

Health Literacy and Disease Activity in Patients with Chronic Urticaria: A Cross-Sectional Study

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ABSTRACT

Objective: Chronic urticaria (CU) is a long-standing inflammatory dermatosis that necessitates ongoing clinical follow-up, identification of precipitating factors, and active patient participation to achieve optimal disease control. Although health literacy is recognized as an important component of self-management in chronic conditions, data examining its level and its association with disease activity in CU are scarce. Therefore, the present study sought to evaluate health literacy among patients with CU and to explore its relationship with disease activity as measured by the Urticaria Activity Score-7 (UAS-7).

Materials and Methods: In this cross-sectional investigation, adult individuals diagnosed with CU were assessed using the Turkish Health Literacy Scale (THLS-32), a validated instrument that evaluates health literacy within two core domains as treatment and health services and disease prevention/health promotion across four information-processing dimensions: access, comprehension, appraisal, and application of health-related information. Health literacy scores were standardized to a 0–50 index and categorized as inadequate, problematic/limited, adequate, or excellent. Disease activity was assessed using UAS-7.

Results: More than half of the participants (57.4%) demonstrated inadequate or problematic/limited HL. No significant association was observed between total THLS-32 scores and UAS-7 ($p=0.118$). However, a significant relationship was identified between disease activity and the evaluating information subdimension within the disease prevention and health promotion domain ($p=0.037$). Other health literacy domains and subdimensions showed no significant association with UAS-7.

Conclusion: Limited health literacy is common among individuals with CU. Although global health literacy scores were not independently linked to disease activity, competencies related to the critical appraisal of health information seem to be particularly relevant for symptom control. These results underscore the role of advanced health literacy skills in the management of CU and indicate that patient-centered educational strategies aimed at strengthening information evaluation abilities may serve as a valuable adjunct to guideline-based therapy.

Keywords: Chronic urticaria, health literacy, Urticaria Activity Score-7 (UAS-7), disease activity, patient education

INTRODUCTION

The contemporary healthcare system requires individuals not only to access healthcare services but also to actively participate in health-related decision-making and disease self-management. In this context, health literacy, defined as the ability to access, understand, appraise, and apply health-related information, has emerged as a fundamental determinant of effective healthcare utilization and patient outcomes (1,2). The World Health Organization

(WHO) conceptualizes health literacy as a set of cognitive and social skills that enable individuals to make informed decisions to promote and maintain good health (3).

Despite its recognized importance, health literacy levels remain suboptimal worldwide. Population-based studies from the United States and Europe have consistently demonstrated a high prevalence of inadequate or limited health literacy among adults (4,5). Similarly, national data from Türkiye indicate that overall health literacy levels are

generally limited, highlighting the need for targeted interventions in vulnerable populations (6).

Low health literacy has been associated with impaired disease knowledge, reduced self-efficacy, poor treatment adherence, increased healthcare utilization, and higher healthcare-related costs, particularly in individuals with chronic diseases requiring long-term management (7–10). These adverse effects are especially relevant in chronic inflammatory and immune-mediated conditions, where symptom control and quality of life are strongly influenced by patient engagement and self-management behaviors.

Chronic urticaria (CU) is a persistent dermatological condition characterized by recurrent wheals and/or angioedema lasting longer than six weeks, often with an unpredictable disease course and significant impact on daily functioning and psychosocial well-being. Effective management of CU relies heavily on patients' understanding of disease triggers, adherence to long-term antihistamine therapy, avoidance strategies, and appropriate healthcare-seeking behavior (11). However, data examining health literacy levels and their potential influence on disease activity in patients with CU remain limited.

Therefore, this study aimed to evaluate health literacy levels in patients with CU and to investigate the relationship between health literacy and disease activity, with a particular focus on identifying health literacy components that may be relevant for improved disease control and patient-centered care.

MATERIALS and METHODS

Ethical Approval

This research was conducted in accordance with the ethical standards of the Declaration of Helsinki and received formal approval from the Malatya Turgut Özal University Health Sciences Scientific Research Ethics Committee (Date: September 11, 2025; No: E-30785963-020-330236). All participants were thoroughly briefed on the study's aims and protocols before participation, with electronic informed consent collected via Google Forms.

