race/color was predominant with 82.97%, followed by brown with 4.90%, yellow with 3.47%, and black with 1.37%. However, 7.29% of the records did not present this information.

The mean age was 37.6 ± 24.5 years. Age distribution varied according to the type of mycosis; onychomycosis and tinea pedis were more common in the population of 50-69 years (18.74% and 3.53%), while skin and nail

candidiasis, urogenital candidiasis, and *Candida* stomatitis were more frequent between 0-9 years (1.14%, 3.13%, and 4.90%). Vulvovaginal candidiasis was more frequent in the population aged 20-29 years (4.38%) and 0-9 years (3.42%). Tinea cruris was more often between 0-9 years (1.48%) and 50-59 years (1.03%). Tinea corporis, between 0-19 years (3.59%), and tinea barbae/tinea capitis, between 0-9 years (2.05%), 50-59 years (1.54%) and 60-69 years (1.54%). Table III shows all frequencies considering age, sex, and disease.

Concerning the procedures performed, none was specific for mycoses. All of them referred to clinical or diagnostic procedures, without drug dispensing. Medical appointments, which includes specialized medical care, emergency care and primary care were responsible for 48.92% of the records, followed by surgical pathology exam/biopsy with 38.71%, and ultrasound scan with 5.01%. Table IV portrays all the procedures performed.

The capital, Curitiba, was the city where most procedures were performed (78.47%). When considering the patient's home municipality, the cities with more registers were Curitiba (63.61%), Cascavel (9.79%), and Araucária (6.83%). Adjusting by the total population, the cities with a greater prevalence of procedures were Cascavel (0.012%), Curitiba (0.011%) and Mandirituba (0.008%). The map with all with all prevalences by the municipality is available in Figure 3.

DISCUSSION

This is the first study to explore SIA as a data source for an epidemiological and descriptive study of psoriasis and cutaneous mycoses in a Brazilian state. The SIA warehouses a large amount of data; in 2020, 3,136,553,990 procedures were registered in SIA throughout

Table II. Procedures registered under ICD codes L40 and M07 in Paraná (2016-2000).

Procedure	n (%)
Methotrexate	46599 (23.17)
Acitretin	28751 (14.29)
Adalimumab	25252 (12.55)
Calcipotriol	21071 (10.47)
Etanercept	16679 (8.29)
Clobetasol	16334 (8.12)
Phototherapy	13591 (6.76)
Leflunomide	8715 (4.33)
Cyclosporine	7709 (3.83)
Infliximab	4679 (2.33)
Secukinumab	3254 (1.62)
Sulfasalazine	2555 (1.27)
Medical appointment	1705 (0.85)
Golimumab	1457 (0.72)
Naproxen	870 (0.43)
Surgical pathology exam/biopsy	731 (0.36)
Hepatitis C antibody (anti-HCV) test	349 (0.17)
Ustekinumab	279 (0.14)
Other*	581 (0.29)
Total	201161 (100.00)

* Procedures with a frequency under 0.14% were grouped in the "Other" category.

