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Research/Technical Note

Development and Validation of Chinese Assessment Scale for Zoster-Associated Pain

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Abstract

Objective: To develop and validate a Chinese assessment scale for patients with zoster-associated pain (ZAP) that is tailored to China's national conditions. *Methods:* A descriptive study was conducted to formulate the preliminary scale items based on the common clinical features of ZAP, incorporating consensus from domestic herpes zoster experts, clinical guidelines, and international scale development procedures. The pre-scale was refined through review by pain specialists and pre-testing. From March 20 to November 21, 2024, a clinical investigation involving 145 ZAP patients from the Pain Department of Shandong Provincial Hospital was carried out. The pre-scale questionnaire was administered and item analysis—including the critical ratio method, correlation coefficients, and discrete trend analysis—was performed to screen items and form a preliminary version. Reliability and validity were further assessed. *Results:* The scale demonstrated strong validity and reliability, with a standardized Cronbach's α of 0.857 (>0.7), a KMO value of 0.781 (>0.6), and a Bartlett's sphericity test result of $\chi^2 = 914.521$ ($p < 0.001$). Exploratory factor analysis extracted five common factors with a cumulative variance contribution of 70.169% (>50%) and factor loadings between 0.529 and 0.920. Confirmatory factor analysis indicated good model fit: $\chi^2/df = 1.902$, RMSEA = 0.079 (<0.08), CFI = 0.915 (>0.90), and IFI = 0.917 (>0.90). The final ZAP assessment scale comprises three sections: 15 non-quantitative items, 17 quantitative items across 5 dimensions, and 3 additional quantitative items specific to acute-phase patients. *Conclusion:* The developed Chinese assessment scale for ZAP exhibits good reliability, validity, and applicability, making it a suitable tool for clinical use in China.

Keywords

Pain Measurement, Questionnaires, Herpes Zoster, Zoster-associated Pain, Scale, Chinese Version, Reliability and Validity

1. Introduction

Herpes Zoster (HZ) is a painful rash resulting from the reactivation of the varicella-zoster virus (VZV) latent in dorsal root or cranial nerve ganglia [1]. It represents a frequent clinical presentation in both dermatology and pain medicine. Zoster-Associated Pain (ZAP) is clinically characterized by dermatomal rash accompanied by intense, often refractory, neuropathic pain. Its underlying pathological mechanisms are complex, and the condition frequently leads to persistent and severe pain [2]. This pain not only adversely affects daily functioning but is also associated with psychological comor-

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bidities such as anxiety and depression, significantly impairing the patient's quality of life (QoL) [3, 4].

In the clinical assessment of ZAP, several scale tools have been developed and validated [5]. These include the Visual Analogue Scale (VAS), Numerical Rating Scale (NRS), and Short-Form McGill Pain Questionnaire (SF-MPQ) for evaluating pain intensity [6]; the Douleur Neuropathique 4 (DN4) and Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) for characterizing neuropathic pain features [7]; the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36) and Nottingham Health Profile (NHP) for assessing quality of life (QoL) [8]; as well as the Hospital Anxiety and Depression Scale (HADS) [9] and Pittsburgh Sleep Quality Index (PSQI) [10] for evaluating psychological status and sleep quality, respectively. However, these instruments are often limited to a single dimension or are designed as generic measures, lacking specificity for the distinct features of ZAP. Furthermore, most were developed within Western cultural contexts and may introduce interpretation biases in Chinese populations due to cultural differences and variations in healthcare systems, potentially compromising their accuracy and relevance. At present, there is no standardized, ZAP-specific assessment tool available in China. Therefore, our research team aims to develop a comprehensive ZAP assessment instrument tailored to the characteristics of the Chinese population. By integrating evidence from both domestic and international clinical studies on ZAP and synthesizing existing scale methodologies, this tool intends to optimize treatment strategies, improve patient quality of life, establish a standardized basis for future ZAP research, support clinical practice among pain specialists, and contribute to the advancement of this field within China.

2. Subjects and Methods

2.1. Development of the Preliminary Scale

2.1.1. Drafting the Initial Scale

First, the research team conducted a systematic search of several authoritative databases, including PubMed, Web of Science, CNKI, and Wanfang Data, to integrate relevant literature evidence. With reference to the Chinese Expert Consensus on the Diagnosis and Treatment of Herpes Zoster (2022 Edition) [11], the Expert Consensus on Whole-Course Management of Zoster-Associated Neuralgia [2], and the Chinese Expert Consensus on the Diagnosis and Treatment of Postherpetic Neuralgia [5], combined with clinical experience, we systematically summarized the common clinical manifestations of zoster-associated pain (ZAP) patients. During the item pool development phase, the research group generated initially over 50 items through repeated discussions. These items broadly covered various disease-related domains, including predisposing factors, symptoms and signs, impact on quality of life, and potential complications. To ensure the scientific validity, practicality, and professionalism of the scale, five pain medicine specialists were invited to evaluate each item in terms of importance, feasibility, and clinical relevance. Based on their feedback, the item pool was revised and refined. The resulting preliminary scale adopted a modular structure consisting of three parts: Part 1 collected demographic information and descriptive pain characteristics (15 non-quantitative items, including disease duration, pain location, and pain nature); Part 2 assessed pain severity through 26 quantitative items covering pain intensity, emotional changes, sleep disturbances, among others; and Part 3 evaluated potential complications in acute-stage patients using 3 quantitative items.

2.1.2. Formation of the Preliminary Scale

To ensure the readability and practicality of the scale, a small-scale pilot survey was conducted at Shandong Hospital Affiliated to Shandong University from March 20 to May 20, 2024. Using a convenience sampling method, 30 patients with zoster-associated pain (ZAP) [7] were recruited to participate in semi-structured interviews [12], focusing on evaluating the scale's performance in terms of item clarity, comprehensibility, and cultural appropriateness. Each interview lasted approximately 30 minutes and primarily assessed the items from dimensions such as semantic clarity, expression clarity, and cultural adaptability. Based on the pilot feedback, items that were ambiguously phrased or lacked relevance were revised. The revised scale was reviewed by pain specialists, resulting in the final preliminary version (Table A1. Preliminary Chinese Version of the Zoster-Associated Pain Patient Assessment Scale). All interviews were conducted jointly by the research team members, and data accuracy and completeness were ensured through cross-verification.

2.2. Formation of the Provisional Scale

2.2.1. Study Subjects

Inclusion Criteria: (1) Voluntary participation and age ≥ 18 years; (2) No history of psychiatric disorders or impaired consciousness.

Exclusion Criteria: (1) Presence of communication barriers affecting the ability to complete the scale; (2) Diagnosis of mixed pain types.

This study was approved by the Biomedical Research Ethics Committee of Shandong Provincial Hospital Affiliated to Shandong University (Ethics Approval No.: SWYX: NO. 2024-736). To ensure statistical reliability, the sample size was determined based on the principle that the ratio of sample size to the number of items should be at least 5:1 [13]. A minimum of 130 participants was required. Accounting for a potential 10% rate of invalid questionnaires, at least 145 subjects were recruited. A total of 145 patients with ZAP who received treatment in the Pain Department of Shandong Pro-

vincial Hospital Affiliated to Shandong University between March 20, 2024, and November 21, 2024, were enrolled.

2.2.2. Data Collection

The survey team consisted of three experienced pain specialists, all of whom had received standardized training to ensure standardized and consistent operating procedures. Before distributing the questionnaires, the researchers provided all participants with a detailed explanation of the study's purpose, main content, and privacy protection measures, and obtained their informed consent. While participants self-administered the questionnaire, researchers provided guidance as needed to ensure that participants accurately understood each item. During assisted completion, the questionnaires underwent real-time review to promptly identify any omissions or logical errors. The survey was conducted using both paper-based and online questionnaires (via the Questionnaire Star platform). Each completed questionnaire was collected immediately and reviewed by the researchers. If errors or omissions were identified, they were corrected through follow-up communication. All data were double-entered into an electronic database to ensure accuracy.