Study Design and Participants

To investigate how health literacy influences disease-related outcomes in individuals aged >18 years with CU, this correlational and cross-sectional study was conducted with 174 participants. Between late 2023 and late 2025,

patients at a tertiary care facility in eastern Türkiye were screened for eligibility. Inclusion was restricted to adults who had not previously undergone health literacy training and were able to communicate clearly. All relevant data, including sociodemographic profiles, were systematically collected through an electronic platform.

Data Collection Instruments

Sociodemographic and Clinical Information Form

A structured questionnaire developed by the researchers was used to collect data on age, sex, marital status, occupation, educational level, health insurance status, income level, and reading habits (books, newspapers, and school-related materials). Additional items assessed patients' knowledge and perceptions regarding CU, including its common name in the community, whether it is contagious, which medical departments manage the condition (excluding emergency settings), its most common causes, frequent triggers, and dietary triggers. Patients were also asked whether they had consulted herbalists for urticaria-related complaints, whether they had used any dietary supplements, whether they experienced any adverse effects, and their level of trust in such sources. Information regarding social media use, whether patients followed health-related websites or physicians' online websites, and perceived disease triggers was recorded. Disease activity was evaluated using the 7-day Urticaria Activity Score (UAS-7), and patients were subsequently classified based on their respective scores.

Measurement of Health Literacy

The Turkish Health Literacy Scale-32 (THLS-32) was employed to measure health literacy levels. Validated by Okay and Abacigil (12), this instrument evaluates how individuals process health information across the domains of healthcare and disease prevention. The scale consists of 32 items scored from 1 (very easy) to 4 (very difficult) (Table I). These scores are converted into a standardized 0–50 index, where higher values indicate superior health literacy.

The levels are defined as:

- **Inadequate:** 0–25
- **Problematic:** >25–33
- **Sufficient:** >33–42
- **Excellent:** >42–50

Table I: Turkish Health Literacy Scale Questionnaire--32 (THLS--32) (12).

Questions	VE	E	D	VD	NO
1 When you experience a health complaint, determining whether it may be a symptom of a disease.					
2 When you experience a health complaint, reading and understanding any written material on the topic (e.g., brochures, booklets, posters).					
3 When you experience a health complaint, evaluating whether the advice provided by your family or friends is reliable.					
4 When you wish to visit a healthcare institution, finding out which physician you should consult.					
5 When you wish to visit a healthcare institution, finding out how to complete your application (such as making an appointment).					
6 Making an appointment with a healthcare institution via telephone or the internet.					
7 Finding information regarding treatments for diseases relevant to you.					
8 Understanding your physician's explanations about your illness.					
9 Evaluating the advantages and disadvantages of different treatment options recommended by your physician.					
10 Using medications as recommended by a healthcare professional (e.g., physician, pharmacist).					
11 Understanding the instructions for using a medication on the packaging.					
12 Deciding whether you need a second opinion from another physician.					
13 Understanding information related to preparations required before tests/examinations (e.g., dietary instructions).					
14 Finding information about places where you can receive treatment when you are unwell (e.g., laboratories, outpatient clinics).					
15 Deciding what to do in an emergency situation (such as an accident or sudden health problem).					
16 Calling an ambulance when necessary.					
17 Following the health monitoring and check-ups recommended by your physician at regular intervals.					
18 Searching for information regarding conditions that may be harmful to your health, such as obesity or high blood pressure.					
19 Understanding health warnings related to conditions that may be harmful to your health, such as obesity or high blood pressure.					
20 Finding information about how to cope with unhealthy behaviors such as smoking or insufficient physical activity.					
21 Understanding health warnings related to unhealthy behaviors such as smoking or insufficient physical activity.					
22 Finding information about the health screenings you should undergo based on your age, gender, and health status (e.g., breast cancer screening for women, prostate cancer screening for men).					
23 Understanding information from sources such as the internet, newspapers, television, or radio that recommend how to improve your health.					
24 Assessing whether information from sources such as the internet, newspapers, television, or radio regarding maintaining good health is reliable.					
25 Understanding information on food labels that you believe may affect your health.					
26 Evaluating the positive and negative characteristics of your environment (home, street, neighborhood) that may influence your health.					
27 Finding information about what can be done to improve the healthiness of your environment (home, street, neighborhood).					
28 Evaluating which of your daily behaviors (such as exercising, eating healthily, avoiding smoking) affect your health.					
29 Changing your lifestyle for your health (such as exercising, eating healthily, avoiding smoking).					
30 Being able to follow a diet plan prescribed to you by a dietitian.					
31 Providing recommendations to your family or friends on how to become healthier.					
32 Interpreting policy changes related to health.					

