

Evaluation of an existing screening tool for psoriatic arthritis in people with psoriasis and the development of a new instrument: the Psoriasis Epidemiology Screening Tool (PEST) questionnaire

G.H. Ibrahim¹, M.H. Buch¹, C. Lawson¹, R. Waxman², P.S. Helliwell^{1,2}

¹St. Luke's Hospital, Bradford Teaching NHS Foundation Trust, Bradford, West Yorkshire, UK;

²Academic Unit of Musculoskeletal Disease, University of Leeds, Leeds, UK.

Abstract

Objective

To evaluate an existing tool (the Swedish modification of the Psoriasis Assessment Questionnaire) and to develop a new instrument to screen for psoriatic arthritis in people with psoriasis.

Design

The starting point was a community-based survey of people with psoriasis using questionnaires developed from the literature. Selected respondents were examined and additional known cases of psoriatic arthritis were included in the analysis. The new instrument was developed using univariate statistics and a logistic regression model, comparing people with and without psoriatic arthritis. The instruments were compared using receiver operating curve (ROC) curve analysis.

Results

168 questionnaires were returned (response rate 27%) and 93 people attended for examination (55% of questionnaire respondents). Of these 93, twelve were newly diagnosed with psoriatic arthritis during this study. These 12 were supplemented by 21 people with known psoriatic arthritis. Just 5 questions were found to be significant predictors of psoriatic arthritis in this population. Figures for sensitivity and specificity were 0.92 and 0.78 respectively, an improvement on the Alenius tool (sensitivity and specificity, 0.63 and 0.72 respectively).

Conclusions

A new screening tool for identifying people with psoriatic arthritis has been developed. Five simple questions demonstrated good sensitivity and specificity in this population but further validation is required.

Key words

Psoriasis, psoriatic arthritis, screening, epidemiology.

*Gamal H. Ibrahim, ABMS, MRCP, MSc
Maya Hema Buch, MRCP, PhD
Cathy Lawson, MRCP, Specialist Registrar
Robin Waxman, Senior Research Associate
Philip S. Helliwell, DM, PhD, FRCP*

Dr Helliwell conceived the study, collected data and undertook the analysis; Drs Ibrahim, Buch, and Lawson collected the study data; Ms Waxman provided administrative help and contributed to the data analysis and writing of the paper. All authors reviewed the paper.

Please address correspondence to:

*Philip Helliwell,
Section of Musculoskeletal Disease,
University of Leeds, 2nd Floor,
Chapel Allerton Hospital,
Harehills Lane,
Leeds LS7 4SA, UK.*

E-mail: p.helliwell@leeds.ac.uk

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Introduction

Psoriatic arthritis is characterised by chronic arthritis in the presence of psoriasis and is found in up to 30% of people with psoriasis (1). Further, psoriatic arthritis is not the benign disease it was previously thought with two thirds of people developing progressive joint damage and disability. Certain clinical features help differentiate this disorder from rheumatoid and other forms of arthritis, including the presence of axial involvement, distal interphalangeal involvement, dactylitis and enthesitis. This distinction has recently been facilitated by the development of new classification criteria for psoriatic arthritis (2).

People attending general practitioner and dermatology clinics with psoriasis may complain about their joints but it may be difficult for the non-rheumatologist to distinguish psoriatic arthritis from other forms of arthritis. A screening tool to identify those people with psoriatic arthritis would therefore be of use to both general practitioners and dermatologists and help identify those cases in whom further evaluation should be performed by a rheumatologist.

Several screening tools have been developed. The Psoriasis Assessment Questionnaire (PAQ), published only in abstract form, has been adapted and modified by Swedish workers (for clarity referred to as the mPAQ) who found a sensitivity of 0.60 and specificity of 0.70 in an unselected community population of people with psoriasis (3). More recently, the Psoriatic Arthritis Screening and Evaluation tool (PASE) (4) has been developed in a hospital dermatology setting. This questionnaire incorporates questions pertinent to disability and had a sensitivity of 0.82 and specificity of 0.73 in the hospital clinic. Finally, the TOPAS (TOronto Psoriatic Arthritis Screen) is a tool used to screen for both psoriasis and psoriatic arthritis which has been validated in both dermatology and rheumatology clinics (5). The TOPAS questionnaire has an overall sensitivity of 0.87 and specificity of 0.93.

