

## Validating the Chinese version of the psoriasis epidemiology screening tool and early arthritis for psoriatic patients questionnaires

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*To the Editor:* Psoriatic arthritis (PsA) is a chronic musculoskeletal disease associated with psoriasis. A high proportion of patients with psoriasis have a missed diagnosis of PsA, which will lead to delay in treatment, worse physical function, and severe radiographic progression.

Skin symptoms precede joint symptoms in about 80% of patients with PsA, which places dermatologists in a unique position to identify PsA early. Therefore, a lot of screening questionnaires have been developed for early screening. The Early Arthritis for Psoriatic Patients (EARP) and Psoriasis Epidemiology Screening Tool (PEST) questionnaires are two of the commonly used.<sup>[1,2]</sup> To date, only the verified Chinese language version of the EARP questionnaire exists.<sup>[3]</sup> However, the sensitivity and specificity of the questionnaire have not been assessed, nor compared to other screening questionnaires. Hence, the objective of the present study was to evaluate the effectiveness of the EARP and PEST questionnaires in Chinese psoriasis patients and determine the appropriate cut-off point for early diagnosis.

This study recruited patients with psoriasis on the website (<https://www.yxb365.com>) through the Psoriasis Mutual Assistance Network. Participants under 18 years of age or without a physician-confirmed diagnosis of psoriasis were excluded. Patients previously diagnosed with PsA were also excluded. The study was approved by the Medical Ethics Committee of Peking Union Medical College Hospital (No. S-K 1299).

The information collected in the questionnaire included demographic information and disease characteristics. The second part of the questionnaire was the Chinese version of the EARP and PEST questionnaires. The PEST questionnaire translated into Chinese followed the guidelines about cross-cultural adaptation. Patients who participated in this

study were suggested to visit the rheumatologists to further confirm the presence of PsA. The diagnostic results of the patients were followed up by the telephone call within 3 months after completing the questionnaire.

SPSS 19.0 software (SPSS Inc., Chicago, IL, USA) was used for data analysis. Descriptive data were reported using percentages, means, and standard deviation. Statistical significance was defined as  $P < 0.05$  (two-tailed). The Student's  $t$  test was used for continuous variables, and Person Chi-square test or Fisher exact test was used for categorical variables. To identify the possible factors indicating the development of PsA, univariate logistic regression analysis was used. Variables with a significance  $< 0.25$  in univariate analysis were included in the multivariate model. The receiver operating characteristic curve was used to analyze the sensitivity, specificity, optimal cut-off point, and the area under the curve (AUC) of the EARP and PEST questionnaires.

The patient flowchart is shown in Supplementary Figure 1, <http://links.lww.com/CM9/A521>. A total of 733 participants who met the inclusion and exclusion criteria completed the online questionnaire. The participants came from 32 provincial administrative regions in China. Among them, 515 patients with psoriasis visited the rheumatologists within 3 months of completing the questionnaire. PsA was diagnosed in 40 (7.8%) patients. The remaining patients ( $n = 475$ ) were diagnosed with cutaneous-only psoriasis.

The demographic information and psoriatic disease characteristics of these patients are shown in the Supplementary Table 1, <http://links.lww.com/CM9/A521>. In the two groups of patients, the most common comorbidity was hypertension. Diabetes, hyperlipidemia,

