Inflammatory Joint Manifestations are Prevalent in Psoriasis: Prevalence Study of Joint and Axial Involvement in Psoriatic Patients, and Evaluation of a Psoriatic and Arthritic Questionnaire

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ABSTRACT. ***Objective***. To examine the prevalence of inflammatory manifestations, such as peripheral arthritis, axial disease, undifferentiated spondyloarthropathy (uSpA) and enthesopathies in patients with psoriasis, and to evaluate a psoriatic and arthritic questionnaire (PAQ) to identify patients with arthritis.
Methods. An evaluation of a questionnaire (PAQ) in a hospital- and community-based population of 276 psoriatic patients, and clinical, radiological, and laboratory examination of the 202 patients answering the questionnaire and willing to participate in the subsequent study.
Results. Ninety-seven patients (48%) were identified as having, or having had, inflammatory manifestations (peripheral arthritis, axial disease, uSpA, and enthesopathies). Sixty-seven patients (33%) had peripheral arthritis and/or axial disease, 30 of whom had not previously been diagnosed. A total PAQ score of 4 out of 8 was the best cutoff value detecting arthritis with a sensitivity of 60% and a specificity of 62.2%. A positive answer to the question "Have you ever thought you might have arthritis?" in combination with morning stiffness in peripheral joints for at least 60 min, had a sensitivity of 30% and a specificity of 91.1% and was significantly associated with peripheral arthritis and/or axial disease in multiple logistic regression analysis.
Conclusion. We found a high prevalence of inflammatory joint/axial disease in this group of psoriatic patients. Almost half the patients with peripheral arthritis and/or axial disease had not previously been diagnosed. The PAQ did not, either as a total score or by combining questions, discriminate for arthritis in this population with psoriasis. (J Rheumatol 2002;29:2577–82)

Key Indexing Terms:
PSORIATIC ARTHRITIS PREVALENCE JOINT DISEASE
EVALUATION QUESTIONNAIRE

Early detection of arthritis in patients with psoriasis is important in order to reduce inflammation and prevent destruction, deformity, and functional disability in affected joints. Most patients with psoriasis are seen by general practitioners or dermatologists with variable experience of diagnosing and treating arthritis, particularly when the clinical signs are subtle or when measurable inflammatory activity is absent.

The reported prevalence of psoriatic arthritis (PsA) in patients with psoriasis varies between 7 and 40% in different studies[1-5]. The variability can be explained by selection bias, differences in the definition of PsA, and differences in the expression and prevalence in the population. Although there have been attempts to create new criteria, the most common criteria still in use are those of Moll and Wright[6]. However, their criteria do not include undifferentiated spondyloarthropathy (uSpA) or enthesitis, which have been described among psoriatic patients[7].

The aim of our study was to examine the prevalence of inflammatory manifestations, such as peripheral arthritis, axial disease, uSpA, and enthesopathies, in a group of patients with psoriasis, and to evaluate a psoriatic and arthritic questionnaire (PAQ) in order to identify patients with arthritis.

MATERIALS AND METHODS

During 1995 and 1996 a register of patients (n = 1737) in the County of Västerbotten, Sweden, diagnosed as having psoriasis was collected and administered by the Department of Dermatology, University Hospital, Umeå[8]. The register, which was community as well as hospital based, included diagnostic information about psoriatic patients of all ages from the hospital records at the Department of Dermatology, University Hospital, Umeå, the Departments of Internal Medicine of the local hospitals in Lycksele and Skellefteå, 10 out of 36 primary health care centers in the county of Västerbotten, and from the register of the members of the Swedish Psoriatic Association (Svenska Psoriasisförbundet) living in Västerbotten (n = 602). All patients had psoriasis of the skin diagnosed by a dermatologist or a general practitioner.

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Two hundred ninety-one patients older than 16 years were registered as living in the city of Umeå, with a total population of 82,000 inhabitants. At the time of our study, two of the 291 patients were deceased and 13 had moved from the area. The remaining 276 patients were asked to answer the PAQ and to participate in a prevalence study of joint and/or axial inflammatory involvement in this psoriatic population. After one request, 46 patients had not answered the questionnaire and 28 patients answered the questionnaire but did not wish to participate in the followup study. The remaining 202 patients (73.2%) were included in the study which included clinical, laboratory and radiological assessments.