2.2.3. Formation of the Provisional Scale

To evaluate the scientific validity and feasibility of the scale, we conducted item analysis on the 26 items in Part 2 of the preliminary scale using the critical ratio method, correlation coefficient method, and dispersion trend method [14] to develop a provisional scale.

(i). Critical Ratio Method

Total scores were ranked in descending order, and the top 27% and bottom 27% of participants were classified into high and low groups, respectively, using a cutoff proportion of 25%-33% (typically 27%). An independent samples t-test was used to compare differences between the two groups. Items showing no statistically significant difference ($P > 0.05$) or with a critical ratio (absolute t-value) < 3 were considered for deletion.

(ii). Correlation Coefficient Method [14]

This method involved calculating the Pearson correlation coefficient between each item's score and the total score to evaluate the item's consistency and representativeness. Items with a correlation coefficient < 0.3 or a non-significant P-value ($P > 0.05$) were considered for deletion.

(iii). Dispersion Trend Method [14] (also Known as the Coefficient of Variation Method)

The standard deviation (SD) of each item was calculated to assess its sensitivity and discriminative power. Items with an SD < 0.7 were considered for deletion due to insufficient sensitivity and discriminative ability.

2.3. Validation of the Provisional Scale

2.3.1. Reliability Testing

Additionally, we evaluated the reliability of Part 2 of the provisional scale using Cronbach's α coefficient and McDonald's ω coefficient [15]. These coefficients measure the proportion of variance attributable to measurement error [16] and were used to assess the scale's stability, reliability, and internal consistency [16]. Items with a corrected item-total correlation (CITC) below 0.3, or whose deletion led to a significant increase in Cronbach's α coefficient, were considered for removal [17, 18].

2.3.2. Validity Testing

Validity testing was conducted to assess the degree of agreement between the actual measurement results of Part 2 and the expected outcomes [17], thereby evaluating the validity and accuracy of the survey [17]. The assessment included an evaluation of face validity and construct validity [18].

(i). Face validity refers to the extent to which participants' understanding of the items aligns with the researchers' measurement intentions [19].

(ii). Construct validity, also referred to as conceptual validity or trait validity [17], reflects the internal consistency of the scale and the rationality of its structural dimensions. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are commonly employed to examine the stability and measurement precision of the construct validity of the scale [13], thereby evaluating its structural validity and the authenticity of such validity [18]. Exploratory Factor Analysis typically extracts common factors based on factor loadings > 0.5 and eigenvalues > 1, utilizing the Kaiser-Meyer-Olkin (KMO) test, Bartlett's test of sphericity, Principal Component Analysis (PCA), and the Kaiser-normalized Varimax rotation method [19, 20]. Confirmatory Factor Analysis (CFA) generally employs maximum likelihood estimation to assess model fit indices, including the ratio of chi-square statistic to degrees of freedom (χ^2/df), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the incremental fit index (IFI). Additionally, the average variance extracted (AVE) and composite reliability (CR) are calculated. AVE reflects the explanatory power of observed variables regarding latent variables; an AVE > 0.50 indicates ideal explanatory power, while 0.36 is considered the minimum acceptable value [18]. CR reflects the internal consistency among observed variables within a latent variable; higher values indicate stronger internal consistency, with a common

threshold of > 0.60 [18].

2.4. Statistical Methods

Data were analyzed using SPSS 26.0 and Microsoft Excel. Normally distributed continuous data are expressed as mean ± standard deviation ($\bar{x} \pm s$); non-normally distributed continuous data are presented as median (interquartile range) [M (Q1, Q3)]; and categorical data are described as frequency (percentage). Item analysis, validity testing, and reliability testing were performed on the collected scale data. A P-value < 0.05 was considered statistically significant.

3. Results

3.1. General Characteristics

A total of 145 subjects were enrolled in the study. The median age was 67 years (interquartile range: 60-73), with 70 (48.3%) being male and 75 (51.7%) female. Comorbidities were present in 76 patients (52.4%). The majority (74.5%) had no identifiable predisposing factors prior to onset, while 14.5% reported associations with cold exposure or upper respiratory tract infection. A family history of HZ in close relatives was reported by only 11.7% of participants. Disease duration varied widely, ranging from days to years: 57 patients (39.3%) were in the acute phase, 53 (36.6%) in the subacute phase, and 35 (24.1%) in the chronic phase. Right-sided involvement was more frequent (57.2%). The most commonly affected nerve was the thoracic (46.2%), followed by the lumbar (24.8%), trigeminal (20.7%), and cervical nerves (8.3%). Burning or stabbing pain was reported by 86.9% of patients. Rash resolution occurred within 2-3 weeks in 34.9% of cases, whereas 16.3% required more than one month for healing. During the acute phase, clustered vesicles were the primary manifestation in 63.5% of patients, and 13.1% presented with bullae or pustules. Rash severity was mild (affected area <3%) in 55.8% of cases. Prodromal pain was reported by 90 patients (62.1%), while only 2.1% experienced pain after rash resolution. Pain extended beyond the rash area in 36.6% of patients and was co-localized with the rash in 42.8%.

3.2. Item Analysis

3.2.1. Critical Ratio Method

Independent samples t-tests revealed no statistically significant differences (P > 0.05) between high and low-score groups for items Q6, Q10, Q14, Q15, Q16, and Q17. Additionally, items Q3, Q6, Q10, Q14, Q15, Q16, and Q17 exhibited critical ratio (absolute t-values) below 3. Consequently, these items were deleted (Table 1 The Results of the Item Analysis of the Preliminary ZAP Scale).

3.2.2. Correlation Coefficient Method

Pearson correlation analysis demonstrated that items Q3, Q6, Q7, Q8, Q10, Q14, Q15, Q16, and Q17 had correlation coefficients below 0.3. Furthermore, items Q10, Q14, Q15, Q16, and Q17 showed non-significant correlations with the total score (P > 0.05). Therefore, these items were removed (Table 1 The Results of the Item Analysis of the Preliminary ZAP Scale).

3.2.3. Dispersion Trend Method

All items displayed standard deviations greater than 0.7, reflecting adequate sensitivity and discriminative power. Accordingly, no items were deleted based on this criterion (Table 1 The Results of the Item Analysis of the Preliminary ZAP Scale).

In summary, items Q3, Q6, Q7, Q8, Q10, Q14, Q15, Q16, and Q17 were deleted. The remaining items formed the provisional scale, which subsequently underwent reliability and validity testing.

3.3. Reliability Testing

Reliability testing demonstrated good internal consistency, with a Cronbach's α coefficient of 0.857 and a McDonald's omega coefficient of 0.849, both exceeding the recommended threshold of 0.7. However, item Q2 showed the CITC below 0.3. Additionally, deletion of item Q13 resulted in an increase in Cronbach's α. Consequently, both items Q2 and Q13 were removed from the scale.

3.4. Validity Testing

3.4.1. Face Validity

Five pain specialists evaluated the provisional scale and confirmed its acceptable face validity.

3.4.2. Construct Validity

(i). EFA

The KMO measure was 0.781, exceeding the threshold of 0.6, indicating adequate sampling adequacy for factor analysis. Bartlett's test of sphericity was significant ($\chi^2 = 914.521$, *p* < 0.001), supporting the factorability of the data. Five common factors were extracted, collectively accounting for 70.169% of the total variance, which exceeds the recommended 50% criterion (Table 2 Total Variance Explained by the Extracted Factors). All items demonstrated factor loadings ranging from 0.529 to 0.920, with each item loading significantly on only one factor, supporting clear and meaningful factor structure (Figure 1 Scree Plot, Table 3 Factor Loadings from the Exploratory Factor Analysis). The five dimensions

were designated as follows: Pain Intensity (2 items), Pain Characteristics (2 items), Clinical Signs (2 items), Sleep Quality (2 items), and Emotional State and Daily Life (7 items).

