



Original Article



Frequency and Association of Distal Interphalangeal Joint Enthesitis with Nail Psoriasis in Patients with Psoriasis and Psoriatic Arthritis Presenting at a Tertiary Care Hospital in Karachi

Ekta¹, Humaira Talat¹, Pushp Mala¹, Faryal Naimat¹ and Areeba Rais¹¹Department of Dermatology, Dow University of Health Sciences, Karachi, Pakistan

ARTICLE INFO

Keywords:

Arthritis, Psoriatic, Distal Interphalangeal Joint, Entheses, Nails, Psoriasis, Ultrasonography

How to Cite:

Ekta, ., Talat, H., Mala, P., Naimat, F., & Rais, A. (2026). Frequency and Association of Distal Interphalangeal Joint Enthesitis with Nail Psoriasis in Patients with Psoriasis and Psoriatic Arthritis Presenting at a Tertiary Care Hospital in Karachi: Distal Interphalangeal Joint Enthesitis with Nail Psoriasis with Psoriasis and Psoriatic Arthritis. *Pakistan - Journal of Health Sciences*, 7(7), 117-122. <https://doi.org/10.54393/pjhs.v7i7.3907>

*Corresponding Author:

Ekta

Department of Dermatology, Dow University of Health Sciences, Karachi, Pakistan
ektalund.el@gmail.comReceived Date: 29th January, 20261st Revision Received: 6th March, 20262nd Revision Received: 25th March, 20263rd Revision Received: 27th April, 2026Acceptance Date: 4th May, 2026Published Date: 31st July, 2026

ABSTRACT

Psoriasis is an autoimmune inflammatory disease that has a chronic disease or chronic illness nature, and that is commonly presented in the form of psoriatic arthritis. **Objectives:** To estimate the frequency and association of DIP joint enthesitis with nail psoriasis in patients with psoriasis and psoriatic arthritis presenting at a tertiary care hospital in Karachi. **Methods:** This cross-sectional analytical study was conducted in the Department of Dermatology and Rheumatology, Civil Hospital Karachi, six months following the ethical consent. The enrolment was done through non-probability consecutive sampling among 96 patients aged 18-65 years old with or without psoriatic arthritis, having psoriasis. This data was analyzed in SPSS version 27.0, and the correlation between nail psoriasis and DIP joint enthesitis was discovered with the assistance of chi-square or Fisher's exact test, and a p-value under 0.005 was considered to be statistically significant. **Results:** Nail psoriasis was found in 64.6% of the patients, and ultrasound-verified DIP joint enthesitis was observed in 37.5% of the 96 patients in this cohort. A statistically significant association was found between nail psoriasis and DIP enthesitis confirmed with ultrasound ($p=0.003$). Moreover, the multivariate logistic regression analysis showed that nail psoriasis was independently related to DIP joint enthesitis following the adjustment of age, sex, psoriasis duration, and occurrence of psoriatic arthritis (adjusted OR 3.52; 95% CI 1.289.67; $p=0.014$). **Conclusion:** Nail psoriasis has a strong correlation with distal interphalangeal joint enthesitis in patients with psoriasis and psoriatic arthritis.

INTRODUCTION

Psoriasis is a long-term immune-mediated inflammatory disease, which mostly attacks the skin but often nails and the musculoskeletal system. Pitting, onycholysis, and subungual hyperkeratosis are typical nail changes that could indicate inflammation of the structures most proximate to the distal interphalangeal joint, including nail apparatus and enthesitis of the extensor tendon [1]. According to recent findings, the nail involvement is often correlated with higher disease activity and functional burden in patients with psoriatic arthritis, which suggests

that the nail unit could be a valuable clinical predictor of musculoskeletal disease involvement [2]. This engagement has been further investigated by imaging in order to identify structural and vascular changes in the nail unit and adjacent entheses using high-resolution ultrasonography. Ultrasonographic parameters such as nail plate thickness, nail bed change, and power Doppler signal have been utilized to describe inflammatory variation in patients with psoriasis and psoriatic arthritis, but it has not been easy to differentiate between the two