The Psoriasis and Arthritis Questionnaire. The 12-item PAQ was constructed by Peloso, *et al* at the University of Saskatchewan, Saskatoon, Canada[9] and is presented in Table 1. The questionnaire was translated to Swedish and then back translated to English by another translator to ensure reproducibility. As we wanted to evaluate the PAQ in a population not knowing they had an arthritic disease, we excluded patients with known arthritic disease and removed the third question ("Has a doctor ever told you that you have arthritis?") from our analysis. The duration of morning stiffness was increased to at least 60 min in peripheral joints in accord with the American Rheumatism Association criteria for rheumatoid arthritis[10]; the increased time scale was also applied to morning stiffness of the spine. Consequently, the original total PAQ score of 10 was reduced to 8 in our analysis (Table 1). In order to evaluate the PAQ for detecting arthritis the sum of PAQ scores were compared with clinical diagnoses, and the utility of individual PAQ questions was assessed. The entire PAQ, with all questions, was also analyzed in the entire study population (n = 202).

Clinical assessments. Clinical examinations and medical history of peripheral arthritis, deformities and functional disability, including distal interphalangeal joints as well as spinal pain, buttock pain, chest wall pain, inflammatory back pain[11], spinal mobility (flexion, extension, and rotation), chest expansion (abnormal < 2.5 cm), dactylitis and enthesitis as defined by Helliwell and Wright[12] were evaluated. Measurements of anterior lumbar flexion were made according to Schober[13]. The affected skin area was graded using a 5 point scale: 0 = no actual lesion, 1 = a few small lesions, 2 = many small or a few large lesions, 3 = many large lesions, and 4 = extensive involvement. The activity of skin involvement (erythema, induration, and scaling) was graded as; 0 = no activity, 1 = mild, 2 = moderate, and 3 = severe.

Radiographic examination. In 128 out of 155 (82%) patients with any history of back pain and/or decreased mobility of the spine, the sacroiliac (SI) joints and/or the spine were examined radiologically. From those patients with no history of back pain or actual clinical signs of decreased mobility (n = 47), 20 were randomly chosen for radiographic examination of the SI joints. In 45 of the 58 (78%) patients with peripheral arthritis the involved joints were examined radiologically and graded for erosions (≥ grade 2) according to the Larsen's grading system[14]. The reduction in the number of patients was due to withdrawal of those unwilling to undergo radiographic examination.

Diagnostic criteria. Peripheral arthritis was diagnosed when a swollen and tender joint, with duration > 6 weeks, located outside the spine and/or SI joints, was present. The diagnosis of sacroiliitis was based on radiological grading of the SI joints according to New York criteria (≥ grade 2)[15]. The diagnosis of axial disease was based on radiological sacroiliitis and/or syndesmophytes, ligamentous ossification, vertebral squaring, and shining

Table 1. The Psoriatic and Arthritis Questionnaire (PAQ). The third question was not included in the statistical analyses and the duration of morning stiffness was expanded from the original described 45 min to at least 60 min.

Questions			Original Score for Positive Response	Our Modified Score for Positive Response	
1 Have you ever thought you might have arthritis? (Tror du att du någonsin haft ledinflammation?)	**yes**	**no**	**1**	**1**	
2 Have you ever had a swollen joint (or joints)? (Har du någonsin haft svullen led eller svullna leder?)	**yes**	**no**	**2**	**2**	
3 Has a doctor ever told you that you have arthritis? (Har du någonsin av läkare fått konstaterat att du har ledinflammationer?)	**yes**	**no**	**2**	**—**	
4 Are your joints stiff when you wake up in the morning? (Är dina leder stela när du vaknar på morgonen?)	**yes**	**no**	**1**	**1**	
4a If yes to #4, how long does the stiffness last? (write in number of minutes or hours) (Om du har svarat ja på fråga 4 – hur länge varar stelheten? Ange i minuter eller timmar)	**_____ minutes** minuter	**_____ hours** timmar	**1 if more than 45 min**	**1 if more than 60 min**	
5 Have you ever had back troubles? (Har du någonsin haft ryggvärk/ryggbesvär?)	**yes**	**no**	**0**	**0**	
6 Has your back ever been stiff in the morning? (Har din rygg någonsin varit stel på morgonen?)	**yes**	**no**	**0**	**0**	
6a If yes to #6, how long does the stiffness last? (write in number of minutes or hours) (Om du har svarat ja på fråga 6 – hur länge varar stelheten? Ange i minuter eller timmar)	**_____ minutes** minuter	**_____ hours** timmar	**1 if more than 45 min**	**1 if more than 60 min**	
7 Do your fingernails or toenails have holes or "pits"? (Finns det hål eller gropar i dina tå eller fingernaglar?)	**yes**	**no**	**1**	**1**	**1 for any 2 positive responses to question 7, 8 or 9**
8 Do your fingernails come loose from the nailbed? (Lossnar dina naglar från underlaget?)	**yes**	**no**			
9 Are your nails abnormally thick? (Är dina naglar abnormt tjocka?)	**yes**	**no**			
10 Does anyone in your family have arthritis? (Har någon i din familj (föräldrar, syskon, barn) ledinflammtioner?)		**yes**	**no**	**0**	**0**
Maximum score			**10**	**8**	