(ii). CFA

CFA was conducted using Amos 28.0 with maximum likelihood estimation to evaluate the model fit. The results (Figure 2 Confirmatory Factor Analysis model of the Provisional ZAP Scale, Table 4 Fit Indices for the Confirmatory Factor Analysis Model of the Provisional ZAP Scale) demonstrated adequate model fit, with $\chi^2/df = 1.902$ (< 3), RMSEA = 0.07 (< 0.08), CFI = 0.915 (> 0.90), and IFI = 0.917 (> 0.90), indicating a stable and well-defined factor structure. Standardized regression coefficients are presented in Table 5 Standardized Regression Coefficients for the Confirmatory Factor Analysis Model of the Provisional ZAP Scale. The AVE for Dimension 1 exceeded the minimum threshold of 0.36, while the AVEs for the remaining dimensions were all above 0.50, supporting satisfactory convergent validity. As shown in Table 6 Discriminant Validity of the Provisional ZAP Scale, the correlation coefficients between dimensions were lower than the square roots of their respective AVEs, confirming that the dimensions are related yet empirically distinct, thereby establishing good discriminant validity.

In summary, the final Chinese ZAP Patient Assessment Scale retains a modular structure consisting of three parts: Part 1 includes 15 items, Part 2 comprises 5 dimensions with 17 items, and Part 3 contains 3 items (Table A2. Final Chinese Version of the Zoster-Associated Pain Patient Assessment Scale).

4. Discussion

ZAP manifests with diverse symptoms and is frequently associated with severe pain, heightening the risk of progression to postherpetic neuralgia (PHN). More than 40% of PHN patients experience moderate-to-severe sleep disturbances [21], and approximately 60% report current or recurrent suicidal ideation [5]. Thus, rapid and accurate pain assessment in ZAP patients is essential for guiding appropriate treatment strategies and predicting clinical outcomes. The modular ZAP assessment scale developed in this study consists of three parts: Part 1 includes 15 non-quantitative items (e.g., “Comorbidities,” “Rash presentation,” “Breakthrough pain”) designed to help clinicians comprehensively evaluate the patient’s condition and systematically document clinical data; Part 2 contains 17 items across 5 dimensions, enabling efficient and precise assessment of ZAP-related pain, suitable for both outpatient and self-administered use in home settings; Part 3 is specifically tailored for acute-phase patients and includes 3 items focusing on acute complications—thereby addressing a notable gap in detailed acute-phase assessment and improving evaluation accuracy.

The incidence of HZ in China ranges from 1.90 to 6.42 per 1000 person-years, which is consistent with rates reported in other countries. Lifetime prevalence is moderately higher in women (3.94%-7.90%) than in men (2.86%-7.60%) [22]. The onset of HZ is closely associated with immune status [23]. Aging and declining immune function increase the risk of VZV reactivation and subsequent HZ, particularly among individuals with chronic comorbidities [24, 25]. Moreover, a history of HZ in close relatives, extended family members, or even spouses constitutes a significant risk factor, with the level of risk correlating positively with the degree of kinship [26-28]. Based on these findings, relevant items were incorporated into Part 1 of the assessment scale.

Drawing on the *2016 Chinese Expert Consensus on the Diagnosis and Treatment of Postherpetic Neuralgia* [5] and the *2022 China Expert Consensus on the Diagnosis and Treatment of Herpes Zoster* [11], items pertaining to rash characteristics—such as “acute-phase lesion type” and “rash area”—were developed. Although current literature offers limited analyses using such data to identify influencing factors, these additions are expected to provide novel insights and valuable data for future clinical research. Part 1 also incorporates pre-treatment information to assist clinicians in predicting disease progression, formulating medically appropriate and acceptable treatment plans, and ultimately improving patient adherence. Large-scale statistical analysis of pre-treatment data may further support investigations into therapeutic efficacy, safety, and influencing factors.

The scale employs vocabulary and sentence structures consistent with the everyday expressions of Chinese patients. Assessment items were designed to reflect Chinese cultural habits and lifestyles. Both patients and pain specialists participated in the evaluation and provided feedback to refine the content, thereby ensuring accuracy and reliability. Following item analysis and reliability/validity testing of Part 2 of the preliminary scale, a provisional version comprising 5 dimensions and 15 items was established. The development process adhered rigorously to established methodological principles, resulting in a tool with scientifically sound content, a clear structure, linguistically fluent items, and ease of comprehension.

Item analysis was conducted using the Critical Ratio method, which evaluates discriminative power based on statistical significance (P-value) or the critical ratio value; the correlation coefficient method, which assesses item relevance through Pearson correlation with the total score; and the dispersion trend method, which examines variability via SD. The results indicated statistically significant differences between high- and low-score groups ($P < 0.001$) for all items. All items demonstrated standard deviations greater than 0.70, reflecting good discriminative ability, and item-total correlations exceeded 0.30, confirming satisfactory homogeneity.

Reliability Testing—reflecting precision, stability, and internal consistency—was evaluated using Cronbach’s α and McDonald’s omega coefficients [15]. Test-retest reliability

was not employed due to the potential influence of "memory effects", which could introduce bias [19]. A Cronbach's α value greater than 0.90 indicates excellent internal consistency, values between 0.70 and 0.90 suggest good reliability, and values below 0.70 indicate inadequate consistency, necessitating scale revision. The omega coefficient, derived from factor analysis, offers a more robust estimate of scale reliability, with values above 0.80 considered excellent, 0.70-0.80 indicating good reliability, and values below 0.60 reflecting poor reliability. The results of this study (Cronbach's α = 0.857, omega = 0.849) demonstrate good reliability and high internal consistency of the scale.

Validity reflects the degree of deviation between measured values and the intended measurement target. In this study, both face validity and construct validity were assessed. Five pain specialists unanimously affirmed that the scale exhibits good face validity. EFA extracted five common factors, which collectively accounted for 70.169% of the total variance—exceeding the recommended threshold of 50%. Factor loadings for the items ranged from 0.529 to 0.920. CFA based on structural equation modeling demonstrated that model fit indices met or approached established standards: RMSEA = 0.079 (< 0.08), CFI = 0.915 (> 0.90), and IFI = 0.917 (> 0.90), indicating acceptable model fit. The AVE and CR were calculated for each dimension. The AVE for Dimension 1 was acceptable (> 0.36) and approached 0.50, while the AVEs and CRs for the remaining dimensions met ideal criteria. Furthermore, the square root of the AVE for each dimension was substantially higher than its correlations with other dimensions, supporting good discriminant validity. In summary, the scale demonstrates satisfactory reliability and validity.