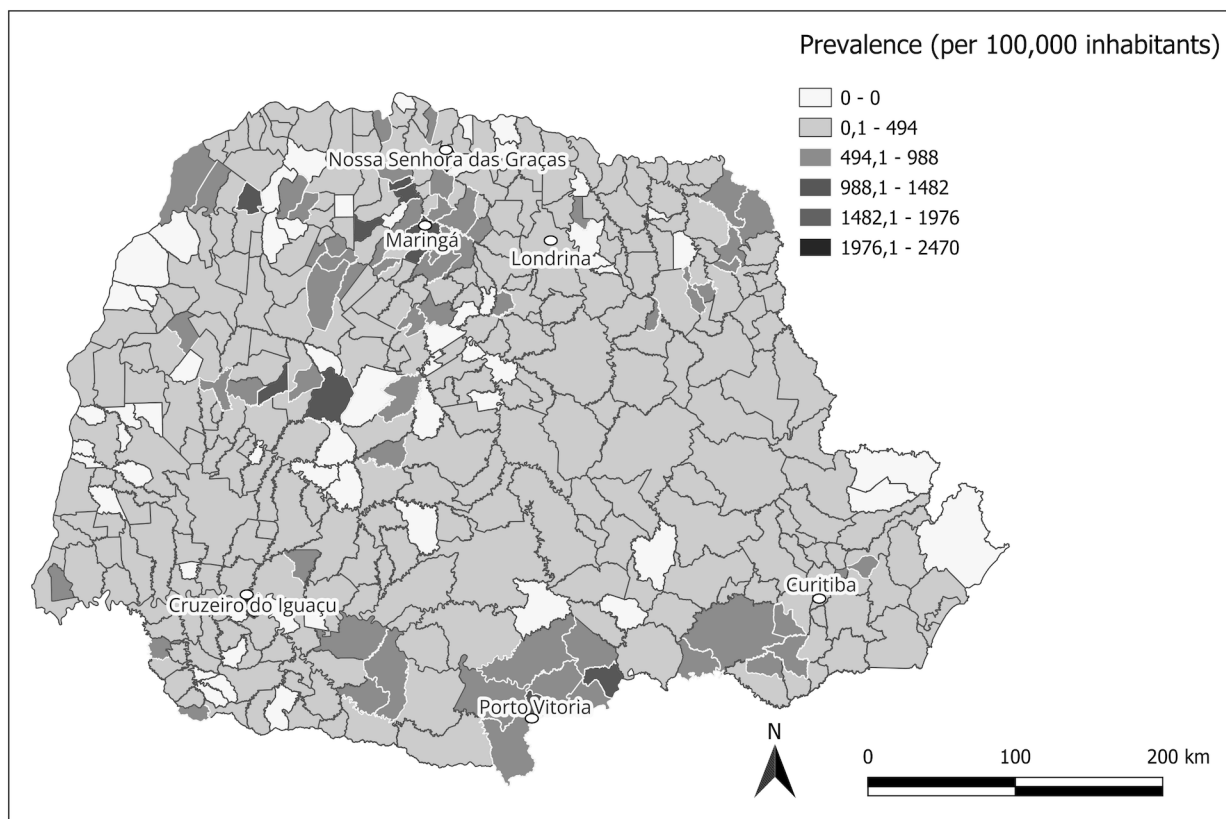


Figure 2. Prevalence of psoriasis/psoriatic arthritis procedures in Paraná (per 100,000 inhabitants).

Brazil, 114,807,458 only from Paraná. These records include drug dispensation, clinical and diagnostic procedures (Ministério da Saúde 2022a). For this reason, we obtained a high number of records for psoriasis and psoriatic arthritis ($n= 201,161$) and a considerable one for cutaneous mycoses ($n=1,756$), with a prevalence of 0.35% and 0.004%, respectively.

Regarding psoriasis and psoriatic arthritis, psoriasis vulgaris was more frequently recorded, which is consistent, considering this is the most common type of psoriasis (Langley et al. 2005, Griffiths et al. 2021). The distribution concerning gender was very similar. The mean age was 51.55 years, predominating the age group of 40-59 years in both sexes. This is in agreement with the literature, which states that there are no differences regarding gender; yet, the first manifestations of psoriasis may

occur earlier in women (Griffiths et al. 2021). The age of the population was similar to other prevalence studies in Brazil (Romiti et al. 2017) and worldwide (Rachakonda et al. 2014, Shalom et al. 2018, Lebwohl et al. 2014).

Unfortunately, in this study, it was not possible to assess the race/color of this population due to a lack of filling of the respective field. This absence is still a problem in SIS, which may affect the quality of the obtained data (Correia et al. 2014) and provide inaccurate information to SUS. This issue with the fragmented data occurs in many countries of Latin America, with an impact on development of public health programs, drug policies, establishment of educational programs, evaluation of interventions, and decision-making (Salas et al. 2020).

The obtained prevalence of psoriasis and psoriatic arthritis procedures was 0.35%, a low

Table III. Distribution (%) of cutaneous mycoses according to age (years), sex, and disease.