VE: Very easy, E: Easy, D: Difficult, VD: Very difficult, NO: No opinion

In terms of reliability, the current study yielded Cronbach's alpha values of 0.94 for the overall scale, 0.88 for the Treatment/Healthcare subscale, and 0.91 for the Disease Prevention/Health Promotion subscale, mirroring the high reliability found in the original validation study.

Data Analysis

The statistical power of the study was evaluated via a post-hoc power analysis using G*Power software (version 3.1.9.7). Given the sample size of 174 participants and a significance level (*aa*) of 0.05, the study achieved a statistical power (*bb*) to detect a medium effect size ($f^2=0.15$). Statistical processing was carried out through SPSS v21.0. Categorical variables were summarized using percentages, while continuous variables were presented as means with standard deviations. All analyses were two-tailed, and results were considered significant at $p<0.05$.

RESULTS

The sociodemographic profile (Table II) revealed a young-adult population (mean age: 33.71 ± 12.27 years) with a strong female predominance (73.5%). The group was largely well-educated and socially insured, with 47.1% holding university degrees and 89.6% having social security coverage. Employment was reported by 61.5%, while 70.1% stated they were regular readers. Results from THLS-32 (Table III) showed an overall mean index of 32.39 ± 8.61 . The subscale scores were closely aligned, with "Treatment and Services" (33.16 ± 8.72) scoring slightly higher than "Disease Prevention and Health Promotion" (31.63 ± 9.54). Collectively, inadequate and limited literacy levels accounted for 57.4% of the participants, highlighting a significant need for health literacy interventions within this patient group.

Table IV on disease knowledge and perceptions shows the participants' knowledge and perceptions regarding CU. A significant majority (82.2%) correctly identified that the disease is not contagious. Regarding healthcare-seeking behavior, 39.7% of patients primarily consulted Allergy and Immunology departments. While social media usage was prevalent (84.5%), the proportion of patients following health-related websites or medical professional websites remained limited at 35.6%.

The relationship between overall health literacy and UAS-7 classifications is detailed in Table V. According to the findings, general health literacy levels did not signifi-

Table II: Sociodemographic characteristics of the participants (n=174).

Variable	Category	n	%
Gender	Female	128	73.5
	Male	46	26.5
Educational Level	Primary education	39	22.4
	High school graduate	53	30.4
	University	82	47.1
Employment Status	Employed in an income-generating job	107	61.5
	Not employed in an income-generating job	67	38.5
Social Security	Yes	156	89.6
	No	18	10.4
Reading Habit	Yes	122	70.1
	No	52	29.9
Age (Year)	Mean $\pm$ SD	33.71 ± 12.27	Min: 18, Max: 72

Table III: THLS-32 Total, subdimension scores, and categorical distribution.

Scale / Category	Mean $\pm$ SD	n (%)
Total THLS-32 Score	32.39 ± 8.61	-
Treatment and services subdimension	33.16 ± 8.72	-
Disease prevention / Health promotion	31.63 ± 9.54	-
Health Literacy Levels		
Inadequate (0–25 points)	-	34 (19.5)
Problematic/limited (>25–33 points)	-	66 (37.9)
Adequate (>33–42 points)	-	42 (24.1)
Excellent (>42–50 points)	-	32 (18.4)

THLS-32: Turkish Health Literacy Scale-32

Table IV: Knowledge and perceptions of patients with chronic urticaria.

Question / Field	Most Frequent Responses	n (%)
Contagiousness	No (not contagious)	143 (82.2)
Department consulted	Allergy diseases	69 (39.7)
Most common cause	All (food, stress, infection, etc.)	81 (46.5)
Social media use	Yes (has an account)	147 (84.5)
Trust in traditional treatment	Not at all	68 (39.1)
First action for itching	Taking an antihistamine	25 (14.4)

Tx: Treatment

Table V: Effect of health literacy levels on Urticaria Activity Score (UAS-7).

