Dermatological Health, 2025, Volume 3, Issue 4
http://ojs.bbwpublisher.com/index.php/DH
Online ISSN: 2981-8206
Print ISSN: 3083-4775

The Impact of Intrinsic and External Environmental Factors on Treatment Efficacy in Patients with Chronic Spontaneous Urticaria: A Single-center Retrospective Study

Song Li[1], Aijun Chen[2]*

[1]The First Clinical College of Chongqing Medical University, Chongqing 400016, China
[2]Department of Dermatology, The First Affiliated Hospital of Chongqing Medical University, Chongqing 400016, China

**Author to whom correspondence should be addressed.*

Abstract: *Purpose:* This study aimed to explore the association between patient-intrinsic factors, environmental exposures, and improvement in psychosocial adaptation among individuals with chronic spontaneous urticaria (CSU). *Methods:* We conducted a single-center retrospective cohort study by reviewing medical records of 84 CSU patients aged 18–65 years who attended a tertiary dermatology outpatient clinic between January 2023 and January 2024, with follow-up of at least 3 months. Data on demographic characteristics, disease severity (measured by UCT score), and psychosocial adaptation (assessed via the Chinese version of the Patient Attitude and Self-Adaptation Questionnaire, PASQ-CSD) were extracted from electronic health records, while environmental variables—including monthly averages of temperature, humidity, PM2.5 levels, and pollen concentration—were obtained from national meteorological and environmental monitoring platforms. Improvement in psychosocial adaptation was defined as an increase of ≥5 points in PASQ score during 3–6 months of follow-up. *Results:* The mean age of participants was 44.27 ± 14.86 years, with 55.9% being female. Although no significant differences were observed in UCT scores (P = 0.402) or PARS-3 scores across treatment groups, PASQ scores showed statistically significant intergroup variation (P = 0.015). Occupational distribution differed significantly among groups (P = 0.034), whereas marital status did not (P = 0.219). No direct causal relationship was identified between medication type and psychological improvement; however, findings suggest that sociodemographic roles and environmental stressors may act as potential modifiers. *Conclusion:* These results indicate that psychosocial adaptation in CSU patients is influenced by multiple contextual factors, highlighting the need for integrated biopsychosocial assessment in clinical management and supporting future prospective studies on environment–psychology interactions.

Keywords: Chronic urticaria; Psychosocial adaptation; Longitudinal study; Multivariate logistic regression; Treatment outcome prediction

Online publication: December 31, 2025

1. Introduction

Chronic spontaneous urticaria (CSU), the predominant subtype of chronic urticaria, is a common skin disorder characterized by recurrent episodes of wheals and/or angioedema without apparent triggers lasting for more than six weeks, with a global point prevalence of approximately 1%[1,2] . The pathogenesis of CSU has not been fully elucidated, but it is currently believed to be closely associated with autoimmune abnormalities, spontaneous mast cell activation, and chronic inflammatory states [1-3] . Clinically, it manifests as episodic skin wheals and severe pruritus, with some patients experiencing angioedema, significantly affecting sleep, mood, and daily functioning, thereby imposing a substantial disease burden [2,4,5]. Current first-line treatment involves standard or up-dosed second-generation non-sedating antihistamines; however, approximately 30%–50% of patients show inadequate response and require escalation to therapies such as omalizumab, cyclosporine, or biologics [1,2]. The significant variability in treatment response suggests potential influences from both intrinsic patient factors (e.g., age, sex, disease duration, Dermatology Life Quality Index score, anxiety and depression status, allergy history, autoimmune disease history) and external environmental factors (e.g., seasonal changes, temperature fluctuations, air humidity, PM2.5/PM10 concentrations, pollen levels, periods of viral infection outbreaks) [4,5] . Nevertheless, systematic review analyses on the combined impact of these factors on treatment response in real-world settings are lacking. Although current guidelines mention environmental triggers, they do not thoroughly explore their interactions with individual patient characteristics[6] . Therefore, this study aims to investigate the impact of individual characteristics and environmental exposures on treatment response in CSU patients through a single-center retrospective study, to identify predictors of therapeutic efficacy and provide evidence for clinical individualized management.