The current study sought firstly to validate the modified PAQ as part of a study to determine the prevalence of psoriatic arthritis in a community sample

of people already diagnosed with psoriasis. At the start of this study neither the PASE nor TOPAS were available. Secondly, the addition of questions from a validated questionnaire for spondyloarthropathy permitted the development of a new, simplified instrument to screen for psoriatic arthritis in people with psoriasis. This paper does not report the detailed epidemiological results which will be given in a separate publication.

Methods

Full ethical committee approval was given for this study and all patients gave their signed, informed consent to take part. Subjects were identified from morbidity indices of two general practices in Bradford, West Yorkshire (diagnostic Read codes used for identifying the subjects were M16: 'psoriasis and similar disorders' and MYU30: 'other psoriasis'). These codes were assigned by the general practitioners on the basis of their own clinical appraisal or after review by a dermatologist. Independent verification of the diagnosis was not attempted. Each subject received a pack through the post. The pack contained the screening questionnaire together with a patient information sheet, a consent form and an accompanying letter from their general practitioner. A final question asked if they would be prepared to attend the hospital for an examination and a 1 in 2 sample of alternate respondents were invited. Finally, a series of consecutive patients with previously diagnosed psoriatic arthritis attending out-patient clinics at St Luke's Hospital Bradford were invited to complete the screening questionnaire.

The examination schedule was standardised. Essentially the proforma was identical to that used for the CASPAR study (2). Both historical and examination data were collected including a 76 swollen/78 tender/78 damaged joint count. Swelling of a joint was recorded if there was soft-tissue swelling and/or effusion confined to the joint. Tenderness was assessed using bialpation and a force sufficient to blanch the examiner's nail. Damage was recorded if there was bony enlargement and/or loss of range of movement of the joint. Spinal

Competing interests: none declared.

metrology was taken, sufficient to calculate the Bath Ankylosing Spondylitis Metrology Index (BASMI) (6). Both the Maastricht Ankylosing Spondylitis Enthesitis Index (MASES) (7) and Leeds Enthesitis Index (LEI) (8) were measured. For enthesal tenderness a force sufficient to blanch the examiner's nail was used. Finally the skin was assessed using the Psoriasis Area and Severity Index (PASI) (9). Initially, all patients were asked to have blood taken for rheumatoid factor and C reactive protein and x-rays of hands, feet, pelvis and lumbar spine. However, after obtaining these investigations on the first 20 patients examined, and finding them to be entirely normal, only those patients thought to have a diagnosis of psoriatic arthritis underwent subsequent testing. The diagnosis of psoriatic arthritis was made on clinical grounds only and not by reference to any criteria sets. All diagnoses (both positive and negative) were affirmed by the senior author (PSH).

Questions included in the screening questionnaire

The starting point for the current instrument was the Swedish modification of the Psoriasis Assessment Questionnaire (3). To these questions were added questions used to screen for spondyloarthropathy developed by Guillemin *et al.* (10). The final questionnaire included the following items (* indicates the questions from reference 3, # those from reference 9. Question 15 was added to elicit a history of dactylitis):

1. Have you ever thought you might have arthritis?*
2. Have you ever had a swollen joint (or joints)?*
3. Has a doctor ever told you that you have arthritis?*
4. Are your joints stiff when you wake up in the morning?*
5. How long does the stiffness last? Write in number of minutes.*
6. Have you ever had back troubles?*
7. Has your back ever been stiff in the morning?*
8. If yes, how long does the stiffness last? Write in the number of minutes.*
9. Do your finger nails or toe nails have holes or pits?*

10. Do your finger nails come loose from the nail bed?*
11. Are your nails abnormally thick?*
12. Does any one in your family have arthritis?*
13. Have you had pain in your buttocks?#
14. Have you had pain in your heel? #
15. Have you ever had a finger or toe that was completely swollen and painful for no apparent reason?
16. Have you had an x-ray of your back or hips?#
17. If you have arthritis, did your arthritis pain start before you were 45?#
18. Is there a family history or have you ever had psoriasis?#

In addition, a manikin was provided on which respondents were asked: 'In the drawing below, please tick the joints that have caused you discomfort (stiff, swollen or painful joints)'. The manikin included all large joints and three axial regions but the hand and foot joints were indicated by one box only. The total number of joints was 21.