disorders using solely nail image [3]. Studies have found that nail changes were more prevalent in patients who have concomitant joint disease than those without arthritis [4]. Additionally, international rheumatology standard practices state that nail and distal interphalangeal joint clinical and imaging features can be early indicators of psoriatic arthritis and that these structures require careful consideration in psoriatic arthritis-affected patients [5]. Nail involvement has also been suggested as a possible risk predictor of musculoskeletal manifestation in psoriasis by predictive modeling and observational analyses, but such observations are mostly extrapolated on cross-sectional or observational data that do not determine temporal relationships [6]. On the same note, epidemiologic studies of various groups of patients have demonstrated the presence of relationships between nail disease and various psoriatic arthritis in different populations and within different study designs, with varying strengths and reliability [7]. Dermatologic and dermoscopic studies also indicate that the severity of nail disease can be largely dependent on overall psoriasis in general and serve as support to the notion that nail pathology is a reflection of underlying inflammatory process as opposed to being a predictor of joint involvement on its own [8]. More recently, imaging modalities such as optical coherence tomography and high-frequency ultrasound have been used to assess structural changes in the psoriatic nail unit, enhancing the capacity to detect subclinical alterations that would otherwise be undetected on routine clinical examination [9]. Regardless of such technological advances, the clinical and diagnostic implications of nail and enthesitis abnormalities as detected by imaging are still unclear. The reviews on nail ultrasonography highlight that the existing evidence on nail ultrasonography and distal interphalangeal joint enthesitis has shown association, but most of the evidence available is cross-sectional and, as such, cannot show causation or progression to psoriatic arthritis [10]. The existing literature, therefore, mostly indicates the existence of associative relationships between nail psoriasis and distal interphalangeal joint enthesitis. Numerous investigations of this association have already been performed using ultrasound; most of these studies have been performed in European and other foreign populations, implying that the novelty of further studies is constrained unless they provide information on underrepresented populations or other clinical settings. Published information that assesses the relation between nail psoriasis and distal interphalangeal joint enthesitis is limited in areas like South Asia, and especially in Pakistan. Since it is cross-sectional, the research assessed the associations only at the time, and it cannot determine the relationship and predictive causality between nail psoriasis and distal interphalangeal joint enthesitis over time. Local

statistics can be used to describe patterns of disease manifestation unique to the population, as well as give comparative data to studies in other parts of the world. This study aimed to find the prevalence of distal interphalangeal joint enthesitis and its correlation with nail psoriasis in patients with psoriasis and psoriatic arthritis who went to a tertiary care hospital in Karachi. The research is expected to add regional epidemiologic information to the available international literature.

METHODS

This cross-sectional analytical research was carried out at the Department of Dermatology and Rheumatology, Civil Hospital Karachi, for six months between April 2025 and September 2025, with the approval of the Institutional Ethical Review Committee (Approval No. IRB-3721/DUHS/Approval/2024/101; dated 5th March 2025). The population under study was patients referred to the dermatology and rheumatology clinic outpatient and inpatient services, with a diagnosis of psoriasis and or psoriatic arthritis. A non-probability consecutive sampling technique was used to recruit eligible participants. The calculation of the required sample size was based on the formula of a prevalence study, where the prevalence enthesitis of the distal interphalangeal joint was assumed to be 50% in patients with nail psoriasis. This is a conservative estimate that was taken because of the variation that has been reported in past studies [11]. A 95% confidence level ($Z = 1.96$) and a margin of error of 10% were used, which gave a calculated sample size of 96 participants. Psoriatic arthritis diagnosis was done through clinical examination and meeting the Classification Criteria of Psoriatic Arthritis (CASPAR). The inclusion criteria were patients between the ages of 18 and 65 years old who had a confirmed diagnosis of psoriasis with or without psoriatic arthritis who signed written informed consent. Patients with other inflammatory rheumatologic diseases like rheumatoid arthritis or systemic lupus erythematosus, traumatic nail disorders, onychomycosis, or patients who had undergone biologic therapy in the past six months were ruled out. Any patient who was not willing to participate did not take part in the study. The participants received informed consent and were interviewed on the basis of a structured questionnaire to provide demographic and clinical data such as age, sex, disease duration, and treatment history. The same day, an assessment was carried out through clinical examinations. A dermatologist was used to assess nail psoriasis in terms of the Nail Psoriasis Severity Index (NAPSI). The involvement of the nails was considered a NAPSI score of more than zero. Physical examination of clinical enthesitis of the distal interphalangeal joint was determined according to tenderness or swelling at the