THLS-32 Category	Well Controlled (<7) n (%)	Mild (7-15) n (%)	Moderate (16-27) n (%)	Intense (28-42) n (%)	p- value
Total Sample	7 (4.0)	32 (18.4)	38 (21.8)	97 (55.7)	0.118
Inadequate	1 (2.9)	5 (14.7)	10 (29.4)	18 (52.9)	
Problematic	0 (0)	16 (25)	14 (21.9)	34 (53.1)	
Adequate	4 (10.3)	6 (15.4)	11 (28.2)	34 (53.1)	
Excellent	2 (6.3)	5 (15.6)	3 (9.4)	22 (68.8)	

THLS-32: Turkish Health Literacy Scale-32

Table VI: Relationship between information processing dimensions and disease activity (p-values).

Information processing dimensions	Treatment and Services (p)	Disease prevention / promotion (p)
Accessing Information	0.920	0.358
Understanding Information	0.880	0.858
Evaluating Information	0.632	0.037*
Using/Applying Information	0.593	0.115

*Statistically significant (p<0.05).

cantly correlate with UAS-7 categories (p=0.118). Notably, intense disease activity was prevalent across the cohort (55.7%), irrespective of the participants' literacy status.

Furthermore, Table VI explores the interplay between specific health literacy information-processing dimensions and disease severity. While most dimensions such as accessing, comprehending, or applying information showed no significant ties to UAS-7 (p>0.05), a statistically significant association was observed for the "evaluating information" component within the "Disease Prevention and Health Promotion" domain (p=0.037).

DISCUSSION

This research offers an in-depth assessment of health literacy within the CU population, specifically examining its interplay with disease activity as measured by the UAS-7. A pivotal finding of this analysis is that a substantial majority of the participants (57.4%) demonstrated either inadequate or limited health literacy, highlighting a significant need for health literacy interventions. This observation is in line with national data from Türkiye reporting generally low health literacy levels in the adult population and confirms previous evidence indicating that patients with chronic inflammatory and dermatological diseases

are particularly vulnerable to insufficient health literacy (13,14). Given that CU is a long-standing condition requiring continuous symptom monitoring and lifestyle adaptations, such a high prevalence of limited health literacy may have important implications for disease management.

Despite the well-established role of health literacy in chronic disease outcomes, our analysis did not reveal a statistically significant association between the total THLS-32 score and disease activity (UAS-7). This finding may initially appear counterintuitive, as higher health literacy has consistently been associated with better self-management, treatment adherence, and health outcomes in patients with inborn errors of immunity, and chronic diseases such as diabetes, cardiovascular disorders, and asthma (15-20). However, health literacy is a multidimensional construct, and the absence of a relationship with the overall score suggests that not all components of health literacy contribute equally to disease control in CU. This observation underscores the importance of examining health literacy not only as a global index but also through its specific domains and competencies.

Notably, a significant association was identified between disease activity and the evaluating information subdimension within the disease prevention and health promotion domain. This finding represents one of the most important contributions of the present study. CU is a dynamic and heterogeneous condition characterized by fluctuating symptoms and multiple triggering factors, including foods, infections, stress, medications, and environmental exposures.

Effective disease control therefore requires patients to continuously evaluate diverse sources of health information, distinguish reliable from unreliable advice, and apply this knowledge to their individual context. International guidelines emphasize that successful CU management extends beyond pharmacological treatment and relies heav-

ily on patient engagement, trigger identification, and informed decision-making (21). Our results suggest that the ability to critically appraise health information often conceptualized as critical health literacy may be more decisive for symptom control than basic skills such as accessing or understanding information.