Statistics

To develop a new screening questionnaire univariate statistics were calculated for each of the questions, calculating sensitivity and specificity and using chi-squared statistics. Questions 5 and 8 were recoded ($0 \leq 29$ mins and $1 \geq 30$ mins). The joint score from the manikin was used as a variable coded as $0 \leq 7$ joints and $1 \geq 7$ joints. Question 18 was excluded from the analysis as all patients were assumed to have or have had psoriasis. Questions with a significance of less than 0.1 were then entered into

a forward stepwise logistic regression model with diagnosis (psoriatic arthritis or non-psoriatic arthritis) as the dependent variable. The variables included in the final model (with a significance of <0.1) were then used in the new screening questionnaire. Performance of the new questionnaire and the Alenius modification of the PAQ was carried out using the area under the receiver operating curve (ROC), and the magnitudes of sensitivity and specificity. All statistics were carried out using SPSS v12.0.

Results

The two general practices had a combined patient population of approximately 27,500. From this combined population 633 people had one of the diagnostic labels indicated for psoriasis. This equates to a psoriasis prevalence of 2.3%. 168 questionnaires were returned (response rate 27%) and 93 people attended for examination (55% of questionnaire respondents). Of these 93, twelve were thought to have psoriatic arthritis clinically. Other diagnoses included osteoarthritis (26), mechanical low back pain (18), unclassified polyarthralgia (12) hypermobility syndrome (3), regional pain syndrome (5) and one each of polymyalgia rheumatica, rheumatoid arthritis, gout, fibromyalgia and Raynaud's phenomenon (in 12 cases no rheumatological diagnosis could be assigned). From the questionnaire manikin figures the median number of joints ticked was 8 and 4 for those diagnosed with psoriatic arthritis and those with other diagnoses respectively.

Fig. 1. Flow diagram indicating the way the subject group was formed. The statistical analyses were carried out on the two groups indicated in the darker shaded boxes (n=33 psoriatic arthritis; n=89 other diagnoses).

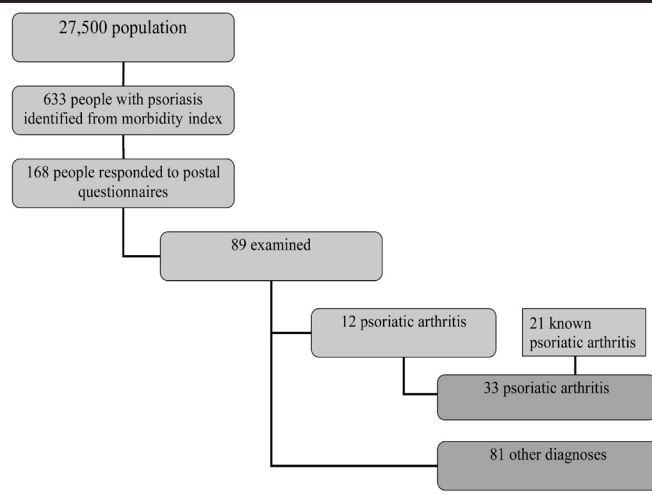


Table I. The logistic regression model. Homer-Lemeshow test chi-squared 6.86, df 7, p=0.44. Nagelkerke R squared 0.60.

	Coefficient	Std error	Odds ratio	95% CI
Constant	-5.62	1.11		
Swollen joints (Q2)	1.51	0.73	4.53	1.09 – 18.86
Told arthritis (Q3)	2.18	0.86	8.86	1.64 – 47.78
Pits in nails (Q9)	1.74	0.63	5.71	1.66 – 19.68
Pain in heel (Q14)	1.12	0.63	3.07	0.98 – 11.76
Digit swollen for no reason (Q15)	1.47	0.62	4.35	1.30 – 14.52

	AUC (95% CI)	Sensitivity	Specificity
Alenius	0.76 (0.69 – 0.85)	0.63	0.72
PEST	0.91 (0.86 – 0.97)	0.92	0.78