tendon of extensor insertion. Each of the participants was then subjected to high-frequency musculoskeletal ultrasound of the distal interphalangeal joint extensor tendon enthesis. Ultrasound analysis adhered to outlined musculoskeletal imaging measures and criteria along with the definitions of enthesitis in the Outcome Measures in Rheumatology (OMERACT) definitions. The detection of typical features that included hypoechogenicity at the tendon insertion, enthesophyte formation, or hyper-vascularity observed on power Doppler imaging, defined ultrasound-confirmed enthesitis. The radiologist who performed the ultrasound examination was blinded to the findings of the clinical nail assessment to minimize detection bias. Clinical enthesitis detected in physical examination was entered in different categories compared to ultrasound-detected enthesitis, and both of these two variables were analyzed independently. All ultrasound studies were carried out by one radiologist who was skilled in musculoskeletal imaging. To improve methodological rigor, a random sample of the scans (10 percent of examinations) was re-evaluated after two weeks in order to test intra-observer reliability, which was determined with the Cohen kappa coefficient. Presence or absence of psoriatic arthritis was also noted, and the patients with psoriasis alone and with psoriatic arthritis were compared individually and with mixed models to eliminate possible confounding. Possible confounding factors were age, sex, Psoriasis duration, psoriatic arthritis, and previous treatment.

Statistical Package of the Social Sciences (SPSS) version 27.0 was used to analyze the data. Continuous variables (age and disease duration) were used with the mean $\pm$ SD, and frequencies and percentages were used in order to show the categorical variables (sex, nail psoriasis, psoriatic arthritis status, and distal interphalangeal joint enthesitis). The chi-square test or Fisher's exact test, where necessary, was first used to determine the primary relationship between nail psoriasis and ultrasound-detected distal interphalangeal joint enthesitis. Multivariate logistic regression analysis was then done to consider the possible confounding factors. The correlation between nail psoriasis and distal interphalangeal joint enthesitis adjusted by age, sex, disease duration, and psoriatic arthritis was determined, and the adjusted odds ratios (ORs) and 95 percent confidence intervals (CIs) were obtained. Stratified analyses were done to determine whether the association varied based on age group, sex, disease duration, or presence of psoriatic arthritis. Post-stratification comparisons were taken with care since numerous subgroup analyses may lead to the possibility of type I error. The p-value of less than 0.05 was taken to be statistically significant.

RESULTS

A total of 96 patients with psoriasis, with or without psoriatic arthritis, were included in the final analysis. The demographic profile and baseline clinical characteristics are summarized. The mean age of participants was 38.7 ± 11.4 years, with a slight male predominance (54.2%) (Table 1).

Table 1: Demographic and Baseline Clinical Characteristics (n=96)

Variables	n (%) / Mean $\pm$ SD
Mean Age (Years)	38.7 $\pm$ 11.4
Male	52 (54.2%)
Female	44 (45.8%)
Mean Duration of Psoriasis (Years)	6.2 $\pm$ 3.8
History of Joint Pain	58 (60.4%)
Mean Duration of Joint Symptoms (Years)	3.4 $\pm$ 2.6
Positive Family History of Psoriasis/PsA	29 (30.2%)

Nail psoriasis was observed in 62 patients (64.6%). The findings demonstrate extensive erythematous plaques over the trunk and abdomen, consistent with chronic plaque psoriasis. The lesions appear well-demarcated with diffuse scaling, reflecting active cutaneous disease involvement (Figure 1).