The lack of significant associations between UAS-7 and other health literacy subdimensions, such as accessing or understanding health information, further supports this interpretation. In the current digital era, patients are increasingly exposed to a vast amount of health-related information through social media, websites, and informal networks. However, access to information alone does not guarantee appropriate health behaviors or improved outcomes. In fact, exposure to conflicting or inaccurate information may exacerbate uncertainty and maladaptive behaviors, particularly in conditions like CU where misconceptions about triggers and treatments are common. Patients with higher evaluative health literacy may be better equipped to navigate this complex information landscape, leading to more effective avoidance strategies and adherence to evidence-based recommendations (22). The UCARE study by Cherrez-Ojeda et al. (23) demonstrated that patients with CU show high interest in using information and communication technologies (ICTs) to support symptom monitoring and healthcare decision-making. However, the authors also highlighted variability in patients' ability to effectively use and interpret digital health information. This finding is consistent with our results, which showed no association between overall health literacy levels and disease activity, but identified a significant relationship between disease activity and the *evaluating* subdimension within the *disease prevention and health promotion* domain. Together, these findings suggest that access to digital health information alone is insufficient for optimal disease control in CU; rather, the ability to critically appraise and apply health information appears to be a key determinant of effective symptom management.

From a clinical perspective, these findings have important implications. Routine assessment of health literacy, particularly evaluative and critical components, may help identify CU patients at risk of poor disease control. Targeted educational interventions focusing on critical appraisal skills such as distinguishing evidence-based recommendations from anecdotal advice could complement pharmacological therapy and improve disease outcomes (24,25). Previous studies have shown that health literacy

sensitive interventions can enhance self-management and quality of life in chronic diseases, supporting the potential benefit of similar strategies in CU (15- 20, 26-30).

Strengths and Limitations

The present study has several strengths. It is among the first to evaluate health literacy in patients with CU using a validated national instrument and to explore its association with disease activity using a standardized clinical score. The multidimensional assessment of health literacy allowed for a more nuanced understanding of which specific competencies are relevant to disease control.

Several inherent constraints of this research warrant consideration. Primarily, the cross-sectional nature of the study precludes the establishment of causal relationships; therefore, prospective longitudinal designs are essential to determine if enhancing health literacy specifically evaluative competencies results in long-term clinical improvements. Furthermore, both health literacy and disease activity were captured via self-reported measures, which may be susceptible to recall or social biases. Lastly, as the data were gathered from a single-center cohort, the external validity (generalizability) to diverse cultural or clinical contexts may be restricted. Nevertheless, the application of the validated THLS-32 and the standardized UAS-7 assessment significantly bolsters the methodological robustness of our findings.

Future Directions

Future research should focus on longitudinal and interventional studies to evaluate whether targeted health literacy interventions particularly those aimed at enhancing information evaluation and critical appraisal skills can lead to meaningful improvements in disease activity and quality of life in patients with CU. The development of disease-specific educational tools tailored to different health literacy levels may further support personalized care. In addition, integrating health literacy assessment into routine dermatology and allergy practice could help identify patients at risk of poor disease control and guide more effective, patient-centered management strategies.

In conclusion, this study demonstrates that limited health literacy is highly prevalent among patients with CU and highlights the critical role of information evaluation skills in disease activity. While overall health literacy levels were not directly associated with UAS-7 scores, the signifi-

cant relationship between evaluative health literacy within the disease prevention and health promotion domain and disease activity underscores the importance of critical health literacy in CU management. These findings suggest that future patient-centered approaches should move beyond information provision and focus on strengthening patients' capacity to critically assess and apply health information in daily life. Such strategies may represent an important adjunct to guideline-based medical treatment and contribute to improved long-term disease control in CU.

Acknowledgement

The statistical power of the study was calculated using artificial intelligence (G*Power) analysis.

Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical Approval

Approval for this study was obtained from Malatya Turgut Özal University Health Sciences Scientific Research Ethics Committee (approval date: 11.09.2025; approval number: E-30785963-020-330236).

Informed Consent

Informed consent was required due to the prospective use of de-identified administrative data.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data Availability Statement

The data that supports the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

Authors' Contributions

Concept: GA, AB, AFK, Design: GA, AB, AFK, Data collection or processing: GA, AB, AFK, Analysis or Interpretation: GA, AB, AFK, Literature search: GA, AB, AFK, Writing: GA, Approval: GA.