2. Materials and methods

2.1. General information

Medical records of patients diagnosed with chronic spontaneous urticaria (CSU) at the dermatology outpatient clinic of a hospital between January 2023 and January 2024 were retrospectively collected. Inclusion criteria: (1) met diagnostic criteria for CSU with symptoms lasting more than 6 weeks; (2) aged between 18 and 65 years; (3) completed the Chinese version of the Psychological Adaptation Scale (PASQ-CSD) at both initial visit and follow-up; (4) follow-up duration of no less than 3 months. Exclusion criteria: (1) presence of severe psychiatric disorders or diagnosed psychological conditions; (2) suffering from severe systemic diseases affecting psychological assessment (e.g., malignancies, end-stage organ diseases); (3) in an acute exacerbation phase or with severe allergic reactions at first visit; (4) incomplete medical records or missing key variables. A total of 98 patients were screened, among whom 4 were younger than 18 years, 1 refused to participate, and 1 was lost to follow-up without follow-up assessment records. Finally, 84 patients meeting the criteria were included in the analysis.

2.2. Data collection and variable definition

Demographic and clinical information, including gender, age, marital status, occupation, education level, disease duration, comorbidities, and scores on the Chinese-adapted Psychological Adaptation Scale (PASQ-CSD) completed at initial diagnosis and follow-up, were extracted from the hospital's electronic medical record system and outpatient follow-up records. All scales were completed under the guidance of trained professionals during routine clinical practice and archived as part of clinical assessment data.

In this study, patient characteristics such as gender, age, and disease duration were classified as internal environmental factors, while variables reflecting psychosocial background, including marital status, employment

status, living conditions, and sources of social support, were classified as external environmental factors. All variables were independently extracted by two researchers and cross-verified; discrepancies were resolved through discussion or adjudication by a third researcher. Data extraction included initial visit date, follow-up time points, original scores for each PASQ-CSD dimension, and total scores. All analyses were based on existing clinical records, with no interventions or additional data collection performed.

2.3. Measurement tools

2.3.1. Assessment of patients' psychosocial adaptation

To evaluate and monitor patients' psychosocial adaptation, the PASQ-CSD scale adapted into Chinese by the author was used [7]. The scale underwent bilingual comparison and back-translation using the Brislin translation model, and cultural adjustments were made to the items based on expert input—for instance, changing "I still consider myself attractive" to "I am confident that I have not been socially excluded after illness." The scale consists of 18 items divided into three dimensions: emotional (8 items), self-perception (6 items), and social adaptation (4 items). A 5-point Likert scale (always/often/sometimes/rarely/never) is used for scoring; higher total scores indicate stronger psychosocial adaptation. Exploratory factor analysis confirmed its structural validity (KMO = 0.848, cumulative variance explained = 65.142%), and Cronbach's α coefficient reached 0.930, indicating good internal consistency. Changes in scores can reflect intervention effects. For example, a significant increase in scores on the emotional dimension after intervention (e.g., rising from 20 to 40 points) suggests that psychological support measures may be effective.

2.3.2. UCT

After treatment, the Urticaria Control Test (UCT) [8] was used to assess disease control in both patient groups. It includes four questions, each with five response options (0–4 points). The total score is the sum of the four item scores, with a maximum of 16 points. Lower total scores indicate poorer disease control and higher disease activity. According to UCT scores, disease control is classified as uncontrolled/no response (12 points), partially controlled/partial response (12 to <16 points), or fully controlled/complete response (16 points). An UCT score ≥12 indicates effective treatment. A change of 3 points is considered the minimum clinically relevant difference in UCT.

2.4. Statistical analysis

Statistical analysis was performed using STATA 17.0. Normally distributed continuous variables were expressed as $\overline{x} \pm s$, and intergroup differences were compared using the independent samples t-test. Categorical data were presented as numbers (percentages), and group comparisons were conducted using the χ^2 test. The statistical significance level was set at two-tailed $\alpha=0.05$.

3. Results

3.1. Baseline characteristics

A total of 84 patients were enrolled in this study, with the following baseline characteristics: the mean age was 44.27±14.86 years (age as a continuous variable, without adjustment for case count); regarding gender, there were 47 females (55.9%) and 37 males (44.1%); in terms of marital status, 57 patients were married (67.9%), 25 were unmarried (29.8%), and 2 were divorced (2.4%). Educational level was primarily university/undergraduate (33

cases, 39.3%) and junior high school (22 cases, 26.2%), followed by college diploma (13 cases, 15.5%), senior high school (7 cases, 8.3%), primary school (5 cases, 6.0%), postgraduate (3 cases, 3.6%), and vocational high school (2 cases, 2.4%). Occupations were varied: 17 were clerks (20.2%), 17 were unemployed (20.2%), 12 were workers (14.3%), 11 were students (13.1%), 10 were self-employed (11.9%), 7 were retirees (8.3%), and all other occupations accounted for less than 6%. In disease assessment, the UCT score was 14.00 (11.00, 15.00). According to control status, 41 patients (48.8%) had partial control, 30 (35.7%) had uncontrolled disease, and 13 (15.5%) had complete control.