Figure 1: Clinical Features of Plaque Psoriasis

The results illustrate typical nail psoriasis changes, including onycholysis, subungual hyperkeratosis, and dystrophic nail plate changes. (a) Fingernail showing onycholysis (arrowhead), characterized by separation of the nail plate from the nail bed. (b) Fingernail demonstrating subungual hyperkeratosis (arrow) with accumulation of keratotic debris beneath the nail plate. (c) Bilateral hand nails showing dystrophic nail plate changes (asterisk), including discoloration, thickening, surface irregularity, and nail deformity consistent with psoriatic nail involvement (Figure 2).



Figure 2: Nail Changes in Nail Psoriasis (a-c)

The most common nail changes were nail pitting (45.8%), followed by onycholysis (32.3%) and subungual hyperkeratosis (27.1%). The mean NAPS score among patients with nail involvement was 14.6 ± 6.9 (Table 2).

Table 2: Nail Examination Findings (n=96)

Nail Parameters	n (%) / Mean $\pm$ SD
Presence of Nail Psoriasis	62 (64.6%)
Nail Pitting	44 (45.8%)
Onycholysis	31 (32.3%)
Subungual Hyperkeratosis	26 (27.1%)
Nail Crumbling	18 (18.8%)
Mean NAPS Score	14.6 ± 6.9

A representative ultrasound image of the DIP joint demonstrating the region of the extensor tendon insertion evaluated for enthesitis is represented. (a) Clinical photograph showing swelling of the affected digit (arrow), (b) Clinical examination image demonstrating the site of tenderness over the involved distal interphalangeal region (arrowhead), (c) Ultrasound image showing features suggestive of enthesitis (asterisk), including thickening/hypo-echogenicity at the tendon insertion with surrounding inflammatory changes (Figure 3).

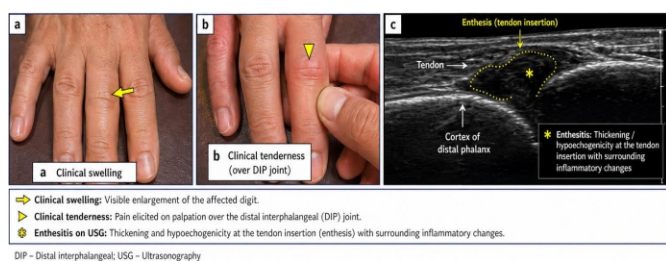


Figure 3: Ultrasound Features of DIP Joint Enthesitis Showing Clinical Tenderness, Clinical Swelling, and Enthesitis

Clinical tenderness was observed in 42.7%, and swelling in 30.2% of DIP joints, whereas ultrasound-confirmed enthesitis was detected in 37.5% of cases (Table 3).

Table 3: DIP Joint Clinical and Ultrasound Findings (n=96)

DIP Joint Findings	n (%)
Clinical Tenderness	41 (42.7%)
Clinical Swelling	29 (30.2%)
Ultrasound-Confirmed Enthesitis	36 (37.5%)

A statistically significant association was observed between nail psoriasis and ultrasound-confirmed DIP joint enthesitis ($p=0.003$, Chi-square test). Enthesitis was

present in 48.4% (30/62) of patients with nail psoriasis compared to 17.6% (6/34) without nail involvement (Table 4).

Table 4: Association Between Nail Psoriasis and DIP Enthesitis (n=96)

Nail Psoriasis	Enthesitis Present	Enthesitis Absent	Total	p-value
Present	30	32	62	0.003*
Absent	6	28	34	
Total	36	60	96	

Chi-square test; $p < 0.005$ considered statistically significant

On multivariable logistic regression analysis, nail psoriasis remained an independent predictor of ultrasound-confirmed DIP enthesitis (OR = 3.52, $p=0.014$). Additionally, the presence of psoriatic arthritis (OR = 2.41, $p=0.047$) and increasing NAPS score (OR = 1.08 per unit increase, $p=0.009$) were significantly associated with enthesitis. Age, sex, and duration of psoriasis were not statistically significant predictors. Correlation analysis demonstrated a statistically significant positive association between NAPS score and ultrasound-confirmed DIP joint enthesitis, indicating that greater nail disease severity increases the likelihood of enthesal involvement (Table 5).

