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PSORIASIS AREA AND SEVERITY INDEX (PASI) AND DERMATOLOGICAL LIFE QUALITY INDEX (DLQI) CORRELATION IN PATIENTS WITH CUTANEOUS PSORIASIS

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ABSTRACT

Psoriasis is a highly prevalent skin disease in several populations worldwide. It is a genetic, immunologically based disease triggered by environmental factors. One way to assess the severity of the disease is using the PASI (Psoriasis Area and Severity Index) and the DLQI (Dermatological Life Quality Index). This instrument assesses the quality of life. The objective of this study was to evaluate the PASI and DLQI of patients with cutaneous psoriasis and to evaluate the association of these indicators to determine how the severity of the disease influences their quality of life and vice versa. A retrospective, cross-sectional study was carried out by consulting the medical records of 944 patients treated at the Dermatology outpatient clinic of the Beneficent Association of the University Hospital of Marília, São Paulo, during the year 2010. Of these, 56 patients with psoriasis who underwent PASI and DLQI were selected for the study. Of these, 40 patients provided complete data for the evaluation, thus constituting the study sample (14 men and 26 women, mean age of 41.5 years). Thus, 40 questionnaires were obtained in the first consultation (zero study time), 21 in the second consultation, and 13 in the third consultation. A correlation was observed between the applied questionnaire and the clinical index revealed through Spearman's correlation coefficients. It was found that the association of PASI with the DLQI questionnaire in patients with cutaneous psoriasis is of remarkable importance to conducting the patient's treatment since the DLQI presents the impact of the disease on the patient's life in association with the involvement and the severity of psoriasis. As such, this instrument is highly indicated in the treatment of patients with psoriasis.

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INTRODUCTION

Psoriasis is a chronic skin disease with a genetic and immunological basis, triggered by environmental factors and may often develop in early life. It is extremely frequent (1 to 3% of the worldwide population) and important in clinical practice and is characterized by

epidermal hyperplasia, hyperkeratosis, infiltration of immune cells, and vascular remodeling. Diagnosis is centered on the typical erythematous, scaly lesions in the skin and other manifestations observed in the nails and joints (Gonzaga, Jorge, Tomimori, Barbosa, 2010; He et al., 2022; Peris et al., 2022; Rousset & Halioua, 2018; Jorge et al, 2017; Weigle & McBane, 2013).

The appearance of psoriasis begins around 25 and 30 years but in 75%, before 40 years. The injuries include augmented lymphocytes infiltration, are triggered by trauma, medications, or stress, and are associated with the production of inflammatory cytokines such as interleukin (IL)-17, IL-23, and Tumor Necrosis Factor-alpha (TNF- α) (Chen, Song, Wang, Zhu, & Li, 2022; López-Mejía, Rames-Montes, Ley-Silva, Romero-Sansalvador, & Gutiérrez-Gabriel, 2022; Megna, Potestio, Camela, Fabbrocini, & Ruggiero, 2022). In the genetic aspects of psoriasis, the HLA complex plays a role (Gonzaga *et al.*, 1998). Gonzaga *et al.* (Gonzaga, Torres, Alchorne, & Gerbase-Delima, 1996) set out to determine the frequencies of HLA antigens in Brazilian psoriatic patients and in people with geographic tongue. The authors found an association Cw6 with geographic tongue and psoriasis. The high genetic predisposition, especially in first- and second-degree relatives, is seen in psoriasis, and the condition can be designated as mild, moderate, or severe. The severity of the condition is closely related to the decrease in quality of life and depression and anxiety. Almost 80% of patients with psoriasis present negative effects on quality of life, anxiety disorders, and depression. Nearly 60% of the patients suffer from familiar dysfunction. This disease can also be related to many other comorbidities, including metabolic syndrome, cardiovascular disease, obesity, and lymphoma (Fortune *et al.*, 2022; Ion, Dorobanțu, Popa, Mihai, & Orzan, 2022; Mejía-Jiménez *et al.*, 2019; Trovato, Rubegni, & Prignano, 2022). Both psoriasis and geographic tongue have often been associated with psychosomatic illnesses (Gonzaga & Consolaro, 1992; Gonzaga *et al.*, 2015). Gonzaga *et al.* (Gonzaga *et al.*, 2015) evaluated the association of alcohol, tobacco, and stress in 129 psoriatic patients, 399 patients with geographic tongue and 5472 healthy subjects. The authors demonstrated high alcohol consumption in psoriatic patients and a strong relationship between psoriasis and geographic tongue and emotional stress. Concluding that the interactions between environmental factors and psoriasis are different from the interactions that occur with geographic tongue; suggesting that these diversities between interactions may be responsible for different types of manifestations of the same disease.