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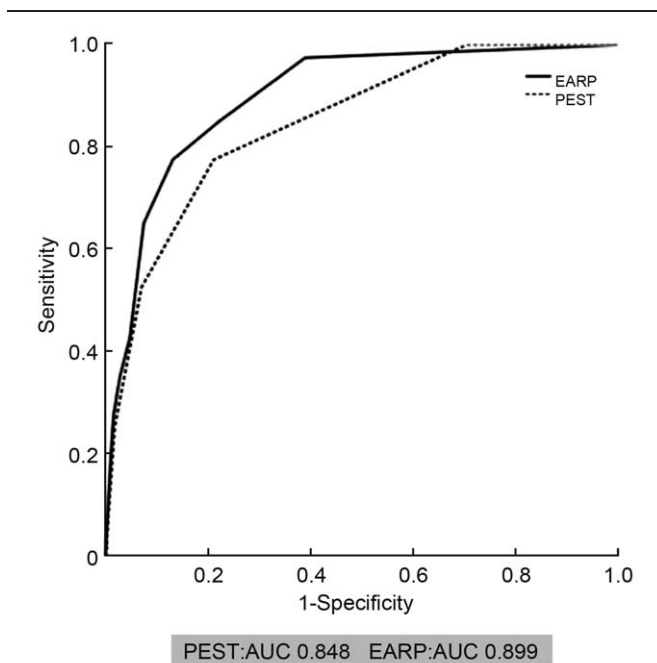
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**Figure 1:** Receiver operator characteristic curve (ROC) analysis for the EARP, PEST questionnaires on 515 participants with psoriasis. AUC: Area under the curve; EARP: Early Arthritis for Psoriatic Patients questionnaire; PEST: Psoriasis Epidemiology Screening Tool.

and gout are also common comorbidities. In terms of psoriasis drug treatment, topical treatment is the most treatment option, and the use of biological agents is common. In the PsA group and the psoriasis group, the proportion of biological agents use was 17.5% and 20.6%, respectively.

Patients diagnosed with PsA were older and had psoriasis for longer time ( $P < 0.05$ ). Variables including age, the coexistence of diabetes mellitus, coronary heart disease, course of psoriasis, family history, and body surface area were included in a multivariate regression analysis ( $P < 0.25$ ). None of the variables were statistically significant.

When the cut-off point of the EARP questionnaire was 3, the questionnaire's sensitivity and specificity were 77.5% and 86.9%, respectively. The AUC of the EARP questionnaire was 0.899 (95% confidence interval [CI] 0.853–0.945). The PEST questionnaire's sensitivity and specificity were 77.5% and 78.9% when the cut-off point was 2. The sensitivity and specificity were 52.5% and 93.1%, respectively, when the cut-off point was 3. The AUC of PEST questionnaire was 0.848 (95% CI 0.788–0.908) [Figure 1]. The CI for the AUC overlap between questionnaires. Although the EARP had the higher AUC, there was no difference between them statistically.

The study was conducted to evaluate the efficacy of the Chinese version of EARP and PEST questionnaires. The results showed that the EARP and PEST questionnaires have good sensitivity and specificity, similar to the result of previous studies in European and American populations.<sup>[4]</sup> To our knowledge, this is a rare assessment of the EARP

and PEST questionnaires' sensitivity and specificity in the Chinese population. It seems that the EARP is slightly better than the PEST in identifying PsA. This may be related to the EARP focusing on the symptoms of PsA patients. Besides, the PEST questionnaire did not involve the symptom of axial involvement, which will make the identification of patients with purely axial disease impossible.

Choosing the cut-off point of 2 in the PEST questionnaire, which was lower than the cut-off point of 3 in the initial validation study, showed significantly increased sensitivity and slightly decreased specificity, consistent with Coates and Leijten's studies.<sup>[5]</sup> However, with the decrease of the cut-off point, the proportion of psoriasis patients who need to be referred to the rheumatologists has increased from 7.8% to 21.1%, which will undoubtedly increase more medical burden. Considering the high prevalence and the adverse prognosis of missed diagnosis, this lower cut-off point is acceptable.

Our study also has some limitations. This study is an online study. Subjects may tend to share research links with friends or colleagues who are in the same situation and have the same problems and can result in bias. Second, not all the patients who completed the questionnaire within 3 months were confirmed by rheumatologists, which may impact the questionnaire results. Furthermore, 20.6% of cutaneous-only psoriasis patients were using biological agents, which may reduce or mask the performance of joint involvement. Finally, considering that it is difficult for patients to provide accurate information on disease characteristics such as axial involvement or enthesitis, the study did not collect relevant information.

In conclusion, the PEST and the EARP questionnaires are useful tools for screening PsA in Chinese patients with psoriasis.

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### Conflicts of interest

None.

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