REFERENCES

1. Eyüboğlu E, Schulz PJ. Do health literacy and patient empowerment affect self-care behaviour? A survey study among Turkish patients with diabetes. *BMJ Open* 2016;6(3):e010186. doi: 10.1136/bmjopen-2015-010186.
2. Kerber A, Beintner I, Burchert S, Knaevelsrud C. Does app-based unguided self-management improve mental health literacy, patient empowerment and access to care for people with mental health impairments? Study protocol for a randomised controlled trial. *BMJ Open* 2021;11(7):e049688. doi: 10.1136/bmjopen-2021-049688.
3. Sørensen K, Pelikan JM, Röthlin F, Ganahl K, Slonska Z, Doyle G, et al; HLS-EU Consortium. Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). *Eur J Public Health* 2015;25(6):1053-8. doi: 10.1093/eurpub/ckv043.
4. Kim SH. Health literacy and diabetes self-care activities: The mediating effect of knowledge and patient activation. *Int J Nurs Pract* 2021;27(4):e12925. doi: 10.1111/ijn.12925.
5. Jia J, Levy DE, McCurley JL, Anderson E, Gelsomin ED, Porneala B, et al. Health Literacy, Numeracy, and Health Promotion: A Secondary Analysis of the Choosewell 365 Workplace Trial. *Am J Prev Med* 2022;63(1):93-101. doi: 10.1016/j.amepre.2021.12.020.
6. Durusu Tanrıöver M, Yıldırım HH, Demiray Ready N, Çakır B, Akalın EH. Türkiye sağlık okuryazarlığı araştırması, 2012. Erişim adresi: <http://www.sagliksen.org.tr/MediaContent/vYcK-1419245270-mA5r.pdf>.
7. Boueri M, Abdelkhalik M, Al Maaz F, Chehade H, Bouclaous C. Navigating Health Care in Crises: Health Literacy and Treatment Adherence Among Hemodialysis Patients in Lebanon. *Kidney Med* 2025;7(10):101081. doi: 10.1016/j.xkme.2025.101081.
8. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int* 2000;15(3):259-67. doi: 10.1093/heapro/15.3.259.
9. Okur E, Demirci YA, Nural N. Health Literacy Levels and Predictors Among Hospitalized Patients With Chronic Diseases. *J Eval Clin Pract* 2025;31(7):e70305. doi: 10.1111/jep.70305. PMID: 41129796.
10. Coughlin SS, Vernon M, Hatzigeorgiou C, George V. Health Literacy, Social Determinants of Health, and Disease Prevention and Control. *J Environ Health Sci* 2020;6(1):3061. PMID: 33604453; PMCID: PMC7889072.
11. Hindelang M, Zink A, Knitz J, Darkow R, Welcker M, Biedermann T, et al. Acceptance and perceived usefulness of digital health services in the management of chronic urticaria: a survey of patients and physicians. *BMC Health Serv Re.* 2025;25(1):894. doi: 10.1186/s12913-025-13043-7.
12. Okyay P, Abacıgil F. Türkiye Sağlık Okuryazarlığı Ölçekleri Güvenilirlik ve Geçerlilik Çalışması. *Anıl Matbaa*. 1. Baskı. Ankara 2016; 1-104.
13. Özvarış ŞB, Doğan BG, Ünlü HK, Karadag O, Doğan N, Gelbal S, et al. Development and Validation of a Culture-Sensitive Generic Health Literacy Scale in Turkish-Speaking Adults. *Health Lit Res Pract* 2022;6(1):e2-e11. doi: 10.3928/24748307-20211208-01.
14. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: an updated systematic review. *Ann Intern Med* 2011;155(2):97-107. doi: 10.7326/0003-4819-155-2-201107190-00005.
15. Kim K, Shin S, Kim S, Lee E. The Relation Between eHealth Literacy and Health-Related Behaviors: Systematic Review and Meta-analysis. *J Med Internet Res* 2023;25:e40778. doi: 10.2196/40778.