The scale was designed based on common clinical manifestations of Zoster-Associated Pain (ZAP) to assess pain from both subjective and objective dimensions. Although items such as Q13:"Is pain persistent (with or without intermittent exacerbation)?" and Q14:"Breakthrough pain?" were statistically eliminated during analysis—potentially due to the older age and more severe symptomatology of the patient population at our center. "Persistent pain" reflects an ongoing abnormal state of the nervous system following injury [29], and it serves as a cornerstone for assessing disease severity and a patient's baseline quality of life. In a 2024 study published in *Frontiers in Medicine* [30], persistent pain was significantly associated with higher NRS-11 scores compared to intermittent pain; furthermore, a longer duration of pain was linked to an increased risk of developing PHN. Supporting this, research by Marahatta et al. in 2025 [31] identified prolonged prodromal pain as one of the most significant predictors of PHN. "Breakthrough pain" refers to a transient, intense exacerbation of pain that occurs spontaneously or is triggered by specific factors, such as touch, movement, or emotional stress [32]. The presence of breakthrough pain often indicates underlying hyperalgesia or allodynia, necessitating the use of supplemental, as-needed analgesic medication in addition to baseline pain control regimens, rather than reliance on scheduled analgesics alone. The clinical relevance of these pain patterns is also reflected in established assessment tools. For instance, the Brief Pain Inventory (BPI) [33] includes items for "worst pain," "least pain," and "average pain," which collectively capture the concepts of background and breakthrough pain. Similarly, the PainDETECT questionnaire [34] explicitly includes a "pain course pattern" item to differentiate between persistent pain without fluctuations and persistent pain with breakthrough episodes. As a result, they were reinstated following expert consultation due to their clinical relevance. This inclusion is instrumental in identifying high-risk patients, guiding personalized treatment strategies, and predicting the risk of PHN development.

Consequently, Part 2 was finalized with 5 dimensions and 17 items. The clinical appropriateness of this decision warrants further validation through external datasets and multi-center clinical trials across China. The total score of the scale ranges from 0 to 150, with higher scores indicating greater pain severity and more pronounced effects on psychological status and daily life. In alignment with the *2021 Expert Consensus on Whole-Course Management of Zoster-Associated Pain* [2], which emphasizes the significance of complications resulting from VZV-induced nerve damage in acute-phase patients, Part 3 incorporates three items specifically for this subgroup: "Skin infection in the pain area?", "Other acute complications in the pain area?", and "Muscle strength changes in the pain area?". This allows a comprehensive evaluation of acute-phase complications.

In summary, this study adhered to established scale development principles, ensuring methodological rigor and scientific validity. Analytical validation resulted in a culturally appropriate, readily comprehensible, and comprehensive assessment tool tailored to the Chinese population. The scale demonstrated strong feasibility, reliability, and validity, supporting its utility as a robust instrument for clinical assessment. It accurately reflects the pain status of patients with ZAP, and its scientific and practical value has been substantiated, offering a novel and dependable tool for clinical evaluation of ZAP-related pain in China. Nevertheless, several limitations should be acknowledged. The sample size was relatively small and derived from a single-center study, which may limit generalizability. Potential biases could arise from regional socioeconomic and cultural variations, as well as the specific context of the participating hospital. Future work will include patient follow-up, expansion of the sample size, and nationwide multi-center clinical trials to enhance subject diversity. These efforts will further validate the scale's applicability and support its continuous refinement toward broad implementation across China.

Table 1. The Results of the Item Analysis of the Preliminary ZAP Scale.

Item number	Item content	Critical Ratio (t value)	Pearson Correlation Coefficients between the Item and Total Score	SD
Q1	What was the intensity of the most severe pain you experienced in the past week?	4.434*	0.476*	1.241
Q2	What was the intensity of the mildest pain you experienced in the past week?	3.625*	0.337*	2.170
Q3	How severe was your pain during the acute phase of herpes zoster?	2.192*	0.279*	2.463
Q4	How would you rate your pain intensity for most of the past week?	4.201*	0.387*	1.772
Q5	How severe are the numbness, itching, crawling sensations, or constrictive feelings associated with your pain?	4.746*	0.390*	2.911
Q6	Does cold weather or exposure to cold temperatures worsen your pain?	0.788	0.200*	3.911
Q7	Does hot weather or exposure to heat worsen your pain?	3.497*	0.292*	3.317
Q8	Do changes in the weather or environment worsen your pain?	-3.592*	-0.271*	2.785
Q9	Is your pain worsened by light touch or contact (e.g., from clothing)?	6.592*	0.526*	3.527
Q10	Does applying pressure with your hand to the painful area relieve your pain during an episode?	1.156*	0.160	3.336
Q11	Does lightly stroking the painful area with a cotton swab trigger or worsen your pain? (To be assessed by a clinician)	7.285*	0.574*	3.117
Q12	Does pressure applied with a finger to the painful area trigger or worsen your pain? (To be assessed by a clinician)	6.421*	0.523*	3.074
Q13	Is your pain persistent, either constantly or with occasional flare-ups?	4.307*	0.364*	3.381
Q14	Do you experience breakthrough pain?	0.322	0.025	2.523
Q15	How effective are your pain medications (e.g., ibuprofen, acetaminophen) in relieving your pain?	0.422	0.076	2.577
Q16	How effective are your neuropathic pain medications (e.g., pregabalin, duloxetine) in relieving your pain?	-0.669	-0.078	2.942
Q17	Have you ever undergone treatments such as nerve radiofrequency ablation or electrical nerve stimulation? If yes, how effective was the pain relief?	0.601	0.096	3.280
Q18	Over the past week, has your pain made you feel anxious, tense, irritable, or restless?	7.982*	0.587*	2.978
Q19	Over the past week, has your pain caused you to feel depressed, helpless, or frustrated?	10.948*	0.622*	3.274
Q20	Over the past week, have you felt that your pain has been getting worse?	7.051*	0.560*	2.889
Q21	Has your pain reduced your interest in activities you previously enjoyed?	9.121*	0.622*	3.186
Q22	Over the past week, has your pain disturbed your sleep?	8.423*	0.557*	3.036
Q23	Over the past week, have you been awakened by pain during sleep?	10.651*	0.610*	3.304
Q24	How much has your pain interfered with your activities of daily living (e.g., eating, bathing, housework) in the past week?	8.513*	0.610*	3.118
Q25	How much has your pain limited your physical mobility (e.g., standing, walking, squatting, climbing stairs) in the past week?	7.471*	0.538*	3.255
Q26	How much has your pain impacted your social interactions with family, friends, or colleagues in the past week?	9.390*	0.618*	3.156

Note: *P < 0.05

Table 2. Total Variance Explained by the Extracted Factors.

Factor	Initial Eigenvalue			Extracted Load Squared Sum			Rotated Load Squared Sum		
	Total	Variance Contribution Rate (%)	Cumulative Variance Contribution Rate (%)	Total	Variance Percentage	Cumulative %	Total	Variance Percentage	Cumulative %
1	5.234	34.891	34.891	5.234	34.891	34.891	3.398	22.655	22.655
2	1.781	11.871	46.762	1.781	11.871	46.762	1.895	12.634	35.289
3	1.421	9.471	56.233	1.421	9.471	56.233	1.884	12.558	47.847
4	1.058	7.052	63.285	1.058	7.052	63.285	1.694	11.293	59.139
5	1.033	6.884	70.169	1.033	6.884	70.169	1.654	11.030	70.169

Table 3. Factor Loadings from the Exploratory Factor Analysis.

Item	Factor				
	1	2	3	4	5
Q18	0.797				
Q19	0.737				
Q26	0.723				
Q21	0.666				
Q20	0.640				
Q25	0.576				
Q24	0.529				
Q4		0.799			
Q1		0.705			
Q12			0.920		
Q11			0.882		
Q22				0.852	
Q23				0.852	
Q9					0.863
Q5					0.755

Table 4. Fit Indices for the Confirmatory Factor Analysis Model of the Provisional ZAP Scale.

Project	χ^2/df	RMSEA	CFI	IFI
Reference Standard	1～3	<0.08	＞0.90	＞0.90
Fact	1.902	0.079	0.915	0.917

Note: χ^2/df represents the ratio of the chi-square statistic to the degrees of freedom for goodness-of-fit, RMSEA denotes the Root Mean Square Error of Approximation, CFI indicates the Comparative Fit Index, and IFI refers to the Incremental Fit Index.

Table 5. Standardized Regression Coefficients for the Confirmatory Factor Analysis Model of the Provisional ZAP Scale.