Table 5: Multivariable Logistic Regression Analysis (n=96)

Variables	Adjusted OR	95% CI	p-value
Nail Psoriasis (Present vs Absent)	3.52	1.28 - 9.67	0.014
Age (Per Year Increase)	1.02	0.98 - 1.06	0.301
Male Sex vs Female	1.21	0.52 - 2.83	0.648
Duration of Psoriasis (Years)	1.07	0.96 - 1.19	0.214
Presence of Psoriatic Arthritis	2.41	1.01 - 5.74	0.047
NAPS Score (Per Unit Increase)	1.08	1.02 - 1.15	0.009

Adjusted for age, sex, duration of psoriasis, and psoriatic arthritis

DISCUSSION

A close anatomical and inflammatory relationship between the nail unit and DIP joint enthesitis has been proposed in previous studies. Elliott *et al.* noted that the nail disease was linked to systemic enthesal inflammation among patients with psoriatic arthritis and that nail pathology could indicate inflammation at other enthesal locations [12]. The current research results can be explained by this idea, where patients who had nail psoriasis exhibited a greater rate of ultrasound-detected DIP enthesitis than those whose nails were not involved. Ruscitti *et al.* compared nail and enthesitis involvement with high-frequency ultrasonography in patients with psoriatic disease and demonstrated a high correlation between nail abnormalities and enthesal inflammation [11]. The level of ultrasound-detected DIP enthesitis that was observed in the current study is widely consistent with those that have been demonstrated by imaging studies in the same context of cross-sectional research. Nail psoriasis is also explored

as another possible clinical manifestation of musculoskeletal involvement of psoriasis. Liu *et al.* provided a predictive nomogram to predict the risk of psoriatic arthritis among patients who had plaque psoriasis, and nail involvement was found to be a significant clinical factor that has a higher risk of musculoskeletal disease [13]. The positive correlation of nail psoriasis and ultrasound-confirmed DIP enthesitis in our study during multivariate analysis is consistent with these results. Epidemiological reports have indicated a great difference in the prevalence of psoriatic arthritis amongst patients with psoriasis in various regions. Kang *et al.* provided a worldwide epidemiological study, and they found that there were great regional disparities in the prevalence and burden of psoriatic arthritis [14]. The percentage of patients who experienced joint symptoms among the population of our study remains stable on average, with the trends provided in the epidemiological studies conducted around the world. Psoriatic arthritis is an uncommon, yet clinically important, inflammatory arthropathy related to psoriasis. Recent statistics have shown that psoriatic arthritis is present in about 112/100,000 adults in the world (0.11%). Geographically, there are significant differences in the prevalence, with the lower estimates in Asia (about 37–48 per 100,000) as opposed to Europe and North America. There is little Pakistani data on psoriatic arthritis, but regional studies on the topic in hospitals indicate that psoriatic arthritis is present in a significant percentage of psoriasis patients, with documented prevalence rates of about one-third of cases in the local community [15]. These epidemiological data reveal the need to assess musculoskeletal manifestations in patients with psoriasis, including enthesitis. Clinical rheumatology sources have also highlighted the relationship between nail psoriasis and the DIP joint pathology. The prognostic value of nail involvement in psoriatic arthritis and the relationship between nail matrix and the endosteum of the distal phalanx extensor tendon have been mentioned by Queiro *et al.* [16]. This anatomical and pathological correlation is in line with the much greater incidence of ultrasound-confirmed DIP enthesitis in patients with nail psoriasis in the current study. Even though the current study did not examine ultrasound nail imaging, the clinical nail examination, the mean NAPSI score of patients with nail psoriasis was found to be very high, which suggests a significant nail disease burden among this population group. [17]. Bonfiglioli *et al.* examined the place of ultrasonography in the diagnostics and the follow-up of peripheral psoriatic arthritis and highlighted the sensitivity of ultrasonography to detect early enthesitis inflammation [18]. In the current research, ultrasound-identified DIP enthesitis was observed in various patients that have failed to show cases of overt

clinical swelling. Nail psoriasis is known to be a typical manifestation of psoriatic disease as far as dermatology is concerned. According to Ji *et al.* nail involvement was a common clinical feature that could be a manifestation of underlying inflammatory activity in psoriasis [19]. The fact that nail psoriasis has a high prevalence in our cohort is in line with the dermatological literature, indicating nail involvement as a frequent occurrence of the disease. It was also reported that clinical studies have found that nail psoriasis can also exhibit several distinct morphological patterns. According to Canal-Garcia *et al.* nail pitting, onycholysis, and subungual hyperkeratosis are typical symptoms of nail psoriasis that occur due to inflammatory processes on the nail matrix and nail bed [20]. The patterns of nail findings in the current study, specifically nail pitting and onycholysis are similar to those earlier reported clinical patterns.

