Prevalence and heritability of psoriasis and benign migratory glossitis in one Brazilian population*

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Abstract: Background: An oral condition associated to psoriasis is benign migratory glossitis. The review of the literature does not show any publication about heritability in both psoriasis and benign migratory glossitis and prevalence of psoriasis in the Brazilian population.
Objective: This research was carried out in order to determine the prevalence of psoriasis and benign migratory glossitis in the Brazilian population from a Brazilian sample, as well as the heritability in these conditions.
Methods: Six thousand patients were studied from the records of the outpatient dermatology department. The sample had 129 patients with cutaneous psoriasis, 399 with benign migratory glossitis without psoriasis and a control group with 5,472 patients. After data collection, the statistical analysis was made using Woolf, Chi-square and Falconer tests.
Results: The prevalence of psoriasis was 2.15% and the benign migratory glossitis was 7.0%. The prevalence of benign migratory glossitis in the psoriasis group was high (16.3%), and that was statistically significant. Family history in the psoriasis group was 38% for the condition itself and 2,75% for benign migratory glossitis and in the benign migratory glossitis group was 17.54% for the condition itself and 1.5% for psoriasis. The study of heritability was 38.8% for psoriasis and 36.6% for benign migratory glossitis, both with medium heritability.
Study limitations: This study was only in the state of São Paulo.
Conclusion: This is the first publication that quantifies how much of these conditions have a genetic background and how important the environmental factors are in triggering them.
Keywords: Genetics; Glossitis, benign migratory; Psoriasis; Prevalence

INTRODUCTION

Psoriasis (PS) is a chronic cutaneous disease with genetic and immunological basis triggered by environmental factors.[1-3] Clinically, the lesions present as erythematous papules and plaques, covered by white scales. The lesions are frequently symmetric and show predilection for the scalp, nails, posterior region of the elbows and anterior region of the knees. The disease can be localized or generalized, affecting almost all the skin. PS has unpredictable course, with spontaneous improvement or exacerbation of the lesions.[3,4]

An oral condition associated to PS is benign migratory glossitis (BMG).[5-7] Also termed geographic tongue, BMG is characterised by irregular areas of loss of filiform papillae, surrounded by white margins with subtle elevation. As a characteristic, these areas vary widely in appearance, size, number, location, due to the healing of one edge and proliferation of another; they frequently disappear, recur and coalesce in variable proportions, so that the lesions appear to migrate.[8,9] The increased prevalence of BMG among

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psoriatic patients and similar microscopic characteristics, support the idea that PS and BMG are associated conditions.[10-12] This association was reinforced by the determination of a genetic marker, the antigen HLA-Cw6, common for both PS and BMG, suggesting that these conditions could share the same genetic basis.[5] Nevertheless, clinical expression led us to question the differences of biological and environmental factors.

Regarding the genetic determinants, the fact that HLA-Cw6 is not the only factor, as both PS and BMG have been classified as polygenic diseases, must be considered. In PS, the involvement of major loci in chromosomes 6p, 17q, 4q, 2p, 8q e 20p was determined.[13-15] In BMG, the investigation was performed only in locus 6p.[5] Accumulated evidence indicates that PS is a multifactorial disorder caused by the concerted action of multiple disease genes in a single individual, triggered by environmental factors. Some of these genes control the severity of multiple diseases by regulating inflammatory processes and immunity (severity genes); whereas others are unique to PS. Various combinations of these genes can occur even within a single family, being largely responsible for many manifestations of PS. Many unaffected individuals carry one or more disease alleles, but lack other genetic and/or environmental factors necessary to develop the disease.[16]

BMG, disease associated to PS, is also a multifactorial disease.[17] Considering that environmental factors may be important in the expression of the disease, the study of heritability might determine how much the phenotype variability of these diseases is due to the genotype or to the environment. Falconer's test could be used to answer these questions.[18] To apply this test, the prevalence of the disease in the studied population must be used. The review of literature did not show any publication about heritability in both PS and BMG, nor studies of the prevalence of PS in the Brazilian population. The aim of this study was to determine the prevalence of PS and BMG in a population of the State of **São Paulo**, Brazil, and the heritability of these conditions.

METHODS

The study included 6.000 dermatology patients from the São Paulo Outpatient Clinic of Dermatology between 2004 and 2008. The retrospective data were collected from the patient's records at the Outpatient Clinic. All patients were submitted to an oral mucosa and skin examination by an experienced examiner in Stomatology and Dermatology using artificial light, gloves, and a tongue depressor for evaluation of oral soft tissues. The sample consisted of 129 patients with cutaneous PS and 5,871 individuals with other dermatological conditions, considered the control group (CG). The patients with cutaneous PS presented BMG simultaneously or not. The CG consisted of patients with superficial mycoses by dermatophytes (780; 14%), dyschromia (662; 12%), eczematous diseases (595; 10.8%), inflammatory skin diseases (585; 10.6%), erythemato-squamous diseases, psoriasis excluded (515; 9%), pityriasis versicolor (325; 6%), benign skin tumors (300; 5%), alopecias (270; 4.9%), scabies (247; 4%), pruritic papular eruptions (210; 3.8%), cutaneous viral diseases (155; 2.8%), prurigo (80; 1.4%), genodermatoses (61; 1.1%), mucocutaneous candidiasis (40; 0.7%), drug eruptions (40; 0.7%) and other diseases (607; 11%). The test results were recorded regardless of age, gender or ethnic group. The association of PS and BMG, family history and heritability of all first-degree members were studied. The project was approved by the ethics and research committee and an informed consent form was signed by each subject. In the statistical analysis, categorical variables are reported as proportions and numeric variables as mean, standard deviation, minimum, and maximum values. The association of PS and BMG was studied comparing to the control group, using the Chi-square and Woolf's tests. A p value <0.05 was considered statistically significant. For heritability, the Falconer's test was used.