Disease	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
Candidiasis of skin and nail	1.14	-	0.40	0.17	0.34	0.11	0.11	0.11	-	-	2.39
Female	0.57	-	0.28	0.06	0.34	0.11	0.06	0.11	-	-	1.54
Male	0.57	-	0.11	0.11	-	-	0.06	-	-	-	0.85
Candidiasis of vulva and vagina	3.42	2.51	4.38	2.56	1.77	0.68	0.40	0.06	-	-	15.77
Female	3.42	2.39	4.16	2.39	1.65	0.63	0.40	0.06	-	-	15.09
Not informed	-	0.11	0.23	0.17	0.11	0.06	-	-	-	-	0.68
Candidiasis of other urogenital sites	3.13	-	0.97	0.40	0.23	0.06	-	-	-	-	4.78
Female	0.97	-	-	-	-	-	-	-	-	-	0.97
Male	2.16	-	0.97	0.40	0.17	0.06	-	-	-	-	3.76
Not informed	-	-	-	-	0.06	-	-	-	-	-	0.06
Dermatophytosis, unspecified	1.14	0.34	0.46	0.63	1.31	1.20	1.14	0.74	0.11	-	7.06
Female	0.46	0.11	0.23	0.28	0.80	0.51	0.68	0.17	0.11	-	3.36
Male	0.68	0.23	0.23	0.34	0.51	0.68	0.46	0.57	-	-	3.70
Candidal stomatitis	4.90	0.17	0.63	0.28	0.06	0.23	0.34	0.23	0.11	-	6.95
Female	2.62	0.17	0.51	0.28	0.06	0.17	0.17	0.11	0.06	-	4.16
Male	2.28	-	0.11	-	-	0.06	0.17	0.11	0.06	-	2.79
Other dermatophytoses	0.28	0.17	0.17	0.06	0.11	0.34	0.17	-	-	-	1.31
Female	-	0.11	0.11	0.06	0.06	0.11	0.11	-	-	-	0.57
Male	0.28	0.06	0.06	-	0.06	0.23	0.06	-	-	-	0.74
Tinea inguinalis (Tinea cruris)	1.48	0.68	0.74	0.40	0.57	1.03	0.57	-	-	-	5.47
Female	0.97	0.34	0.06	-	0.23	0.28	0.11	-	-	-	1.99
Male	0.51	0.34	0.68	0.40	0.34	0.74	0.46	-	-	-	3.47
Tinea barbae and tinea capitis	2.05	0.40	0.63	0.63	0.63	1.54	1.54	0.57	0.17	-	8.14
Female	0.63	0.17	0.34	0.51	0.51	1.03	0.80	0.23	0.17	-	4.38
Male	1.42	0.23	0.28	0.11	0.11	0.51	0.74	0.34	-	-	3.76
Tinea manuum	-	0.06	0.11	-	0.06	0.11	0.06	0.23	-	-	0.63
Female	-	0.06	0.06	-	-	-	-	0.11	-	-	0.23
Male	-	-	0.06	-	0.06	0.11	0.06	0.11	-	-	0.40

Table III. Continuation.

Disease	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
Tinea unguium	1.14	1.14	1.42	2.79	4.73	9.85	8.88	3.87	0.74	0.06	34.62
Female	0.40	0.63	0.80	1.88	3.99	7.86	6.26	2.51	0.23	0.06	24.60
Male	0.74	0.51	0.63	0.91	0.74	1.99	2.62	1.37	0.51	-	10.02
Tinea corporis	1.82	1.77	0.74	0.74	0.34	0.68	0.46	0.17	0.11	-	6.83
Female	0.91	1.20	0.40	0.46	-	0.28	0.28	0.11	0.11	-	3.76
Male	0.91	0.57	0.34	0.28	0.34	0.40	0.17	0.06	-	-	3.08
Tinea pedis	0.23	0.91	0.23	0.57	0.40	1.37	1.03	1.14	-	-	5.87
Female	0.06	0.40	0.23	0.40	0.17	0.97	0.57	0.91	-	-	3.70
Male	0.17	0.51	-	0.17	0.23	0.40	0.46	0.23	-	-	2.16
Tinea imbricata	0.06	-	-	-	-	0.06	-	-	0.06	-	0.17
Female	0.06	-	-	-	-	0.06	-	-	0.06	-	0.17
Total	20.79	8.14	10.88	9.23	10.54	17.26	14.69	7.12	1.31	0.06	100.00