The study supports the claim that nail psoriasis is closely connected with the ultrasound identification of DIP joint enthesitis in psoriasis patients. The study has limitations such as a small sample size, a single-centre study, non-probability sampling, and a cross-sectional evaluation without a mechanistic evaluation. Multicenter longitudinal studies that involve the use of more sophisticated imaging and biomarkers are required to gain a deeper insight into the nail-enthesitis relationship and its clinical implications.

CONCLUSIONS

To summarize, this paper shows that nail psoriasis and enthesitis of the DIP joint have a strong association and that nail inspection and early screening of musculoskeletal ultrasound in psoriasis patients are very crucial. The timely diagnosis of psoriatic arthritis and subsequent good patient outcomes are achievable through early detection of enthesitis involvement.

Authors' Contribution

Conceptualization: E

Methodology: E, HT, PK, FN, AR

Formal analysis: E, FN

Writing and Drafting: E, HT, PM, AR

Review and Editing: E, HT, PM, FN, AR

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflict of Interest

All the authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

REFERENCES

- [1] Mease PJ, Liu M, Rebello S, McLean RR, Dube B, Glynn M et al. Association of Nail Psoriasis with Disease Activity Measures and Impact in Psoriatic Arthritis: Data from the Corrona Psoriatic Arthritis/Spondyloarthritis Registry. *The Journal of Rheumatology*. 2021 Apr; 48(4): 520-6. doi: 10.3899/jrheum.190923.
- [2] Tanaka AA, Werner B, Bragatto AC, Skare TL, Stadler B. Ultrasonographic and Power Doppler Parameters of Nails Fail to Differentiate Between Onychodystrophy in Patients with Psoriasis Vulgaris or Psoriatic Arthritis. *Advances in Rheumatology*. 2024 Apr; 64(1): 25. doi: 10.1186/s42358-024-00367-x.
- [3] Esposito M, Magnanini LM, Antonetti P, De Berardinis A, Pellegrini C, Vagnozzi E et al. Clinical and Ultrasonographic Assessment of Nail Psoriasis: A Comprehensive Study. *Dermatology Practical and Conceptual*. 2025 Jul; 15(3): 5318. doi: 10.5826/dpc.1503a5318.
- [4] Pala E, Melikoğlu M, Karaşahin Ö, Melikoğlu MA. The Frequency of Association of Nail Involvement and Psoriatic Arthritis in Psoriasis Patients. *The Eurasian Journal of Medicine*. 2023 Jun; 55(2): 158. doi: 10.5152/eurasianjmed.2023.53.
- [5] Zabotti A, De Marco G, Gossec L, Baraliakos X, Aletaha D, Iagnocco A et al. EULAR Points to Consider for the Definition of Clinical and Imaging Features Suspicious for Progression from Psoriasis to Psoriatic Arthritis. *Annals of the Rheumatic Diseases*. 2023 Sep; 82(9): 1162-70.
- [6] Peng YT, Yu RT, Chen AJ, Wen ZY, Xu J, Huang K et al. Predicting the Risk of Nail Involvement in Psoriasis Patients: Development and Assessment of a Predictive Nomogram. *Diagnostics*. 2023 Feb; 13(4): 633. doi: 10.3390/diagnostics13040633.
- [7] Loo WY, Tee YC, Han WH, Faheem NA, Yong SS, Kwan Z et al. Predictive Factors of Psoriatic Arthritis in a Diverse Population with Psoriasis. *Journal of International Medical Research*. 2024 Jan; 52(1): 03000605231221014. doi: 10.1177/03000605231221014.