corners of the spine[16]. Undifferentiated SpA was diagnosed when the patients, in addition to psoriasis, had inflammatory back pain[7] and decreased mobility of the spine in at least 2 directions without fulfilling the criteria for sacroiliitis or axial disease. Enthesitis was diagnosed when patients had signs of tenderness, swelling, redness, warmth, loss of function, and/or radiographic destruction at the insertion site of the Achilles tendon, plantar fascia, and lateral or medial epicondyle. Patients reporting pain but not fulfilling any of the cited criteria were grouped as having other joint complaints.

Laboratory test. Blood was collected to measure erythrocyte sedimentation rate (ESR mm/h, Westergren), C-reactive protein (CRP, mg/l), orosomucoid (g/l), haptoglobin (g/l), and rheumatoid factor (RF) (by Waaler-Rose) using routine methods.

Statistics. Student's t test was used to test for differences between continuous data, and chi-square test was used for testing categorical data between groups. Odds ratio (OR) was calculated with 95% confidence interval (CI). All p values refer to 2 sided test, and $p \leq 0.05$ was considered statistically significant. To assess the utility of the PAQ in detecting arthritis, sensitivity, specificity, and predictive values were calculated. The receiver operating characteristic (ROC) curve was used to display the relationship between sensitivity and specificity. For multivariate analysis, logistic regression analysis was used to determine whether specific questions within the questionnaire discriminate for arthritis. The logistic regression model was also used in analysis of PAQ questions and demographic and laboratory variables, with inflammatory involvement as independent variables.

RESULTS

Inflammatory joint manifestations. Ninety-seven patients (point prevalence = 0.48; 95% CI = 0.411–0.549) were identified as having inflammatory manifestations such as peripheral arthritis, axial disease, uSpA, and/or enthesopathies. Sixty-seven patients (point prevalence = 0.33; 95% CI = 0.260–0.400) were diagnosed as having peripheral arthritis and/or axial disease, of whom 30 (45%) had not been previously diagnosed. Of the 58 patients with peripheral arthritis, 34 (59%) had ongoing arthritis with a joint count number of 2.8 ± 0.4 (mean ± SEM) at the time of the study and 29 (50%) had radiographic evidence of erosive and/or deforming disease. Twenty (62%) of 32 patients with inflammatory back pain and decreased mobility of the spine had radiological changes in the SI joint or the spine (Table 2). None of the 20 randomly chosen patients without back pain had radiological changes (Table 2). Among the patients with peripheral arthritis and/or axial disease the duration of peripheral joint involvement was 16.0 ± 12.0 (mean ± SD) years and of axial involvement 18.1 ± 8.6 (mean ± SD) years. In 51 (76%) of the 67 patients, the skin disease preceded joint involvement, while for 10 patients (15%) there was a simultaneous onset of skin and joint manifestations.

When considering the 30 patients with peripheral arthritis and/or axial disease not previously diagnosed, 22 had peripheral arthritis, 6 had axial disease, and 2 had both peripheral and axial disease. Of the patients with peripheral arthritis, 17 had active arthritis and 10 had radiological changes and/or deformities of the joints. By definition, patients with axial disease had radiological changes.