value compared to the estimate for Brazil (1.31%) and the southern region (1.86%) (Romiti et al. 2017). In São Paulo, the prevalence was 2% (Jorge et al. 2017). We believe that the data source explains these variations, since the studies acquired data from primary sources, with a limited value of patients - a telephone population survey with 8947 answers and 6000 medical records of an outpatient clinic of dermatology, respectively. Our study utilized SIA, a secondary source of data, regarding the total population of Paraná, a significantly higher number (11,597,484). A study that also utilized SIA data found a prevalence of 0.0007% of Generalized Pustular Psoriasis (GPP), a rare subtype of psoriasis, in Brazil (Duarte et al. 2022).

The predominant procedures were those related to the dispensation of drugs commonly used in psoriasis and psoriatic arthritis treatment. Methotrexate was the most frequent, as it is used as the first line of systemic treatment in both diseases. This medicine is indicated after failure or contraindication of topical drugs or

phototherapy for psoriasis (Ministério da Saúde 2021a, b).

In turn, biologics are indicated for moderate to severe psoriasis and as a second step for psoriatic arthritis. In this study, they were predominantly registered under the ICDs of psoriatic arthritis, which is an indication that most cases of psoriasis are mild to moderate. Currently, five biological drugs are in the Clinical Protocol and Therapeutic Guidelines (Protocolo Clínico e Diretrizes Terapêuticas - PCDT) for psoriasis and available at SUS: adalimumab, etanercept, ustekinumab, secukinumab and risankizumab (Ministério da Saúde 2021b). Among these, adalimumab is the first choice in the treatment for psoriasis, which reflects its higher frequency regarding biologics in this study. Adalimumab, etanercept, golimumab and infliximab are the first-line biologics for psoriatic arthritis (Ministério da Saúde 2021a) and were also present in the study. Thus, the frequency of drugs and procedures encountered reflects the guidelines recommended by SUS.

It is important to highlight that, due to their specific indication and necessity of closer vigilance, most of the drugs utilized in the treatment of psoriasis - immunosuppressants and biologics - are dispensed via the Specialized Component of Pharmaceutical Assistance (CEAF - Componente Especializado da Assistência Farmacêutica) by the Regional Health Pharmacies, that are not available in all cities, thus concentrated in bigger centers (Ministério da Saúde 2022d). However, since Paraná is divided into 22 Health Regions, the drug dispensation occurs in the closest city of the municipality of the patient (Secretaria da Saúde do Paraná 2023).

Concerning cutaneous mycoses, we found a low number compared to psoriasis and psoriatic arthritis. Since cutaneous mycoses do not usually cause hospitalizations or are fatal, SIA is the best SIS to assess them. Even so, we did not find specific records for diagnosis or treatment of mycoses, and most procedures referred to medical appointments and surgical pathological examination, which are general codes used for several diseases, including differential diagnosis (Ministério da Saúde 2022e). The identification of data about mycoses in SUS is a challenge because fungal infections are not of

compulsory notification in Brazil (Ministério da Saúde 2022f) and, therefore, are not registered in SINAN (Sistema de Informação de Agravos de Notificação - Notifiable Diseases Information System) (Ministério da Saúde 2022g), which contains most infectious diseases.

The prevalence of procedures was 0.004%. According to extensive research carried out, this is the first study that compares cases of cutaneous mycoses with the general population in the state, so there is no equivalent information in the literature. However, a regional study has reported a prevalence of 58.76% among patients suspected of onychomycosis (Souza et al. 2007).