Item	Dimension	Estimate	AVE	CR
Q18	F1	0.662		
Q19	F1	0.634		
Q26	F1	0.803		
Q21	F1	0.710	0.456	0.853
Q20	F1	0.572		
Q25	F1	0.634		
Q24	F1	0.687		
Q4	F2	0.685	0.544	0.703
Q1	F2	0.786		
Q12	F3	0.841	0.795	0.886
Q11	F3	0.940		
Q22	F4	0.805	0.664	0.798
Q23	F4	0.824		
Q9	F5	0.847	0.614	0.760
Q5	F5	0.715		

Note: Estimate refers to the standardized factor loading; AVE denotes Average Variance Extracted; CR represents Composite Reliability; F1 corresponds to Pain Intensity; F2 corresponds to Pain Characteristics; F3 corresponds to Clinical Signs; F4 corresponds to Sleep Quality; F5 corresponds to Emotional State and Daily Life.

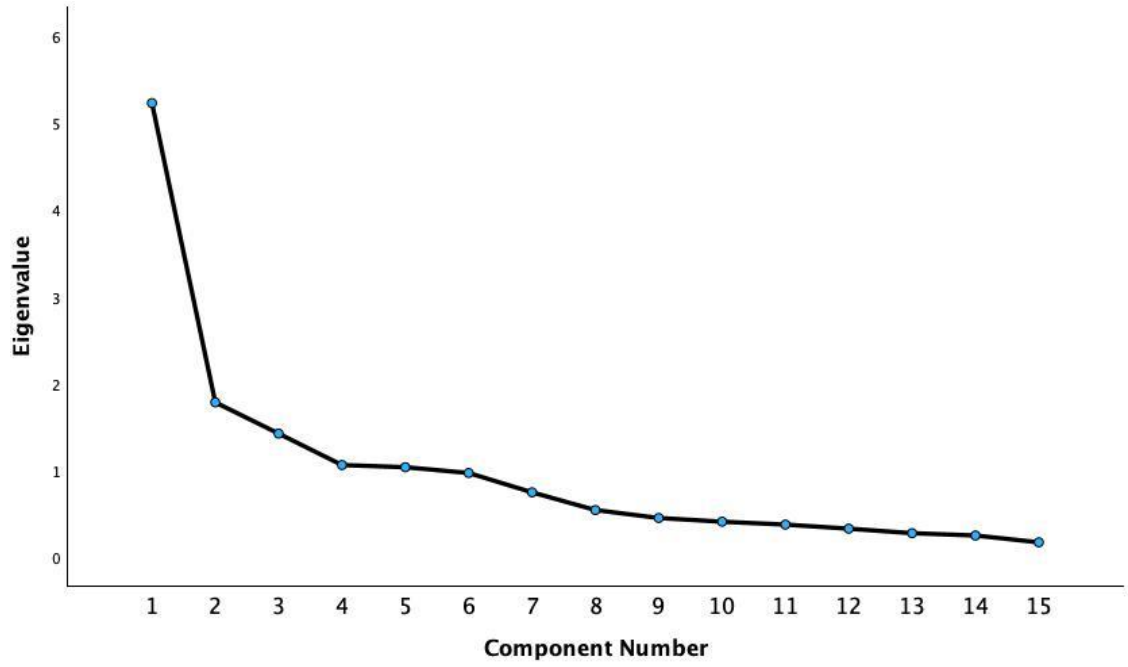

Figure 1. Scree Plot.

Note: Components with eigenvalues exceeding the conventional threshold (typically >1.0) should generally be retained. In this analysis, the substantially higher eigenvalues observed for Factors 1 through 5, followed by a plateau beginning at Factor 6, further support the retention of five common factors.

Table 6. Discriminant Validity of the Provisional ZAP Scale.

Dimension	F1	F2	F3	F4	F5
F1	0.456				
F2	0.505	0.544			
F3	0.369	0.302	0.795		
F4	0.620	0.346	0.305	0.664	
F5	0.304	0.476	0.348	0.232	0.614
The Square Roots of AVE	0.675	0.738	0.892	0.815	0.784

Note: AVE denotes Average Variance Extracted; F1 corresponds to Pain Intensity; F2 corresponds to Pain Characteristics; F3 corresponds to Clinical Signs; F4 corresponds to Sleep Quality; F5 corresponds to Emotional State and Daily Life.

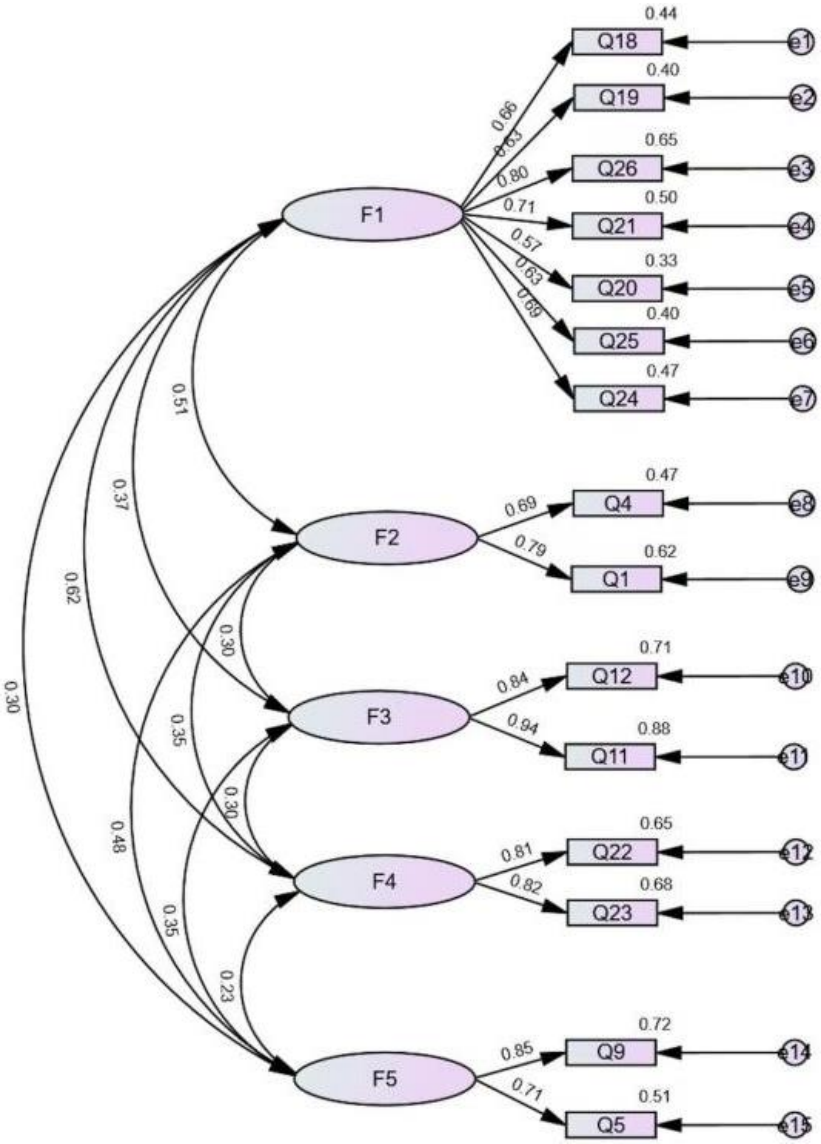

Figure 2. Confirmatory Factor Analysis model of the Provisional ZAP Scale.

Note: The five factors correspond to the following domains: F1 represents pain intensity scores; F2, the qualitative characteristics of pain; F3, observable clinical signs; F4, sleep quality; and F5, emotional well-being and daily functioning.