The spectrum of diagnoses is presented in Table 3, including 78 patients (39%) with no symptoms or signs of inflammatory involvement or other pain syndromes, and 27 (13%) with other joint complaints. Axial involvement was more common among men (axial disease p = 0.003, axial and peripheral disease p = 0.019), while the other manifestations did not differ between the sexes. Classification of the patient's disease according to Moll and Wright is presented in Table 4.

The patients with peripheral arthritis and/or axial disease (n = 67) had significantly longer duration of skin disease, higher ESR, CRP, orosomucoid, and haptoglobin (see Table 5). There was no association between inflammatory joint manifestations and size of the affected area or activity of skin disease. Fourteen patients were RF positive, 8 had peripheral and/or axial disease, 2 had uSpA/enthesitis, and 4 had no joint disease.

Analysis of the PAQ. Analyses of the PAQ score totals are presented in Table 6. The ROC curve indicated a total score of 4 or higher as the optimal cutoff score for predicting peripheral arthritis and/or axial disease in this psoriatic group [area under the curve (AUC) = 0.640, OR = 2.343, 95% CI = 1.224–4.482, p = 0.010]. The same cutoff score was attained for any inflammatory manifestation(s) such as peripheral arthritis, axial disease, uSpA, and/or enthesitis with a sensitivity of 55% and a specificity of 65.7% (AUC = 0.647, OR = 2.471, 95% CI = 1.100–5.548, p = 0.028) (data not shown).

Table 2. Result of radiological examination of sacroiliac joints and spine of patients with psoriasis.

Patients	Examined, n	Sacroiliitis*, n (%)	Spinal Findings**, n (%)
Inflammatory back pain and decreased mobility of the spine, n = 33	32	10 (31.3)	10 (31.3)
Inflammatory back pain without decreased mobility of the spine, n = 36	33	1 (3.0)	0
Any back pain and/or decreased mobility of the spine, n = 86	63	6 (9.5)	2 (3.2)
Neither back pain nor decreased mobility of the spine, n = 47	20	0	0

* According to Reference 15. ** According to Reference 16.

Table 3. Inflammatory joint/axial diagnosis and other joint and pain involvement in the 202 psoriatic patients at the time of the study.

	All Patients, n = 202 (%)	95% CI	Active Disease
No joint disease	78 (38.6)	0.319–0.453	
Peripheral arthritis	45 (22.3)	0.194–0.252	23 (51.1)*
Axial disease	9 (4.5)	0.016–0.074	4 (44.4)**
Peripheral + axial disease	13 (6.4)	0.030–0.098	11 (84.6)*,**
Undifferentiated SpA	12 (5.9)	0.027–0.091	5 (41.7)**
Peripheral enthesitis/tenosynovitis	18 (8.9)	0.050–0.128	8(44.4)†
Other joint complaints	27 (13.4)	0.087–0.181	

* Defined as active, peripheral arthritis with or without increased ESR and/or CRP. ** Defined as actual inflammatory back pain and decreased mobility of the spine with or without increased ESR and/or CRP. † Defined as actual symptoms and signs of inflammation.

Table 4. The Moll and Wright classification of PsA for the 202 psoriatic patients at time of study.

Classification	All Patients, n = 202 (%)	Female n = 100	Male n = 102	Active Disease, n (%)
DIP joint disease, exclusively	0			
Axial disease	15 (7.4)	0	15	10 (66.7)
Mono/oligoarthritis	30 (14.6)	15	15	15 (50)
Polyarthritis*	21 (10.4)	12	9	12 (57.1)
Mutilans arthritis, predominantly	1	0	1	1 (100)

DIP: distal interphalangeal. * Includes symmetric and asymmetric.

Table 5. Demographic and laboratory data for the 202 patients with psoriasis at time of study.

	Peripheral Arthritis and/or Axial Disease, n = 67	Nonarthritic Disease, n = 135	p
Mean age, yrs ± SD	54.4 ± 14.4	50.4 ± 14.4	NS
Duration of skin disease, yrs, mean ± SD	29.7 ± 14.3	24.8 ± 13.9	0.023
ESR, mm/h, mean ± SEM	15.4 ± 1.8	9.7 ± 0.9	0.001
CRP*, mg/l,mean ± SEM	11.6 ± 0.5	10.2 ± 0.1	0.001
p-orosomucoid†, g/l, mean ± SEM	0.81 ± 0.03	0.70 ± 0.01	0.000
p-haptoglobin‡, g/l, mean ± SEM	1.40 ± 0.08	1.09 ± 0.05	0.001