In this study, we reported that 65% of the patients were female. We believe that this was influenced by the considerable number of procedures under the code of vulvovaginal candidiasis (15.77%), which covers only females. It is estimated that 70-75% of women will experience an episode of vulvovaginal candidiasis in their lifetimes - most frequently young women of childbearing age (Sobel 2007) - which was also observed in our study. Onychomycosis was more frequent in women (Table III), diverging from the literature in general, which states that men are more frequently affected (Ameen et al. 2014). However, a study in Maringá- PR also found a higher prevalence of onychomycosis in women (Souza et al. 2007), which may suggest a different profile in this region.

An interesting variable of this study is the age distribution of patients with the different mycoses analyzed. We observed that many mycoses were more frequent in children, while onychomycosis and tinea pedis happened more often in the age group above 50 years. Some mycoses showed peaks in two different age groups (Table III). Onychomycosis occurs more frequently at advanced ages (Gupta et al. 2017). The age itself, nail trauma, and other factors like diabetes or conditions that lead to poor

Table IV. Procedures registered under ICD codes B35 and B37 in Paraná (2016-2000).

Procedure	n (%)
Medical appointment	859 (48.92)
Surgical pathology exam/biopsy	592 (33.71)
Ultrasound scan	88 (5.01)
Medical triage	81 (4.61)
Hepatitis C antibody (anti-HCV) test	19 (1.08)
Other*	117 (6.66)
Total	1756 (100.00)

* Procedures with a frequency under 1% were grouped in the "Other" category.