Abbreviations

ZAP	Zoster-Associated Pain
HZ	Herpes Zoster
VZV	Varicella-Zoster Virus
PHN	Postherpetic Neuralgia
ICHD-3	The International Classification of Headache Disorders, 3rd edition
VAS	Visual Analogue Scale
NRS	Numerical Rating Scale
DN-4	Douleur Neuropathique 4
LANSS	Leeds Assessment of Neuropathic Pain Symptoms and Signs Scale
SF-MPQ	Short-Form McGill Pain Questionnaire
SF-36	Medical Outcomes Study 36-item short form health survey
HADS	Hospital Anxiety and Depression Scale
PSQI	Pittsburgh Sleep Quality Index
NHP	Nottingham Health Profile
QoL	Quality of Life
SD	Standard Deviation
CITC	Corrected Item-Total Correlation
KMO	Kaiser-Meyer-Olkin
RMSEA	Root Mean Square Error of Approximation
CR	Composite Reliability
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
IFI	Incremental Fit Index
AVE	Average Variance Extracted
NSAIDs	Nonsteroidal Anti-inflammatory Drugs
PCA	Principal Component Analysis
TCM	Traditional Chinese Medicine

Author Contributions

Wang Yuxuan: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Software, Validation, Visualization, Writing – original draft

Zhao Jinfeng: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Software, Validation, Visualization, Writing – original draft

Sun Tao: Methodology, Project administration, Resources, Supervision, Validation, Writing – review & editing

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Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Appendix

Table A1. *Preliminary Chinese Version of the Zoster-Associated Pain Patient Assessment Scale.*

Name: Gender: Age: Hospital ID: Contact:

To accurately evaluate and effectively treat your condition, please provide truthful responses to the following questions. Mark "√" in the box that best reflects your actual situation.

I. Patient General Information

1. Underlying diseases:

□ Diabetes □ Hypertension

□ Coronary heart disease

□ History of malignancy (_____)

□ History of infectious disease (e.g., hepatitis B, tuberculosis, etc.)

□ Smoking/alcohol history

(Smoking: _____ years, _____ cigarettes or _____ packs/day; or quit smoking, abstinence duration: _____

Alcohol: _____ years, _____ bottles of beer or _____ liang of liquor/day; or quit alcohol, abstinence duration: _____)

□ Others: _____

11. Relationship between painful area and rash area:

□ Pain area smaller than rash area

□ Pain area consistent with rash area

□ Pain area larger than rash area

12. Time to complete rash healing:

□ <1 week □ 1-2 weeks □ 2-3 weeks

□ 3-4 weeks □ ≥1 month

13. Type of pain:

□ Burning or stabbing □ Throbbing or distending

□ Electric-shock-like or radiating □ Tearing or cutting

14. Recent use of analgesic medications:

(1) Ion channel blockers:

Pregabalin: _____ Gabapentin: _____

2. Predisposing factors before onset:

□ Fatigue, staying up late, emotional changes, high mental stress

□ Cold exposure, upper respiratory tract infection

□ Trauma, surgery, radiotherapy/chemotherapy, immunosuppressant use

□ None of the above

3. History of herpes zoster in close relatives:

□Yes □No

4. Disease duration:

□ <1 month □ 1-3 months

□ 3-6 months □ 6-12 months

□ 1-3 years □ 3-5 years

□ 5-10 years □ >10 years

5. Side of pain:

□ Left □ Right

6. Involved nerve segments in the painful area:

□ Trigeminal nerve □ Cervical nerve

□ Thoracic nerve □ Lumbar nerve

7. Number of involved nerves:

□ 1 □ 2 □ 3 □ 4 □ ≥5

8. Relationship between pain and rash onset:

□ Pain before rash (prodromal pain)

□ Pain concurrent with rash

□ Pain after rash onset

□ Pain after rash healing

9.Type of rash during the acute phase:

□ No rash □ Erythema/papules only

□ Clustered vesicles □ Necrosis

□ Bullae/hemorrhagic/pustular blisters

10.Area of skin lesions (evaluated by palm method; patient's palm area ≈1%):

□ Mild (<3%) □ Moderate (3-5%) □ Severe (>5%)

(2) Antiepileptics:

Carbamazepine: _____Oxcarbazepine: _____

(3) Tricyclic antidepressants:

Amitriptyline: _____Doxepin: _____

(4) Selective norepinephrine reuptake inhibitors:

Duloxetine: _____ Venlafaxine: _____

(5) Nonsteroidal anti-inflammatory drugs (NSAIDs):

Diclofenac sodium: _____Ibuprofen: _____

Paracetamol/dihydrocodeine: _____Tramadol: _____

Etoricoxib: _____Celecoxib: _____

(6) Opioids:

Oxycodone (acetaminophen/hydrochloride): _____

Morphine (sulfate/hydrochloride): _____

(7) Neurotrophic agents:

Mecobalamin: _____Vitamin B complex: _____

(8) Corticosteroids: _____

(9) Topical agents:

Buprenorphine transdermal patch: _____

Lidocaine gel patch: _____

(10) Others: _____

15. Non-pharmacological treatments received:

□ Shockwave therapy, electrotherapy, laser therapy, ultrasound therapy, etc.

□ Traditional Chinese medicine (TCM) treatments: oral herbs/patent drugs, moxibustion, acupuncture, bloodletting cupping, acupoint embedding/injection, auricular acupuncture, etc.

□ Nerve block

□ Neuromodulation: radiofrequency ablation, electrical stimulation therapy, intrathecal drug delivery

To ensure accurate assessment and effective treatment of your condition, please answer the following questions truthfully based on your experiences over the past week. Mark "√" next to the option that best reflects your actual situation. 0 = No pain; 1-3 = Mild pain; 4-6 = Moderate pain; 7-9 = Severe pain; 10 = Excruciating pain

1. What was the intensity of the most severe pain you experienced in the past week?

(No Pain) 0 1 2 3 4 5 6 7 8 9 10 (Excruciating Pain)

2. What was the intensity of the mildest pain you experienced in the past week?

(No Pain) 0 1 2 3 4 5 6 7 8 9 10 (Excruciating Pain)

3. How severe was your pain during the acute phase of herpes zoster?

(No Pain) 0 1 2 3 4 5 6 7 8 9 10 (Excruciating Pain)

4. How would you rate your pain intensity for most of the past week?

(No Pain) 0 1 2 3 4 5 6 7 8 9 10 (Excruciating Pain)

5. How severe are the numbness, itching, crawling sensations, or constrictive feelings associated with your pain?

15. How effective are your pain medications (e.g., ibuprofen, acetaminophen) in relieving your pain?

0- No relief / Not applicable (0 points)

1- Slight relief (2.5 points)

2- Moderate relief (5 points)

3- Substantial relief (7.5 points)

4- Complete relief (10 points)

16. How effective are your neuropathic pain medications (e.g., pregabalin, duloxetine) in relieving your pain?

0- No relief / Not applicable (0 points)

1- Slight relief (2.5 points)

2- Moderate relief (5 points)

3- Substantial relief (7.5 points)

(No Numbness) 0 1 2 3 4 5 6 7 8 9 10 (Excruciating Numbness)

6. Does cold weather or exposure to cold temperatures worsen your pain?

0- No (0 point)

1- Lighter (2.5 points)

2- Moderate (5 points)

3- Severe (7.5 points)

4- Extremely severe (10 points)

7. Does hot weather or exposure to heat worsen your pain?

0- No (0 point)

1- Lighter (2.5 points)

2- Moderate (5 points)

3- Severe (7.5 points)

4- Extremely severe (10 points)

8. Do changes in the weather or environment worsen your pain?

0- No (0 point)

1- Lighter (2.5 points)

2- Moderate (5 points)

3- Severe (7.5 points)