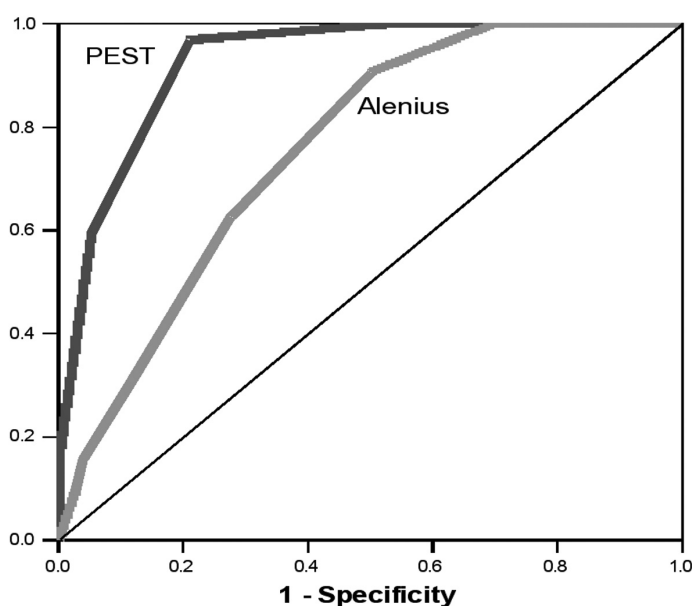


Fig. 2. Receiver operating curves for the PEST score and the Alenius score (cut off for Alenius ≥ 4 , cut off for PEST ≥ 3)

A further 21 patients with known psoriatic arthritis attending the rheumatology clinic completed the screening questionnaire. For clarification, the origin of the patients in the study group is given in the flow diagram (Fig. 1).

Characteristics of people newly diagnosed with psoriatic arthritis

Using the CASPAR criteria (2) all 12 of these were classified as psoriatic arthritis. None of these 12 people had a raised CRP and all were sero-negative. Two patients had abnormal x-rays, one demonstrating juxta-articular new bone formation and the other unilateral grade 2 sacroiliitis. The 12 people diagnosed with psoriatic arthritis (6 males, 6 females) had a mean (sd)

age of 54.9yrs (9.2), mean duration of psoriasis 31.8yrs (17.9), mean duration arthritis 19.2yrs (15.1), mean swollen joint count of 3.4 (4.5) and mean PASI score of 2.1 (2.0).

Characteristics of patients known to have psoriatic arthritis

This group comprised 21 people with established psoriatic arthritis who had been attending the rheumatology outpatients for some time. They were, mostly polyarticular and on treatment with disease modifying drugs.

Development of the new questionnaire

On the basis of the univariate statistics a number of questions from the screening questionnaire were excluded from the

multiple logistic regression analysis: 1, 6, 7, 8 (recoded), 11, 12, 13 and, as indicated in the Statistics section, 18. The logistic regression analysis thus included 11 variables: questions 2, 3, 4, 5 (recoded) 9, 10, 14, 15, 16, 17 and the number of joints ticked (recoded as indicated in the Statistics section). The final model generated from the logistic regression analysis included only 5 variables: questions 2, 3, 9, 14 and 15 (see Table). As a check, and because patients with a known diagnosis of psoriatic arthritis would have been more likely to affirm question 3, the logistic regression analysis was performed after excluding rheumatology clinic patients with established psoriatic arthritis. However, question 3 remained a significant predictor (OR 18.08, 95% CI 2.06-158.03).

The five questions were used in the subsequent ROC analysis and form the basis of the Psoriasis Epidemiology Screening Tool (PEST) screening questionnaire (Figs. 2 and 3). In this dataset the Alenius modification of the PAQ, with a cut off of ≥ 4 , had a sensitivity of 0.63, and a specificity of 0.72. The PEST questionnaire returned figures of 0.92 and 0.78 for sensitivity and specificity respectively.

Discussion

This study sought to validate the PAQ and to develop a new screening questionnaire to detect psoriatic arthritis in people with psoriasis. The new instrument, consisting of 5 simple questions together with a manikin, demonstrated better performance than the PAQ in terms of sensitivity and specificity and area under the ROC curve. The manikin does not contribute to the discriminative ability of the questionnaire but does enable the physician to quickly identify problematic joints, thus facilitating the referral process, should this be required. How does the new questionnaire compare to those already developed? Peloso and colleagues developed the PAQ but it was only published in abstract form. However, the PAQ was modified (mPAQ) and further validated by Alenius and colleagues in a hospital and community based cohort of people with psoriasis (3). All patients were

Have you ever had a swollen joint (or joints)?
 Has a doctor ever told you that you have arthritis?
 Do your finger nails or toe nails have holes or pits?
 Have you had pain in your heel?
 Have you had a finger or toe that was completely swollen and painful for no apparent reason?