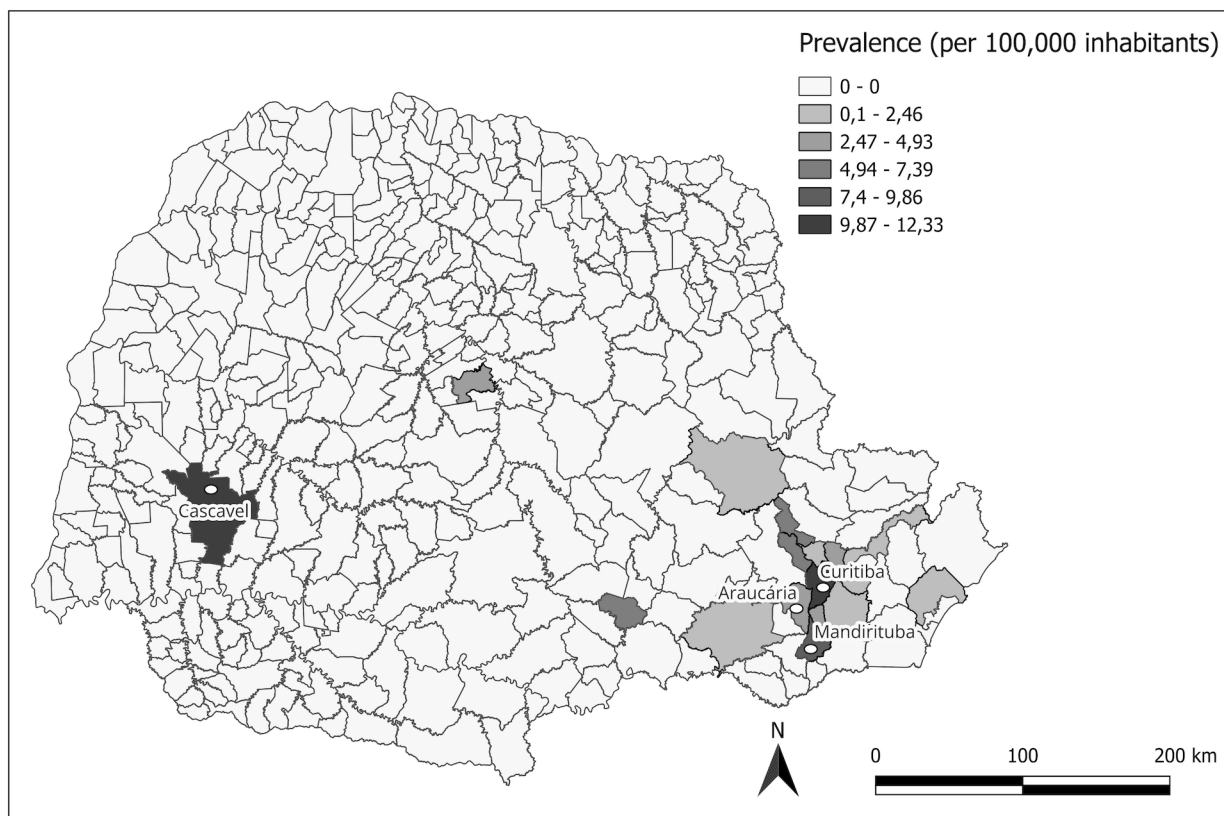


Figure 3. Prevalence of procedures regarding cutaneous mycoses in Paraná (per 100,000 inhabitants).

peripheral circulation are predisposing factors for the development of this mycosis (Sharma & Nonzom 2021). Tinea capitis has been observed to be predominant in children (prepubescent) (Sharma & Nonzom 2021). In our study, the population aged 0-9 years had the highest frequency. We also observed a large number of records related to cutaneous *Candida* infections in children, especially infants. In this age group, it is common to develop oral candidiasis, also called neonatal thrush (Baley 1991); diaper candidiasis - candidiasis in the diaper region that often extends into the folds of the skin in the diaper area (Pogačar et al. 2018) - and chronic paronychia of the fingernails, which generally occurs in children due to thumb sucking (Ameen et al. 2014).

Interestingly, we observed that the age distribution of patients with onychomycosis and

tinea pedis was similar to psoriasis. Studies have discussed the possible relationships between these diseases (Klaassen et al. 2014, Rodríguez-Cerdeira et al. 2021), which may or not occur concomitantly, and often present very similar clinical manifestations, harming the differential diagnosis. Onychomycosis and nail psoriasis are an example of this (Schons et al. 2014). We hypothesize that the similar demographic characteristics observed between these diseases are another potential confounding factor in diagnosis, hence statistical and geospatial analysis is required.

This cross-sectional and retrospective study has some limitations. First, the data source is secondary, presenting the possibility of incorrect filling of fields and lack of filling of non-mandatory variables, a fact observed in the variable race/color in psoriasis and

psoriatic arthritis. Second, data regarding mycoses might be underestimated, even using SIA, considering the possibility of mycoses being a secondary condition that was not registered, and because we did not find specific procedures related to cutaneous mycoses. We also could only evaluate drugs dispensed via SUS, which exclude the possibility of self-medication and buying the medicine directly from pharmacies, common practices for diseases with mild symptoms. Finally, the SIA data is based on the procedure performed, not the patient; thus, data may repeat according to the number of procedures related to a patient. However, we believe that the large amount of data analyzed minimizes these limitations and, by providing an unprecedented panorama of the procedures related to these diseases, allows an estimative of their distribution in the state.

CONCLUSION

This study includes epidemiological data of populations affected by psoriasis, psoriatic arthritis, and cutaneous mycoses in the state of Paraná. SIA has proven to be a valid data source for studying outpatient diseases. For psoriasis/psoriatic arthritis, the distributions regarding sex and age are similar to those reported in the literature. Considering cutaneous mycoses, the patients' age varied according to the type of mycosis and the procedures were not specific for these diseases. The profile of populations with onychomycosis and tinea pedis was similar to that with psoriasis. For both psoriasis/psoriatic arthritis and mycoses the estimated prevalence was low. We believe that the findings of the study allow a relevant contribution to science and public policy in Brazil.

Acknowledgments

This study was supported by Coordenação de Aperfeiçoamento de Nível Superior (CAPES), Brazil - Finance Code 001; and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Brazil - grant number 307777/2023-5.

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How to cite

DINIZ BV, FERREIRA SB & NEGRI M. 2024. Prevalence of psoriasis and cutaneous mycoses: A descriptive study in Paran , Brazil. *An Acad Bras Cienc* 96: e20230828. DOI 10.590/0001-3765202420230828.

*Manuscript received on July 25, 2023;
accepted for publication on March 17, 2024*

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