4- Extremely severe (10 points)

9. Is your pain worsened by light touch or contact (e.g., from clothing)?

0- No (0 point)

1- Mild and negligible (2.5 points)

2- Moderate but tolerable (5 points)

3- Severe, requiring interruption of activity (7.5 points)

4- Extremely severe, intolerable to any contact (10 points)

10. Does applying pressure with your hand to the painful area relieve your pain during an episode?

0- No (0 point)

1- Lighter (2.5 points)

2- Moderate (5 points)

3- Severe (7.5 points)

4- Extremely severe (10 points)

11. Does lightly stroking the painful area with a cotton swab trigger or worsen your pain? (To be assessed by a clinician)

0- No (0 point)

1- Lighter (2.5 points)

2- Moderate (5 points)

3- Severe (7.5 points)

4- Extremely severe (10 points)

12. Does pressure applied with a finger to the painful area trigger or worsen your pain? (To be assessed by a clinician)

0- No (0 point)

1- Lighter (2.5 points)

2- Moderate (5 points)

3- Severe (7.5 points)

4- Extremely severe (10 points)

13. Is your pain persistent, either constantly or with occasional

4- Complete relief (10 points)

17. Have you ever undergone treatments such as nerve radiofrequency ablation or electrical nerve stimulation? If yes, how effective was the pain relief?

0- No relief / Not applicable (0 points)

1- Slight relief (2.5 points)

2- Moderate relief (5 points)

3- Substantial relief (7.5 points)

4- Complete relief (10 points)

18. Over the past week, has your pain made you feel anxious, tense, irritable, or restless?

0- Never (0 point)

1- Sometimes (2.5 points)

2- Halftime (5 points)

3- Usually (7.5 points)

4- Always (10 points)

19. Over the past week, has your pain caused you to feel depressed, helpless, or frustrated?

0- Never (0 point)

1- Sometimes (2.5 points)

2- Halftime (5 points)

3- Usually (7.5 points)

4- Always (10 points)

20. Over the past week, have you felt that your pain has been getting worse?

0- Never (0 point)

1- Sometimes (2.5 points)

2- Halftime (5 points)

3- Usually (7.5 points)

4- Always (10 points)

21. Has your pain reduced your interest in activities you previously enjoyed?

0- Exactly the same (0 point)

1- Slightly reduced (2.5 points)

2- Moderately reduced (5 points)

3- Minimal (7.5 points)

4- Virtually none (10 points)

22. Over the past week, has your pain disturbed your sleep?

0- Never (0 point)

1- Sometimes (2.5 points)

2- Halftime (5 points)

3- Usually (7.5 points)

4- Always (10 points)

23. Over the past week, have you been awakened by pain during sleep?

0- 0 time (0 point)

1- 1~2 times (2.5 points)

2- 3~5 times (5 points)

3- ＞5 times (7.5 points)

4- Unable to sleep (10 points)

flare- ups?

0- No pain at all (0 point)

1- Intermittent with long pain-free intervals (2.5 points)

2- Intermittent with brief pain-free intervals (5 points)

3- Constant without episodic exacerbation (7.5 points)

4- Constant with episodic exacerbation (10 points)

14. Do you experience breakthrough pain?

0- No (0 point)

1- Occasionally, lasting up to 10 minutes per episode (2.5 points)

2- Occasionally, but lasting at least 30 minutes per episode (5 points)

3- Frequently, yet lasting up to 10 minutes per episode (7.5 points)

4- Frequently, and lasting at least 30 minutes per episode (10 points)

24. How much has your pain interfered with your activities of daily living (e.g., eating, bathing, housework) in the past week?

0- No (0 point)

1- Has impact but is negligible (2.5 points)

2- Has noticeable impact but can persist with daily routines (5 points)

3- Has significant impact requiring interruption of activity (7.5 points)

4- Unable to perform any daily activities (10 points)

25. How much has your pain limited your physical mobility (e.g., standing, walking, squatting, climbing stairs) in the past week?

0- No (0 point)

1- Has impact but is negligible (2.5 points)

2- Has noticeable impact but can persist with the activity (5 points)

3- Has significant impact requiring interruption of activity (7.5 points)

4- Unable to perform any activity (10 points)

26. How much has your pain impacted your social interactions with family, friends, or colleagues in the past week?

0- No (0 point)

1- Has impact but is negligible (2.5 points)

2- Has noticeable impact but can be endured (5 points)

3- Has significant impact requiring interruption of activity (7.5 points)

4- Unable to engage in any social interaction (10 points)

To ensure an accurate assessment and effective treatment of your condition, please answer the following questions objectively and accurately. Mark "√" in the box that best reflects your actual situation.

III. Complications (To be completed by patients in the acute phase)

1. Is there a skin infection in your painful area?

0- No (0 point)

1- Yes (10 points)

2. Are there any other acute complications in your painful area? (e.g., keratitis/conjunctivitis, hearing impairment/facial paralysis, abdominal distension/diarrhea/constipation, etc.)

0- No (0 point)

1- Yes (10 points)

3. Is there any change in muscle strength in your painful area?

0- Complete paralysis, no detectable muscle contraction (10 points)

1- Detectable muscle contraction, but no movement generated (8 points)

2- Limb can move on the bed, but cannot overcome gravity (cannot lift off the bed) (6 points)

3- Limb can overcome gravity and lift off the bed, but cannot resist external resistance (4 points)

4- Limb can perform movements against resistance, but with reduced strength (2 points)

5- Normal muscle strength (0 points)

Signature: _____ Date: _____

Table A2. *Final Chinese Version of the Zoster-Associated Pain Patient Assessment Scale.*

Name: Gender: Age: Hospital ID: Contact:

To accurately evaluate and effectively treat your condition, please provide truthful responses to the following questions. Mark "√" in the box that best reflects your actual situation.

I. Patient General Information

1. Underlying diseases:

□ Diabetes □ Hypertension

□ Coronary heart disease

□ History of malignancy (_____)

□ History of infectious disease (e.g., hepatitis B, tuberculosis, etc.)

□ Smoking/alcohol history

11. Relationship between painful area and rash area:

□ Pain area smaller than rash area

□ Pain area consistent with rash area

□ Pain area larger than rash area

12. Time to complete rash healing:

□ <1 week □ 1-2 weeks □ 2-3 weeks

□ 3-4 weeks □ ≥1 month

13. Type of pain:

(Smoking: _____ years, _____ cigarettes or _____ packs/day; or quit smoking, abstinence duration: _____

Alcohol: _____ years, _____ bottles of beer or _____ liang of liquor/day; or quit alcohol, abstinence duration: _____)

□ Others: _____

2. Predisposing factors before onset:

□ Fatigue, staying up late, emotional changes, high mental stress

□ Cold exposure, upper respiratory tract infection

□ Trauma, surgery, radiotherapy/chemotherapy, immunosuppressant use

□ None of the above

3. History of herpes zoster in close relatives:

□Yes □No

4. Disease duration:

□ <1 month □ 1-3 months

□ 3-6 months □ 6-12 months

□ 1-3 years □ 3-5 years

□ 5-10 years □ >10 years

5. Side of pain:

□ Left □ Right

6. Involved nerve segments in the painful area:

□ Trigeminal nerve □ Cervical nerve

□ Thoracic nerve □ Lumbar nerve

7. Number of involved nerves:

□ 1 □ 2 □ 3 □ 4 □ ≥5

8. Relationship between pain and rash onset:

□ Pain before rash (prodromal pain)

□ Pain concurrent with rash

□ Pain after rash onset

□ Pain after rash healing

9.Type of rash during the acute phase:

□ No rash □ Erythema/papules only

□ Clustered vesicles □ Necrosis

□ Bullae/hemorrhagic/pustular blisters

10.Area of skin lesions (evaluated by palm method; patient's palm area ≈1%):