- [8] Long F, Zhang Z, He F, Tu J, Yin Z, Xia J et al. Dermoscopic Features of Nail Psoriasis: Positive Correlation with the Severity of Psoriasis. *The Journal of Dermatology*. 2021 Jun; 48(6): 894-901. doi: 10.1111/1346-8138.15908.
- [9] Jiang P, Tan L, Mao Y, Zhou Q, Cui F, Wang P. Quantitative Analysis of Psoriatic Nail Disease Using Optical Coherence Tomography. *Scientific Reports*. 2025 Nov; 15(1): 40267. doi: 10.1038/s41598-025-24025-4.
- [10] Agache M, Popescu CC, Enache L, Dumitrescu BM, Codreanu C. Nail Ultrasound in Psoriasis and Psoriatic Arthritis—A Narrative Review. *Diagnostics*. 2023 Jun; 13(13): 2236. doi: 10.3390/diagnostics13132236.
- [11] Rusciotti P, Esposito M, Gianneramo C, Di Cola I, De Berardinis A, Martinese A et al. Nail and Enthesis Assessment in Patients with Psoriatic Disease by High Frequency Ultrasonography: Findings from a Single-Centre Cross-Sectional Study. *La Radiologia Medica*. 2022 Dec; 127(12): 1400-6. doi: 10.1007/s11554-022-01568-4.
- [12] Elliott A, Pendleton A, Wright G, Rooney M. The Relationship Between the Nail and Systemic Enthesitis in Psoriatic Arthritis. *Rheumatology Advances in Practice*. 2021; 5(3): rkab088. doi: 10.1093/rap/rkab088.
- [13] Liu P, Kuang Y, Ye L, Peng C, Chen W, Shen M et al. Predicting the Risk of Psoriatic Arthritis in Plaque Psoriasis Patients: Development and Assessment of a New Predictive Nomogram. *Frontiers in Immunology*. 2022 Jan; 12: 740968. doi: 10.3389/fimmu.2021.740968.
- [14] Kang Z, Zhang X, Du Y, Dai SM. Global and Regional Epidemiology of Psoriatic Arthritis in Patients with Psoriasis: A Comprehensive Systematic Analysis and Modelling Study. *Journal of Autoimmunity*. 2024 May; 145: 103202. doi: 10.1016/j.jaut.2024.103202.
- [15] Lembke S, Macfarlane GJ, Jones GT. The Worldwide Prevalence of Psoriatic Arthritis—A Systematic Review and Meta-Analysis. *Rheumatology*. 2024 Dec; 63(12): 3211-20. doi: 10.1093/rheumatology/keae198.
- [16] Queiro R, Alonso S, Pinto-Tasende JA. The Nail in Psoriatic Arthritis: New Insights into Prognosis and Treatment. *Expert Opinion on Biological Therapy*. 2024 Aug; 24(8): 715-7. doi: 10.1080/14712598.2024.2385020.
- [17] Mehl AC, Schmidt LM, Azevedo VF. Ultrasound Nail Assessment in Patients with Psoriatic Arthritis: Is There an Association of Findings with Clinical Scores? *Advances in Rheumatology*. 2024 Sep; 64(1): 75. doi: 10.1186/s42358-024-00398-4.
- [18] Bonfiglioli KR, Lopes FO, Figueiredo LQ, Ferrari LF, Guedes L. Ultrasonographic Insights into Peripheral Psoriatic Arthritis: Updates in Diagnosis and Monitoring. *Journal of Personalized Medicine*. 2024 May; 14(6): 550. doi: 10.3390/jpm14060550.
- [19] Ji C, Wang H, Bao C, Zhang L, Ruan S, Zhang J et al. Challenge of Nail Psoriasis: An Update Review. *Clinical Reviews in Allergy and Immunology*. 2021 Dec; 61(3): 377-402. doi: 10.1007/s12016-021-08896-9.
- [20] Canal-García E, Bosch-Amate X, Belinchón I, Puig L. Psoriasis Ungueal. *Actas Dermo-Sifiliográficas*. 2022 May; 113(5): 481-90. doi: 10.1016/j.ad.2022.01.006.