RESULTS

The prevalence of PS (n = 129) among the studied population was of 2.1% and BMG (n = 420) was 7.0%. The PS group included 66 (51%) men and 120 (93%) Caucasians with an average age of 34.4 years, ranging from 2 to 80 years old. The BMG group included 216 (54%) women and 345 (86%) Caucasians with an average age of 30.3 years, ranging from 1 to 90 years old. The CG group included 3,119 (57%) women and 4,799 (88%) Caucasians at an average age of 28.5 years, ranging from 1 to 92 years old (Table 1). The incidence of BMG in the PS group was 16.3%, statistically higher than the control group (6.8%), as shown in table 2. Regarding family history, the PS group presented 38% for this disease and 9.3% for BMG. Thus, the BMG group showed positive family history for this condition in 27.3% and for PS in 2.7%. The estimation of heritability was 38.8% for PS and 36.6% for BMG, both with medium heritability, taken from table 3.

DISCUSSION

The incidence of PS was 2.15%, presenting a similar frequency reported in studies performed in other countries.[1,19] This data represents the first epidemiologic study of the prevalence of PS in a Brazilian population, and this is the first study on the prevalence of BMG in a Brazilian population of dermatology patients. The frequency of BMG among dermatological conditions was 7.0% and is equivalent to the observed in literature, which varies from 1.14 to 6.8%.[20,21] However, the analysis of this association was

Table 1: Demographic characteristics according to the presence of psoriasis (PS), benign migratory glossitis (BMG), and control groups (CG)

Data	PS (n = 129)	BMG (n = 420)	CG (N=5.451)
GENDER	-	-	-
Women (%)	66 (51%)	216 (54%)	3.119 (57%)
Men (%)	63 (49%)	204 (46%)	2.332 (43%)
ETHNICITY	-	-	-
White (%)	120 (93%)	345 (86%)	4.799 (88%)
Non-white (%)	9 (7%)	75 (14%)	652 (12%)
AGE (mean ± SD, years)	34 ± 14	30 ± 19	28 ± 17

SD = Standard Deviation

Table 2: Sample distribution according to the presence of benign migratory glossitis (BMG) in psoriasis (PS) and control groups (CG)

BMG	PS	CG
	N (%)	N (%)
YES	21 (16.3)	399 (6.8)
NO	108 (83.7)	5.472 (93.2)
TOTAL	129 (100)	5.871 (100)

Risk limit (Y) Mean = -0.9986; Relative Risk (X) = 0.37; Reliability limit (95%): -1.467; standard deviation (sd) = 0.2394; $X^2(1)= 17.399$

Table 3: Heritability for psoriasis (PS) and benign migratory glossitis (BMG)

Disease	Heritability	A	N	q	P	x	a
PS	First-degree relatives	33	6.000	0.005	0.995	2.576	2.892
PS	Propositi	129	6.000	0.02	0.98	2.054	2.421
BMG	First-degree relatives	72	6.000	0.012	0.98	2.257	2.603
BMG	Propositi	399	6.000	0.07	0.93	1.476	1.918

Propositi: disease individuals; A: observed number of affected individuals in the sample; N: total number of individuals in the sample; q: incidence = A/N; p: 1-q ; "x" and "a" are parameters of the standardized normal distribution, corresponding to incidence q, and whose values were taken from the table in Appendix A from Falconer (1965).[17]

limited since no other BMG prevalence data in dermatology patients are available. The PS group presented an increased frequency of BMG (16.3%), statistically significant compared to the control group (Table 1). This frequency was higher than the ones found in other publications of oral evaluation in PS patients.[6,22] The increased frequency of BMG in patients with PS allowed several authors to imply that PS and BMG are associated conditions, and that was confirmed in the present research. Picciani *et al.* (2016) showed that BMG is frequent in psoriatic patients, presenting histopathological, immunohistochemical and genetic similarities with this disease.[23] However, some investigators do not agree, and the difficulty in accepting the diagnosis of BMG as oral psoriasis resides in the fact that some nonpsoriatic patients present BMG.[9,10] It is perfectly understandable that a subset of psoriasis patients might have exclusive oral lesions, a situation common to other diseases such mucosal lichen planus.[24] The presented data showed that the PS group had a family history for this disease in 38%, similar to what is found in the literature, ranging from 36% to 91%.[25] For BMG, positive family history was found in 9.3%. In the BMG group, 27.3% had positive family history for this condition and and 2.7% had family history of psoriasis (Table 3). Similar percentage was reported by Eidelman *et al.* (1976). These authors reported that collecting family history was an arduous task, often requiring more than one visit for the patient to bring appropriate data from the family, and where necessary, the patient's relatives were contacted.[26] A lack of thorough assessment may explain the lower rate of heritability found in the literature. Such family history from one condition to another had never been reported before. The estimation of heritability for the PS group indicated a medium heritability revealing that in this population, 38.8% of the determinant of phenotypic variability of PS is of genetic origin, and 61.2% due to environmental factors. In the BMG group, the estimation of heritability also indicated a medium heritability, revealing that 36.6% of the determinant of phenotypic variability of BMG is of genetic origin, and 63.4% due to environmental factors. Our study has some limitations because the sample was selected from only one region in Brazil. However, to minimize this limitation, we evaluated 6000 patients of different ethnicities.

CONCLUSION

This is the first publication on PS and BMG that quantifies the percentage of the genetic components in these two diseases and shows the importance of the environmental factors in their manifestation. This information may be very important for professionals for they may guide their practice with each patient. ❑

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