□ Mild (<3%) □ Moderate (3-5%) □ Severe (>5%)

□ Burning or stabbing □ Throbbing or distending

□ Electric-shock-like or radiating □ Tearing or cutting

14. Recent use of analgesic medications:

(1) Ion channel blockers:

Pregabalin: _____ Gabapentin: _____

(2) Antiepileptics:

Carbamazepine: _____Oxcarbazepine: _____

(3) Tricyclic antidepressants:

Amitriptyline: _____Doxepin: _____

(4) Selective norepinephrine reuptake inhibitors:

Duloxetine: _____ Venlafaxine: _____

(5) Nonsteroidal anti-inflammatory drugs (NSAIDs):

Diclofenac sodium: _____Ibuprofen: _____

Paracetamol/dihydrocodeine: _____Tramadol: _____

Etoricoxib: _____Celecoxib: _____

(6) Opioids:

Oxycodone (acetaminophen/hydrochloride): _____

Morphine (sulfate/hydrochloride): _____

(7) Neurotrophic agents:

Mecobalamin: _____Vitamin B complex: _____

(8) Corticosteroids: _____

(9) Topical agents:

Buprenorphine transdermal patch: _____

Lidocaine gel patch: _____

(10) Others: _____

15. Non-pharmacological treatments received:

□ Shockwave therapy, electrotherapy, laser therapy, ultrasound therapy, etc.

□ Traditional Chinese medicine (TCM) treatments: oral herbs/patent drugs, moxibustion, acupuncture, bloodletting cupping, acupoint embedding/injection, auricular acupuncture, etc.

□ Nerve block

□ Neuromodulation: radiofrequency ablation, electrical stimulation therapy, intrathecal drug delivery

To ensure accurate assessment and effective treatment of your condition, please answer the following questions truthfully based on your experiences over the past week. Mark "√" next to the option that best reflects your actual situation. 0 = No pain; 1-3 = Mild pain; 4-6 = Moderate pain; 7-9 = Severe pain; 10 = Excruciating pain

II. Pain Assessment

i. Pain Intensity (2 questions, 20 points)

1. How would you rate your pain intensity for most of the past week?

(No Pain) 0 1 2 3 4 5 6 7 8 9 10 (Excruciating Pain)

2. What was the intensity of the most severe pain you experienced in the past week?

(No Pain) 0 1 2 3 4 5 6 7 8 9 10 (Excruciating Pain)

10. Over the past week, have you been awakened by pain during sleep?

0- 0 time (0 point)

1- 1~2 times (2.5 points)

2- 3~5 times (5 points)

3- ＞5 times (7.5 points)

4- Unable to sleep (10 points)

v. Emotional State and Daily Life (7 questions, 70 points)

11. Over the past week, has your pain made you feel anxious, tense,

ii. Pain Characteristics (4 questions, 40 points)

3. Is your pain worsened by light touch or contact (e.g., from clothing)?

0- No (0 point)

1- Mild and negligible (2.5 points)

2- Moderate but tolerable (5 points)

3- Severe, requiring interruption of activity (7.5 points)

4- Extremely severe, intolerable to any contact (10 points)

4. How severe are the numbness, itching, crawling sensations, or constrictive feelings associated with your pain?

(No Numbness) 0 1 2 3 4 5 6 7 8 9 10 (Excruciating Numbness)

5. Is your pain persistent, either constantly or with occasional flare- ups?

0- No pain at all (0 point)

1- Intermittent with long pain-free intervals (2.5 points)

2- Intermittent with brief pain-free intervals (5 points)

3- Constant without episodic exacerbation (7.5 points)

4- Constant with episodic exacerbation (10 points)

6. Do you experience breakthrough pain?

0- No (0 point)

1- Occasionally, lasting up to 10 minutes per episode (2.5 points)

2- Occasionally, but lasting at least 30 minutes per episode (5 points)

3- Frequently, yet lasting up to 10 minutes per episode (7.5 points)

4- Frequently, and lasting at least 30 minutes per episode (10 points)

iii. Clinical Signs (2 questions, 20 points)

7. Does pressure applied with a finger to the painful area trigger or worsen your pain? (To be assessed by a clinician)

0- No (0 point)

1- Lighter (2.5 points)

2- Moderate (5 points)

3- Severe (7.5 points)

4- Extremely severe (10 points)

8. Does lightly stroking the painful area with a cotton swab trigger or worsen your pain? (To be assessed by a clinician)

0- No (0 point)

1- Lighter (2.5 points)

2- Moderate (5 points)

3- Severe (7.5 points)

4- Extremely severe (10 points)

iv. Sleep Quality (2 questions, 20 points)

9. Over the past week, has your pain disturbed your sleep?

0- Never (0 point)

1- Sometimes (2.5 points)

2- Halftime (5 points)

3- Usually (7.5 points)

4- Always (10 points)

irritable, or restless?

0- Never (0 point)

1- Sometimes (2.5 points)

2- Halftime (5 points)

3- Usually (7.5 points)

4- Always (10 points)

12. Over the past week, has your pain caused you to feel depressed, helpless, or frustrated?

0- Never (0 point)

1- Sometimes (2.5 points)

2- Halftime (5 points)

3- Usually (7.5 points)

4- Always (10 points)

13. How much has your pain impacted your social interactions with family, friends, or colleagues in the past week?

0- No (0 point)

1- Has impact but is negligible (2.5 points)

2- Has noticeable impact but can be endured (5 points)

3- Has significant impact requiring interruption of activity (7.5 points)

4- Unable to engage in any social interaction (10 points)

14. Has your pain reduced your interest in activities you previously enjoyed?

0- Exactly the same (0 point)

1- Slightly reduced (2.5 points)

2- Moderately reduced (5 points)

3- Minimal (7.5 points)

4- Virtually none (10 points)

15. Over the past week, have you felt that your pain has been getting worse?

0- Never (0 point)

1- Sometimes (2.5 points)

2- Halftime (5 points)

3- Usually (7.5 points)

4- Always (10 points)

16. How much has your pain limited your physical mobility (e.g., standing, walking, squatting, climbing stairs) in the past week?

0- No (0 point)

1- Has impact but is negligible (2.5 points)

2- Has noticeable impact but can persist with the activity (5 points)

3- Has significant impact requiring interruption of activity (7.5 points)

4- Unable to perform any activity (10 points)

17. How much has your pain interfered with your activities of daily living (e.g., eating, bathing, housework) in the past week?

0- No (0 point)

1- Has impact but is negligible (2.5 points)

2- Has noticeable impact but can persist with daily routines (5 points)

3- Has significant impact requiring interruption of activity (7.5 points)

4- Unable to perform any daily activities (10 points)

To ensure an accurate assessment and effective treatment of your condition, please answer the following questions objectively and accurately. Mark "√" in the box that best reflects your actual situation.

III. Complications (To be completed by patients in the acute phase)

1. Is there a skin infection in your painful area?

0- No (0 point)

1- Yes (10 points)

2. Are there any other acute complications in your painful area? (e.g., keratitis/conjunctivitis, hearing impairment/facial paralysis, abdominal distension/diarrhea/constipation, etc.)

0- No (0 point)

1- Yes (10 points)

3. Is there any change in muscle strength in your painful area?

0- Complete paralysis, no detectable muscle contraction (10 points)

1- Detectable muscle contraction, but no movement generated (8 points)

2- Limb can move on the bed, but cannot overcome gravity (cannot lift off the bed) (6 points)

3- Limb can overcome gravity and lift off the bed, but cannot resist external resistance (4 points)

4- Limb can perform movements against resistance, but with reduced strength (2 points)

5- Normal muscle strength (0 points)

Signature: _____ Date: _____

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