16. Nutbeam D, Lloyd JE. Understanding and Responding to Health Literacy as a Social Determinant of Health. *Annu Rev Public Health* 2021;42:159-73. doi: 10.1146/annurev-publ-health-090419-102529.
17. Verweel L, Newman A, Michaelchuk W, Packham T, Goldstein R, Brooks D. The effect of digital interventions on related health literacy and skills for individuals living with chronic diseases: A systematic review and meta-analysis. *Int J Med Inform* 2023;177:105114. doi: 10.1016/j.ijmedinf.2023.105114. Epub 2023 Jun 8. PMID: 37329765.
18. Durmaz MSB, Keskin G, Altın S. Health literacy in patients with inborn errors of immunity. *Allergol Immunopathol (Madr)* 2025;53(5):108-16. doi:10.15586/aei.v53i5.1406
19. Hyvert S, Yailian AL, Haesebaert J, Vignot E, Chapurlat R, Dussart C, et al. Association between health literacy and medication adherence in chronic diseases: a recent systematic review. *Int J Clin Pharm* 2023;45(1):38-51. doi: 10.1007/s11096-022-01470-z. Epub 2022 Nov 11. PMID: 36369411.
20. Refahi H, Klein M, Feigerlova E. e-Health Literacy Skills in People with Chronic Diseases and What Do the Measurements Tell Us: A Scoping Review. *Telemed J E Health* 2023;29(2):198-208. doi: 10.1089/tmj.2022.0115. PMID: 35671526.
21. Zuberbier T, Aberer W, Asero R, Abdul Latiff AH, Baker D, Ballmer-Weber B, et al; Endorsed by the following societies: AAAAI, AAD, AAIITO, ACAAI, AEDV, APAAACI, ASBAI, ASCIA, BAD, BSACI, CDA, CMICA, CSACI, DDG, DDS, DGAKI, DSA, DST, EAACI, EIAS, EDF, EMBRN, ESCD, GA²LEN, IAA-CI, IADVL, JDA, NVvA, MSAI, ÖGDV, PSA, RAACI, SBD, SFD, SGAI, SGDv, SIAAIC, SIdEMaST, SPDV, TSD, UNBB, UNEV and WAO. The EAACI/GA²LEN/EDF/WAO guideline for the definition, classification, diagnosis and management of urticaria. *Allergy* 2018;73(7):1393-414. doi: 10.1111/all.13397.
22. Bailey SC, O'Connor R, Bojarski EA, Mullen R, Patzer RE, Vencio D, et al. Literacy disparities in patient access and health-related use of Internet and mobile technologies. *Health Expect* 2015;18(6):3079-87. doi: 10.1111/hex.12294.
23. Cherrez-Ojeda I, Vanegas E, Cherrez A, Felix M, Weller K, Magerl M, et al. How are patients with chronic urticaria interested in using information and communication technologies to guide their healthcare? A UCARE study. *World Allergy Organ J* 2021;14(6):100542. doi: 10.1016/j.waojou.2021.100542.
24. Shan Y, Ji M, Dong Z, Xing Z, Xu X. Assessing Patients' Critical Health Literacy and Identifying Associated Factors: Cross-sectional Study. *J Med Internet Res* 2023;25:e43342. doi: 10.2196/43342.
25. Özdemir S, Akça H. Health Literacy in Turkey. *Med J SDU* 2021;28(3):535-6.
26. Cabezas MF, Nazar G, Ranchor AV, Annema C. The Effect of Health Literacy Interventions on Self-management in Chronic Diseases: A Systematic Review. *Ann Behav Med* 2025;59(1):kaaf073. doi: 10.1093/abm/kaaf073.
27. Schulz P, Nakamoto K. Patient behavior and the benefits of artificial intelligence: the perils of "dangerous" literacy and illusory patient empowerment. *Patient Educ Couns* 2013;92:223-8.
28. Shin KS, Lee EH. Relationships of health literacy to self-care behaviors in people with diabetes aged 60 and above: Empowerment as a mediator. *J Adv Nurs* 2018;74(10):2363-72. doi: 10.1111/jan.13738. Epub 2018 Jul 5. PMID: 29893030.
29. De DR, Seivright J, Yee D, Hsiao JL, Shi VY. Readability, quality, and timeliness of patient online health resources for urticaria. *J Am Acad Dermatol* 2022;86(5):1182-5. doi: 10.1016/j.jaad.2021.04.089.
30. Diviani N, van den Putte B, Giani S, van Weert JC. Low health literacy and evaluation of online health information: a systematic review of the literature. *J Med Internet Res* 2015;17(5):e112. doi: 10.2196/jmir.4018. PMID: 25953147; PMCID: PMC4468598.