Reference values: * CRP: < 10 mg/l; † p-orosomucoid: 0.54–1.17 g/l, ‡ p-haptoglobin: 18–50 yrs, 0.35–1.85 g/l; > 50 yrs, 0.47–2.05 g/l

When analyzing each separate PAQ question, a positive response to the first PAQ question ("Have you ever thought you might have arthritis?") (OR = 2.36, 95% CI = 1.026–5.407, p = 0.043) and to the question about morning stiffness in peripheral joints lasting for at least 60 minutes (OR = 3.43, 95% CI = 1.329–8.844, p = 0.011) significantly predicted peripheral arthritis and/or axial disease. When analyzing the 2 questions together, the sensitivity was 30%, specificity 91.1%, positive predictive value 42.9%, and the negative predictive value was 85.5% (OR = 4.39, 95% CI = 1.648–11.709, p = 0.003). We weighted the scoring of the questions and gave those questions most strongly predicting arthritis a double score compared with the other questions. Thus, the maximum score in this analysis was 9. Using this weighted modification, the ROC curve indicated a score of 5 or higher as the optimal cutoff score for predicting peripheral arthritis and/or axial disease (sensitivity = 50%, specificity = 73.3%, positive predictive value = 29.4%, negative predictive value = 86.8%), as well as when uSpA and/or enthesitis was included in the analysis (sensitivity = 45%, specificity = 77.1%, positive predictive value = 52.9%, negative predictive value = 71.1%) (data not shown). When analyzing the entire PAQ with all questions in the entire study population (n = 202), we got higher sensitivity and lower specificity compared to our modified analysis. The ROC curve indicated a total score ≥ 6 for predicting periph-

Table 6. PAQ score excluding patients with known arthritis disease and the third question (Pop A), and total PAQ score including all patients and all questions (Pop B).

PAQ score	Sensitivity, %		Specificity, %		Positive Predictive Value, %		Negative Predictive Value, %	
	Pop A	Pop B	Pop A	Pop B	Pop A	Pop B	Pop A	Pop B
Score ≥ 3	73.3	83.6	44.4	52.6	22.7	46.7	88.2	86.6
Score ≥ 4	60*	82.1	62.2	57.0	26.1	48.7	87.5	86.5
Score ≥ 5	46.7	77.6	72.6	65.9	27.5	53.1	86	85.6
Score ≥ 6	30	68.7**	83	77.8	28.1	60.5	84.2	83.3
Score ≥ 7	16.7	53.7	91.1	86.7	29.4	66.7	83.1	79.1
Score ≥ 8	10	41.8	97	94.1	42.9	77.8	82.9	94.1

* The ROC curve indicated a total score ≥ 4 for predicting peripheral arthritis and/or axial disease for pop A. ** The ROC curve indicated a total score ≥ 6 for predicting peripheral arthritis and/or axial disease for Pop B.

eral arthritis and/or axial disease. The sensitivity was then 68.7%, specificity 77.8%, and the positive predictive value 60.5% (Table 6).

In a multiple logistic regression model, adjusted for sex, the duration of skin involvement and a positive response for the first PAQ question (”Have you ever thought you might have arthritis?”) in combination with morning stiffness for at least 60 minutes, were significantly associated for peripheral arthritis and/or axial disease (Table 7). In the analysis of the modified PAQ scores with the same dependent variable and the same covariates, only the duration of skin involvement remained significant (data not shown).

Dropout analysis. When analyzing the 28 questionnaires answered by patients who did not wish to participate in the full study, 7 patients (25%) answered that they had had a swollen joint, 4 (14%) that a clinician had diagnosed arthritis, and another 4 patients (14%) had back pain in combination with morning axial stiffness for at least 60 minutes. Of the remaining 46 patients who did not answer the questionnaire, one patient was regularly seen at the Department of Rheumatology for his psoriatic arthritis and another patient had been diagnosed with peripheral arthritis and ankylosing in the SI joints. The mean age of the patients in the dropout group did not differ from the study group but dropping out appeared to be more frequent among the younger and the older patients.