In the drawing below, please tick the joints that have caused you discomfort (i.e. stiff, swollen or painful joints).

The diagram shows a stick figure with a smiling face. The joints are labeled as follows: Neck, Shoulder (RIGHT and LEFT), Elbow (RIGHT and LEFT), Wrist (RIGHT and LEFT), Hand / Fingers (RIGHT and LEFT), Thumb (RIGHT and LEFT), Hip (RIGHT and LEFT), Knee (RIGHT and LEFT), Ankle (RIGHT and LEFT), Foot / Toes (RIGHT and LEFT), Upper Back, Lower Back, and a 'Waist level' line is drawn across the torso.

Fig. 3. The PEST screening questionnaire for psoriatic arthritis (in people with psoriasis). Score 1 point for each question answered in the affirmative. A total score of 3 or more is indicative of psoriatic arthritis (sensitivity 0.97, specificity 0.79, positive predictive value 0.65, negative predictive value 0.99).

examined by experienced rheumatologists and almost a third were diagnosed with psoriatic arthritis – within this population, and using a cut off score of ≥ 4 , the mPAQ had a sensitivity of 0.60, and a specificity of 0.62, rather poor figures similar to those obtained for the mPAQ used in this study. More recently the PASE questionnaire provides an entirely novel approach to discriminating psoriatic arthritis in that the instrument incorporates questions on function and pain as well as specific questions on arthritis (4). The scale is divided into two parts: a symptom scale and a function scale and the two scales are combined to give a total score. In 69 people with psoriasis seen in a hospital clinic 17 (25%) were found to have psoriatic arthritis by a rheumatologist. Using a cut off of ≥ 47 the PASE distinguished psoriatic arthritis from non-psoriatic arthritis (including osteoarthritis) with a sensitivity of 0.82 and a specificity

of 0.73. Finally, the Toronto group has published a screening questionnaire for psoriasis and psoriatic arthritis designed to be used in unselected people: the TOPAS questionnaire (5). Although the instrument was developed in a secondary care setting part of the validation was done in a family clinic. Several figures for performance were given, depending on the setting in which the validation took place but the figures for overall sensitivity and specificity (87% and 93% respectively) were good. The PASE and TOPAS were not available when this study commenced. In some ways they each serve a different purpose although the underlying theme is identifying cases of psoriatic arthritis. A head to head comparison should now be undertaken in a setting where unselected cases of psoriasis can be given the instruments and subsequently be examined by an experienced rheumatologist. What characteristics are important in

an instrument used to screen for a disease? Certainly both sensitivity and specificity are important but of these a high sensitivity is required so that cases are not missed. Joint pain and arthritis are common in the community and increase with advancing age (11). The general practitioner in particular is therefore challenged to associate these symptoms with the psoriasis previously diagnosed and to make appropriate referral for further evaluation. If the patient is deemed to have osteoarthritis and psoriasis then the treatment options and referral pathways may differ than if the patient is thought to have psoriatic arthritis. It is hard to imagine a scenario where the patient does not present both articular and dermatological symptoms but the key is identifying the inflammatory arthritis. This will be the value of a screening test for psoriatic arthritis.

Given a prevalence of psoriatic arthritis of up to 30% in a hospital population of patients with psoriasis, a screening test with a sensitivity of 0.92 will miss few cases but with a specificity of 0.78 will diagnose (falsely) psoriatic arthritis in about 19/100 cases. For this prevalence the positive predictive value (PPV) of the test will be 0.65 and the negative predictive value (NPV) 0.94. However, in a population where the prevalence of psoriatic arthritis is much less, such as the community, the PPV will be lower and the NPV of the test higher. This therefore may present problems for this instrument as a screening test in the community. For the dermatologist, who is less likely than the general practitioner to be presented with articular symptoms, but who is seeing a group of patients with a higher prevalence of psoriatic arthritis, a tool with a high sensitivity is ideal to ensure no cases of true psoriatic arthritis are overlooked and that cases can be appropriately selected for the joint dermatology/rheumatology clinic, or for referral to a rheumatology colleague.

In summary, a new, simple screening questionnaire consisting of five questions has been developed to identify cases of psoriatic arthritis in a population of people with known psoriasis. Further evaluation and comparison of performance with other instruments is now required.

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