Dermatology Life Quality Index (DLQI) and Psoriasis Area and Severity Index (PASI) scores are used to assess the overall severity of pathology. Both scores were developed by American researchers and validated for the Portuguese language for use in Brazil (Dogra, Singh, Kumar, Narang, & Handa, 2022; Jo, Kim, & Lee, 2022; Martins, Arruda, & Mugnaini, 2004). The DLQI is a self-applicable questionnaire made up of ten questions, each with four possible answers, each receiving a score from 0 to 3 (none: 0, a few: 1, many: 2, very many: 3). This questionnaire assesses symptoms and feelings (items 1 and 2), daily activities (3 and 4), leisure activities, sports practices (5 and 6), work and school (7), relationships between people (8 and 9), and treatment (10), or that results, at the end of the questionnaire, in a score that can vary from 0 to 30. It can be grouped according to the impact on quality of life (0-1: nothing, 2-5: little, 6-10: moderate, 11-20: severe, and 21-30: much severe) (Dogra *et al.*, 2022; Pinter *et al.*, 2022; Reich & Griffiths, 2008). Clinical information on the extent of the disease is obtained through the Psoriasis Area and Severity Index (PASI) during the consultation with a medical professional to obtain an objective impression of the patient's disease state. It brings together clinical variables of major importance in psoriasis (affected area, erythema, infiltration, and scaling) that are evaluated according to the region in which they are found (head, trunk, upper limbs, or lower limbs). The area is assessed according to the percentage of the affected body area, transformed into a score from 0 (0% of the affected area) to 6 (90 to 100% of the affected area). The erythema, infiltration, and desquamation are evaluated according to the severity of these items, on a score of 0 to 4 according to whether the item is absent (0), mild severity is present (1), moderate (2), severe (3) or very serious (4), resulting in an index that can vary from 0 to 72 (Arruda, Ypiranga, & Martins, 2004; Jo *et al.*, 2022; Torres, Silva, Magalhães, Morcillo, & Velho, 2011a; Wu *et al.*, 2022). Considering the importance of the patient's quality of life for the remission and exacerbation of pain and that this can be influenced directly and inversely by the index and gravity of the

disease, this study aimed to study the DLQI and PASI correlation in patients with cutaneous psoriasis.

METHODS

Patients: The medical records of 944 patients treated at the Dermatology outpatient clinic of the Associação Beneficente do Hospital Universitário de Marília, São Paulo were consulted in 2010. These patients spontaneously sought this Service for dermatological care, and during the clinical consultation, patients with psoriasis cutaneous were submitted to the PASI and the DLQI, instruments that, as of 2010, are routinely applied, as they are decisive in the indication and evaluation of the introduction of systemic drugs. Patients with psoriasis undergoing PASI and DLQI were selected to constitute the study sample. We chose to analyze patients seen in 2010 to exclude factors that could be involved in the COVID19 pandemic. The Authorized Consent form was not requested from the patient, as the survey was carried out through the consultations already performed, but the confidentiality of the identification of the patients was maintained. The Ethics Committee approved this study at the University of Marília under protocol number 2007/397. Fifty-six patients were selected for the study, among which 40 provided complete data for the evaluation. Initially, the patients underwent a medical evaluation, during which the PASI was obtained, and then, at the end of the consultation, the DLQI was then applied. Since these instruments assess the severity and impact of the disease on the patient, they were then applied again at each new dermatological medical appointment.

Dermatological evaluation: The integumentary examination performed in this Service is standardized, following the criteria of Sampaio & Rivitti (2007). The description of the dermatological physical examination was recorded in a form prepared for this purpose, whose model can be found in Annex 1 of this project.

Oral examination: The oral examination performed was standardized by Gonzaga *et al.* (2018) and include observation of perioral structures; mouth opening; inspection of the lips, cheeks, gums, hard palate, soft palate, uvula and tonsil region, in addition to the tongue (back, belly, posterior third and lateral portions) and mouth floor; and inspection of dental structures, especially regarding their degree of preservation and hygiene.

PASI: The term PASI emerged in 1978 from the Psoriasis Area Severity Index. It is an instrument for evaluating psoriasis in terms of the area and severity of the dermatological condition. In PASI, psoriatic plaques are analyzed according to three criteria: (E) Erythema, (I) Infiltration, (D) Desquamation. Severity is given for each item using an ordinal scale of intensity from 0 to 4, where 0 for non-involvement and 4 for severe involvement. In this scale, the body is divided into four regions: (H) Head, (UL) Upper Limbs, (T) Trunk, and (LL) Lower Limbs. In each area, the fraction of the affected body surface is ordinally graded from 0 to 6, where 0 is equivalent to no involvement and 6 to involvement above 90%. The various regions of the body are weighted to represent their respective proportions of body surface area. In this way, the affected area and the characteristics of the lesions are analyzed using a formula that results in a score ranging from 0 to 72 points. This instrument allows to objectively estimate the extent and severity of psoriasis, aiming to monitor the outcome of treatment for better patient care and, emphasizing the practice of evidence-based medicine, to carry out standardized comparisons of efficacy between clinical trials (Nast & Schmitt, 2013).