Table 1. Baseline characteristics of patients

Variable	Category	Count	Percentage
Age (years)	44.27 ± 14.86		
Sex			
	Female	51	55.4%
	Male	41	44.6%
Marital Status			
	Married	62	67.4%
	Unmarried	27	29.3%
	Divorced	3	3.3%
Education Level			
	College/Bachelor	36	39.1%
	Junior High	24	26.1%
	Junior College	14	15.2%
	Senior High	8	8.7%
	Primary	5	5.4%
	Postgraduate	3	3.3%
	Secondary Technical	2	2.2%
Occupation			
	Clerk	18	19.6%
	Unemployed	18	19.6%
	Worker	13	14.1%
	Student	12	13.0%
	Self-employed	11	12.0%
	Retired	8	8.7%
	Civil Servant	5	5.4%
	Sales	3	3.3%
	Teacher	2	2.2%
	Medical Worker	1	1.1%
	Nurse	1	1.1%
UCT Score	14.00 (11.00, 15.00)		
UCT Control Status			
	Partially Controlled	45	48.9%
	Uncontrolled	33	35.9%
	Fully Controlled	14	15.2%

3.2. Comparison of marital status among three groups

In the distribution of marital status, the ebastine group had 21.4% unmarried, 71.4% married, and 7.1% divorced; the levocetirizine group had 20.0% unmarried, 76.0% married, and 4.0% divorced; the loratadine group had 47.1% unmarried, 52.9% married, and no divorced individuals. There was no statistically significant difference in marital status among the three groups ($P = 0.219$), analyzed using the chi-square test.

Table 2. Comparison of marital status among three groups

Category	Ebastine group	Levocetirizine group	Loratadine group	*P*-value	Test Type
Single	9 (21.4%)	5 (20.0%)	8 (47.1%)		
Married	30 (71.4%)	19 (76.0%)	9 (52.9%)		
Divorced	3 (7.1%)	1 (4.0%)	0 (0.0%)		
Total				0.219	Chi-square test

3.3. Occupational distribution

Regarding occupational distribution, in the ebastine group, unemployed/job seekers accounted for 26.2%, students 11.9%, workers 7.1%, sales personnel 0.0%, self-employed individuals 4.8%, clerks 26.2%, nurses 4.8%, teachers 2.4%, medical workers 2.4%, and retirees 14.3%; in the levocetirizine group, unemployed/job seekers accounted for 16.0%, students 12.0%, workers 16.0%, sales personnel 8.0%, self-employed individuals 16.0%, clerks 20.0%, nurses 0.0%, teachers 0.0%, civil servants 4.0%, and retirees 8.0%; in the loratadine group, unemployed/job seekers accounted for 11.8%, students 5.9%, workers 35.3%, sales personnel 0.0%, self-employed individuals 29.4%, clerks 0.0%, nurses 0.0%, teachers 0.0%, civil servants 11.8%, and retirees 5.9%. The differences in occupational distribution among the three groups were statistically significant ($P = 0.034$), analyzed using the chi-square test.

Table 3. Occupational distribution of three groups

JOB	Ebastine group	Levocetirizine group	Loratadine group	*P*-value	Test Type
Unemployed/Job-seeking	11 (26.2%)	4 (16.0%)	2 (11.8%)		
Student	5 (11.9%)	3 (12.0%)	1 (5.9%)		
Worker	3 (7.1%)	4 (16.0%)	6 (35.3%)		
Salesperson	0 (0.0%)	2 (8.0%)	0 (0.0%)		
Self-employed	2 (4.8%)	4 (16.0%)	5 (29.4%)		
Employee	11 (26.2%)	5 (20.0%)	0 (0.0%)		
Nurse	2 (4.8%)	0 (0.0%)	0 (0.0%)		
Teacher	1 (2.4%)	0 (0.0%)	0 (0.0%)		
Civil servant	0 (0.0%)	1 (4.0%)	2 (11.8%)		
Medical worker	1 (2.4%)	0 (0.0%)	0 (0.0%)		
Retired	6 (14.3%)	2 (8.0%)	1 (5.9%)		
Total				0.034	Chi-square test

3.4. Comparison of UCT scores and psychosocial adaptation scores

Regarding PASQ scores, the ebastine group scored 79.83 ± 7.9, the levocetirizine group scored 76.04 ± 10.16, and the loratadine group scored 72.06 ± 11.19, with a p-value of 0.015 for intergroup comparison; regarding UCT scores, the ebastine group scored 14.0 [12.0, 15.0], the levocetirizine group scored 12.0 [11.0, 16.0], and the loratadine group scored 11.0 [10.0, 15.0], with a p-value of 0.402 for intergroup comparison.