DISCUSSION

In the study group, we found that 33% of the patients with psoriasis were diagnosed by a rheumatologist as having or having had peripheral arthritis and/or axial disease. When analyzing the patients with peripheral arthritis and/or axial disease as well as uSpA and/or enthesitis, the prevalence of inflammatory diseases increased to 48%. Only about 40% of the psoriatic patients could be classified as healthy based on the absence of joint/back pain. van Romunde, *et al*[3] found a higher prevalence of joint diseases in psoriatic versus in non-psoriatic patients (59% vs 46%), and our study supports findings that there is a high prevalence of inflammatory manifestations as well as non-inflammatory joint involvement in psoriatic patients. There was also a high prevalence of patients (45%) with peripheral arthritis and/or axial disease who had not been previously diagnosed. Of the undiagnosed patients with peripheral arthritis, 71% had active disease and almost half of them had radiologically detectable erosive and/or deforming disease. These observations suggest that many patients are not diagnosed at an appropriate time, suggesting that they may not get sufficient treatment for their joint disease.

Back pain is a common complaint among patients in general and is often difficult to evaluate. In our study, 62% of the patients with inflammatory back pain and decreased mobility of the spine had radiological changes in the SI

Table 7. The logistic regression analysis for identifying patients with peripheral arthritis and/or axial disease, adjusted for sex.

Variables	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	p	OR	95% CI	p
Total score ≥ 4	2.717	1.189–6.210	0.018	1.744	0.656–4.634	0.265
Positive response for the first PAQ question and morning stiffness for at least 60 min	4.540	1.681–12.265	0.003	3.949	1.185–13.158	0.025
Duration of skin involvement, yrs	1.033	1.005–1.062	0.022	1.038	1.007–1.071	0.018
ESR, mm/h	1.035	1.007–1.064	0.015	1.025	0.994–1.057	0.115

joints and/or spine of inflammatory origin. There were no radiological findings in patients without decreased mobility, or any back pain indicating that inflammatory back pain, in combination with decreased mobility of the spine, is an important clinical diagnostic sign for axial disease as reported by Viitanen, *et al*[17].

The aim of our study was to evaluate the PAQ in patients who were not aware they had an arthritic disease. Application of the PAQ for detecting arthritis was not successful for this group. The optimal cutoff score had low sensitivity and specificity as well as a low positive predictive value. The weighting of the scoring for each question, based on the different result in analyzing the separate questions among our patients compared with the Canadian patients, did not improve the predictive value. The first question in the PAQ, "Have you ever thought you might have arthritis?" and the information about morning stiffness for at least 60 minutes seemed to be more valuable than the total PAQ score in detecting arthritis, and this finding was supported by the multiple logistic regression analysis. The negative predictive value was high, i.e., patients with a total cutoff score below 4 usually did not have arthritis (almost 9 out of 10). From our analyses of the PAQ, with and without the third question, in all patients and in patients not knowing they had an arthritic disease, we are able to conclude that to detect arthritis in a psoriatic population the entire PAQ is quite good. However, to identify new cases in a psoriatic population the sensitivity and positive predictive value are fairly low, though the specificity was slightly higher.

An interesting finding in the multiple logistic model was that the duration of skin involvement was the variable that most strongly predicted peripheral arthritis and/or axial disease. This finding indicates that time is important for the development of joint disease in psoriatic patients.

In the dropout group, 8 of 28 patients (29%) answering the questionnaire had had joint inflammation diagnosed by a doctor and/or symptoms of inflammatory back involvement, which was a lower frequency than in the study group. If we propose that this value was valid for the whole dropout group, these patients seemed to be healthier than those in the study group, and this may introduce a possible selection bias in our study. A hypothetical prevalence analysis within the whole group of psoriatic patients (n = 276), including the 8 of 28 patients answering the PAQ and 2 of 46 patients not answering the PAQ but describing inflammatory symptoms, showed a prevalence of peripheral arthritis and/or axial disease of 28%. When uSpA and enthesitis were included in the analysis, the prevalence increased to 39%. This is still a high prevalence of inflammatory manifestations in the psoriatic population.

In summary we found high prevalence of inflammatory joint/axial involvement as well as other joint/axial symptoms in psoriatic patients. Almost half the patients with peripheral arthritis and/or axial disease had not been previously diagnosed for these manifestations. The use of a questionnaire, such as the PAQ, was not helpful in identifying arthritis in this group of psoriatic patients.

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