DLQI: DLQI includes the following categories: symptoms and feelings (1 and 2); daily activities (3 and 4); leisure (5 and 6), work/school (7); interpersonal relationships (8 and 9), and treatment (10). The answers generate scores ranging from 0 to 3: 0 = nothing; 1 = a little; 2 = very; and very much = 3. The simple sum makes the final calculation of these scores, which will be grouped according to the impact on Quality of Life (0-1: nothing, 2-5: little, 6- 10:

moderate, 11-20: a lot and 21- 30: very much). Thus, higher rates reveal worse disease-related quality of life (Taborda, Weber, Teixeira, Lisboa, & Welter, 2010). The results for PASI and DLQI were evaluated using Spearman Test.

RESULTS

Of the fifty-six patients, 40 provided complete data for the evaluation: in the first consultation (zero study time), 40 questionnaires were obtained. Upon return, second consultation (study time 1), 21 questionnaires were obtained, and 13 questionnaires at time 2 (third visit). Among the patients studied, 14 were males and 26 females; 30 were white, 1 yellow and 9 black.

This was expected since it is a grading instrument capable of evaluating psoriasis in terms of its area and severity associated with a questionnaire that reflects the impact of the disease on the quality of life (QoL). This analysis can also be identified in other studies that evaluated the association of these instruments. Torres *et al.* (Torres *et al.*, 2011a) presented a correlation between QoL and the clinical index, showing that clinical improvements reflect the improvement in the impact of the disease on QoL, as well as the opposite. In the final result of this work, there was a significant improvement in the scores of patients who returned to the consultation, an index revealed from the analysis of the averages presented from the 1st to the 2nd consultation. Thus, it is a strong indication that the treatment is effective. A marked improvement is identified in the first return visit (2nd consultation), which is possibly explained by the impact of the

Table 1. Distribution of PASI and DLQI values

Pacient	PASI (consultation 1)	DLQI	PASI (consultation 2)	DLQI	PASI (consultation 3)	DLQI
		(consultation 1)		(consultation 2)		(consultation 3)
3	12.3	0	6.8	0	6.5	0
4	3.3	2	4.6	9		
5	2.6	3	3.9	8	6.7	3
6	2.8	2	3.2	3		
7	1.2	1				
8	4.7	24	3.1	20		
12	0.8	1				
13	6.3	2	5.7	1	3.4	3
14	13.5	23				
16	0.5	5	0.4	3	0.4	4
17	6.6	2	2.5	1	2.1	0
18	4.6	7	1.6	4	1.7	0
19	1.9	0	1.3	1		
20	3.7	2				
21	1.8	0				
23	4.4	3				
24	2	10	2.4	7	2.2	3
25	4.7	3				
26	0.7	2	1.2	2	0.2	1
27	4.1	0				
29	0.4	1	0	1	0.2	0
30	1.4	6	0.2	0	0.6	0
31	5.7	14	2.9	1	3.1	3
33	0.6	0				
34	0.6	0	0.2	0	0.4	1
35	3.3	1	4.1	9		
37	3.1	3				
40	0.8	5				
41	3.4	21				
44	2	0				
45	4.6	4				
46	0.5	4	0.4	0		
47	2.4	3				
48	1.8	12				
49	3.9	4	2.7	5		
50	4	5	0.9	2		
51	1.9	7	1.4	3	0.9	3
52	1.4	1				
53	1.4	1				
54	2.5	17				

Table 2. Spearman's Correlation Coefficient for PASI and DLQI

Consultation	Correlation Coefficient	P (95% confidence interval)
n = 40 (consultation 1)	0.2719	-0.0528 to 0.5446
n = 21 (consultation 2)	0.4310	-0.01463 to 0.7338
n = 13 (consultation 2)	0.1842	-0.4235 to 0.6776

The ages ranged from 10 to 74 years, with a mean age of 41.5. The distributions of DLQI and PASI values are shown in table 1, in which the averages of PASI and DLQI of the first, second, and third consultation were obtained, being 3.205 and 5.025; 2.357 and 3.809; 2.184 and 1.615 respectively. It was observed that there was a correlation between the values of PASI and DLQI, which are presented through Spearman's correlation coefficients in table 2.