Table 4. Comparison of physical exercise behavior, UCT scores, and psychosocial adaptation scores among three groups

Category	Ebastine group	Levocetirizine group	Loratadine group	*P*-value
PASQ	79.83 ± 7.9	76.04 ± 10.16	72.06 ± 11.19	0.015
UCT	14.0 [12.0, 15.0]	12.0 [11.0, 16.0]	11.0 [10.0, 15.0]	0.402

4. Discussion

This study, through a single-center retrospective analysis of 84 patients with chronic spontaneous urticaria (CSU), preliminarily reveals differences in patients' psychosocial adaptation ability (PASQ) and their potential associations with demographic and occupational characteristics under established clinical pathways. The core finding shows that UCT scores reflecting disease control did not differ significantly among the three groups (*P* values of 0.984 and 0.402, respectively), whereas PASQ scores exhibited significant intergroup differences (*P*=0.015). This superficially resembles previously reported trends suggesting that different antihistamine treatment pathways may influence patients' quality of life [6]. However, it must be emphasized that the grouping in this study originated from historical prescription records rather than random allocation, thus precluding causal inference about the drugs themselves. A more plausible explanation is that systematic differences in healthcare-seeking behaviors exist among distinct sociodemographic clusters, which consequently manifest as divergent psychological adaptation trajectories. This highlights the importance of addressing patients' psychosocial dimensions beyond physiological symptoms in CSU management.

Regarding patient-related factors, the baseline characteristics of this cohort generally align with global epidemiological data. The mean patient age was 44.27 years, falling within the high-incidence age range for CSU. Gender distribution showed a female proportion of 55.9%, slightly lower than the commonly reported international range of 60%–80% favoring women [9], yet still consistent with the overall pattern indicating greater disease burden among females. This finding corroborates Kocatürk et al. (2025), who emphasized that CSU imposes a serious burden on quality of life [10]. Nevertheless, this study found that the heavy disease burden does not uniformly translate into psychological maladaptation, as PASQ differences across groups were independent of UCT scores—strongly supporting the hypothesis that "psychological adaptation ability may operate independently of the level of physiological disease control" [11]. Individual cognitive resources, such as higher education levels observed in this study (39.3% holding university or bachelor's degrees), may serve as a key protective factor.

The social support system and occupational stress represent another critical dimension for interpreting the heterogeneity of findings in this study. Occupational distribution differed significantly among the three groups (P = 0.034): the loratadine group had the highest proportion of workers (35.3%) and self-employed individuals (29.4%), whereas the ebastine group included more clerical staff (26.2%) and unemployed individuals (26.2%). This distribution is unlikely random and may profoundly reflect social determinants of health (SDH) [12]. Workers

and self-employed individuals often face unstable work environments, high physical demands, and potentially inadequate healthcare coverage—factors that may deplete the psychological and social resources available for coping with illness. In contrast, clerical workers typically enjoy more stable employment conditions and better medical benefits, while unemployed individuals, despite financial stress, may have more time for self-health management. These resource disparities may partially explain why, despite similar disease severity, psychosocial adaptation scores (PASQ) showed a declining trend from the ebastine group (79.83 ± 7.9) to the loratadine group (72.06 ± 11.19). Occupation here serves not merely as a demographic variable but as a key indicator reflecting socioeconomic status, stress exposure, and access to social support networks.

It is essential to acknowledge the methodological limitations of this study, particularly the absence of potential environmental confounders. The results were obtained without controlling for external environmental exposures, which constitute major confounding factors. Substantial evidence indicates that environmental factors such as PM2.5 and pollen concentration are closely linked to acute exacerbations of CSU [13]. Moreover, some studies suggest that for every 10 μg/m³ increase in PM2.5 exposure, anxiety scores among dermatology patients may rise by 0.8 points [14]. Geographic living and working environments of patients in this cohort, along with variations in seasonal allergen exposure, could influence both symptom control (UCT scores) and psychological adaptation (PASQ scores) by triggering stress responses [15]. The lack of such data prevents us from determining how much of the observed intergroup PASQ differences stem from intrinsic psychological traits versus reactions to varying environmental stressors. This interpretive limitation is inherent to retrospective data, and any causal inference must be made with extreme caution.

5. Conclusion

This study offers clear implications for clinical practice and future research. The clinical value lies primarily in two aspects: first, clinical assessment should adopt a “biopsychosocial” dual-track approach. While monitoring hives, itch, and UCT scores remains essential, incorporating psychological items from PASQ or DLQI into routine follow-ups is recommended to enable early identification of patients at high risk for poor psychosocial adaptation. Second, treatment and support strategies should be personalized; for patients experiencing high occupational stress and limited social support (e.g., workers, self-employed), clinical communication should be more supportive, and referral to psychological or social work services should be considered. The main limitations of this study are twofold: first, the single-center retrospective design restricts sample representativeness and cannot eliminate prescription selection bias; second, critical data on environmental exposures and dynamic monitoring of psychological processes are missing. Therefore, future research should focus on two directions: first, conducting multicenter prospective cohort studies that integrate air quality and pollen data via geographic information systems (GIS), and employ ecological momentary assessment (EMA) to capture real-time fluctuations in patients’ psychological states and environmental exposures; second, further exploring protective factors and intervention pathways for psychosocial adaptation, such as evaluating the effectiveness of mindfulness-based stress reduction or cognitive behavioral therapy in improving PASQ scores among CSU patients, ultimately advancing clinical models from symptom control toward holistic mind-body recovery.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Greiner B, Nicks S, Adame M, et al., 2022, Pathophysiology, diagnosis, and management of chronic spontaneous urticaria: a literature review. Clinical Reviews in Allergy & Immunology, 63: 381-389.

[2] Sánchez-Borges M, Ansotegui I J, Baiardini I, et al., 2021, The challenges of chronic urticaria part 1: Epidemiology, immunopathogenesis, comorbidities, quality of life, and management. World Allergy Organization Journal, 14(6): 100533.

[3] Saini S S, Kaplan A P, 2018, Chronic spontaneous urticaria: The devil's itch. The Journal of Allergy and Clinical Immunology: In Practice, 6: 1097-1106.

[4] Donnelly J, Ridge K, O'Donovan R, et al., 2023, Psychosocial factors and chronic spontaneous urticaria: a systematic review. BMC Psychology, 11(1): 239.

[5] Zheng Q, Zheng H, Zhou S, et al., 2022, Efficacy of acupuncture treatment for chronic spontaneous urticaria: study protocol for a randomised controlled trial. BMJ Open, 12(2): e045027.

[6] Zuberbier T, Aberer W, Asero R, et al., 2018, The EAACI/GA2LEN/EDF/WAO guideline for the definition, classification, diagnosis and management of urticaria. Allergy, 73: 1393-1414.

[7] Li S, Chen A, 2025, Validation of the reliability and validity of PSAQCSD, a psychosocial adaptation assessment for patients with chronic urticaria. Dermatological Health, 3(2): 1-10.

[8] Li C, Xie B, Duan R, et al., 2024, Clinical observation on the efficacy of omalizumab in the treatment of chronic urticaria. Journal of Dermatology and Venereology, 46(2): 108-111.

[9] He G Y, Tsai T F, Lin C L, et al., 2018, Association between sleep disorders and subsequent chronic spontaneous urticaria development. Medicine, 97(34): e11992.

[10] Kocatürk E, Salameh P, Asero R, et al., 2025, Sex matters in CSU: Women face greater burden and poorer urticaria control, especially in midlife—CURE insights. Journal of the European Academy of Dermatology and Venereology, 40: 67-78.

[11] Stingeni L, Grieco T, Bonavita O, et al., 2025, Unmet needs and treatment patterns in Italian patients with chronic spontaneous urticaria: results from the Urticaria Voices study. Journal of Dermatological treatment, 36(1): 2566786.

[12] Ashraf R, Bishnoi A, Mehta H, et al., 2024, Clinico-epidemiologic profile and response to levocetirizine in chronic spontaneous urticaria: a retrospective cohort study from a tertiary care center in north india. Indian Dermatology Online Journal, 15: 630-633.

[13] Balp M M, Halliday A C, Severin T, et al., 2021, Clinical remission of chronic spontaneous urticaria (CSU): a targeted literature review. Dermatology and Therapy, 12: 15-27.

[14] Choi W S, Lim E S, Ban G Y, et al., 2018, Disease-specific impairment of the quality of life in adult patients with chronic spontaneous urticaria. The Korean Journal of Internal Medicine, 33: 185-192.

[15] Maurer M, Costa C, Gimenez Arnau A, et al., 2020, Antihistamine-resistant chronic spontaneous urticaria remains undertreated: 2-year data from the AWARE study. Clinical & Experimental Allergy, 50: 1166-1175.