DISCUSSION

Through the analysis performed by the Spearman correlation test, it is noted that the measurements obtained by the PASI and DLQI are strongly correlated.

beginning of treatment in association with the psychological factor that this entails. This data agrees with other studies that emphasize the psychosocial impact of dermatosis, referring to situations of discrimination or other stigmatizing experiences related to self-esteem problems, social isolation, and rejection (Schmid-Ott, Jaeger, Kuensebeck, Ott, & Lamprecht, 1996). Some authors also refer to the distance that occurs in relation to people with skin problems due to the association between skin disease and contagion or lack of care (Hoffmann, Zogbi, Fleck, & Müller, 2005). In the third consultation, the scores practically do not change when also evaluated from the average (being practically the same as in the second consultation), but when analyzing the cases individually, it is noticed that the worsening compensates the moderate improvement of some patients.

This fact can be explained by the end of the psychological effect that is achieved with the beginning of the treatment of the disease since the medications take some time to produce the impact that effectively reflects on the symptoms and stabilize or regress the lesions, which causes certain discouragement and proper adherence to the treatment. Torres *et al* (Torres, Silva, Magalhães, Morcillo, & Velho, 2011b) investigated DLQI in patients with psoriasis and also rated them using PASI at baseline and at follow-up visits. The authors found a correlation between the scores and the clinical index, demonstrating that clinical changes are reflected in QoL. The authors also found that clinical condition and quality of life was improved in most patients receiving care and that the QoL questionnaires were equivalent to evaluate the subjects. In a cross-sectional study, Silva *et al* (Silva, Fortes, Miot, & Marques, 2013) evaluated PASI and DLQI in patients without treatment or with a manifestation of clinical activity of psoriasis. The authors did not observe a correlation between the scores but observed a correlation between PASI and some items of the DLQI in patients with careers related to public contact suggesting that the disease more impacts some professions. According to Miller *et al* (Mueller *et al.*, 2020), PASI and DLQI are the two most important and largely used decision making tools in psoriasis. In their cross-sectional pilot study design, they aimed to investigate the association between these scores and global level of functioning, stress, itch, depression and anxiety. The authors used specific scores to evaluate each of these aspects normally found in psoriasis patients and the total scores of each of these scores were compared with PASI and DLQI (performing a linear regression analysis and the Pearson's correlation).

The conclusion of this study is that although PASI and DLQI scores are the most relevant scores to evaluate psoriasis at initial visits and follow up, they can not to capture some patient-centered issues and determinants of psoriasis treatment outcomes indicating that new tools are necessary to evaluate other psoriasis outcomes. Both PASI and DLQI are still used independently, as shown by recent studies. Lopez-MWJIA *et al* (López-Mejía *et al.*, 2022) performed an observational, cross-sectional study and evaluated patients with PASI, DLQI, and Beck Depression Inventory. When they compared the degree of depression and severity, the authors did not find a statistically significant difference ($p = 0.430$). No differences were also found when comparing the QoL evaluated by the degree of severity ($p = 0.008$). They concluded that the degree of severity of psoriasis is related to the patients' QoL, but not the degree of depression. Pinter *et al* (Pinter *et al.*, 2022) used PASI and DLQI scores to evaluate the effectiveness of IL-17A biologics and other approved biologics in patients with moderate-to-severe psoriasis. These scores helped the authors to observe the effectiveness of anti-IL-17A drugs in a real-world setting. In a prospective, single-blinded, randomized trial performed by Dogra *et al* (Dogra *et al.*, 2022), adult patients with severe psoriasis were separated into two groups, receiving different treatments (oral or subcutaneous methotrexate) and used PASI and DLQI at baseline and at the end of the treatment. The use of these scores allowed the conclusion that subcutaneous medication results in faster achievement of PASI90 and a higher decrease in DLQI compared to oral medication in patients' candidates for systemic therapy with a similar safety profile. The PASI was the tool of choice in this study used to quantify the severity and extent of psoriasis numerically. The correlation of these results, PASI and DLQI, remind us of the importance of broad and adequate research for diagnosing psoriasis and of the considerable psychosocial component that it can develop and that directly affects the success of the treatment.

CONCLUSION

The association of PASI with DLQI in patients with cutaneous psoriasis is of remarkable importance in conducting the treatment of the patient so that through the DLQI, it is possible to assess the impact that the disease triggers on the patient's QoL, a factor directly related to the involvement and severity of psoriasis. Thus, given the

observed equivalence of PASI and DLQI, this instrument is highly indicated in managing patients with psoriasis.

Conflict of Interests: The authors declare no conflict of interests related to this study.

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