Brief report

Health literacy in adult patients with atopic dermatitis: A cross-sectional study

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Background: Health literacy (HL) is defined as the degree to which individuals have the capacity to obtain, process, and understand health information and services needed to make appropriate health decisions. Patients with limited HL are less likely to manage chronic diseases appropriately.

Objective: We sought to assess the prevalence of limited HL in patients with atopic dermatitis (AD) and its association with other patient-reported outcomes.

Methods: A cross-sectional questionnaire-based study was conducted at a tertiary referral center for AD. Patients diagnosed with AD by a dermatologist between 2019 and 2021 were identified from medical records. Perception-based HL was assessed by the European Health Literacy Survey Questionnaire 16 and performance-based HL by the Newest Vital Sign. Patients completed the Patient-Oriented Eczema Measure, Dermatology Life Quality Index, and Atopic Dermatitis Control Tool to measure AD severity, quality of life, and AD disease control, respectively.

Results: In total, 322 patients were included (response rate, 48.3%). On the basis of the European Health Literacy Survey Questionnaire 16, 32.4% had limited HL (8.4% inadequate and 24.0% problematic), which was associated with impaired quality of life. According to the Newest Vital Sign, 20.3% had inadequate HL, which was associated with older age.

Conclusions: Up to one-third of the patients with AD showed signs of limited HL, which was associated with impaired health-related quality of life and older age. Further research should evaluate the influence of inadequate HL on health outcomes and focus on strategies to improve organizational HL to eventually enhance patient-centered care. (J Allergy Clin Immunol Global 2024;3:100218.)

Abbreviations used
AD: Atopic dermatitis
HL: Health literacy
HLS-EU-Q16: European Health Literacy Survey Questionnaire 16
HRQoL: Health-related quality of life
NVS: Newest Vital Sign

INTRODUCTION

Atopic dermatitis (AD) is an inflammatory, chronically relapsing and pruritic skin disease.[1] Adequate self-management of AD can improve disease outcomes and quality of life.[1] Patients with limited health literacy (HL)—the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions—are less likely to manage chronic diseases appropriately.[2,3] They generally have less knowledge about their disease, show inadequate self-management, and have poor health outcomes.[3] The present study aimed to assess the prevalence of limited HL and its association with patient-reported outcome measures as disease severity, disease control, health-related quality of life (HRQoL), and treatment in a clinical population of patients with AD.

We conducted a cross-sectional questionnaire-based study at the Department of Dermatology of the University Medical Center Groningen, a tertiary referral center for AD. Patients 18 years or older diagnosed with AD by a dermatologist and visiting the outpatient clinic between 2019 and 2021 were retrospectively identified from electronic medical records. They received a postal or digital survey including questions on patient-reported outcomes, HL, and treatment. The study was approved by the Medical Ethical Review Board of the University Medical Center Groningen (reference no. METc2021/495). All participants gave informed consent. Perception-based HL was assessed by the European Health Literacy Survey Questionnaire 16 (HLS-EU-Q16) including 16 questions related to various areas regarding health care, disease prevention, and health promotion.[4,5] Each question had 4 answer categories (very easy, fairly easy, fairly difficult, and very difficult) and was binarized by combining the 2 outer response categories. The total score was classified as inadequate (range, 0-8), problematic (range, 9-12), and adequate (range, 13-16) HL. Performance-based HL was assessed by the Newest Vital Sign (NVS), a tool measuring reading and numeracy skills on the basis of 6 questions about a nutrition label of ice cream.[6] HL was classified as inadequate (0-3 correct answers) and adequate (4-6 correct answers). The Patient-Oriented Eczema Measure was used to assess the patient-perceived severity of AD (range, 0-28).[7] The Dermatology Life Quality Index was used to assess HRQoL (range, 0-30).[8] The Atopic Dermatitis Control

Tool was used to assess patient-perceived control of AD (range, 0-24).[9] Table E1 (in the Online Repository available at www.jaci-global.org) provides an overview of the patient-reported outcome measures that were used. These validated measures were available in Dutch and included language validation. Current self-reported treatment for AD was categorized as no treatment, exclusively topical treatment, or systemic treatment. Binary logistic regression analyses were performed with adequate versus problematic/inadequate HL as the dependent variable and age, sex, disease severity, HRQoL, and treatment as independent variables. The correlation between the HLS-EU-Q16 and the NVS was tested by the Pearson correlation.

RESULTS AND DISCUSSION

The response rate was 48.3%, resulting in 322 participants being included in the analyses. The mean age of the study population was 43.6 ± 16.2 years, and 53.1% were male participants (Table I). There were no statistically significant differences in age and sex between responders and nonresponders, with mean age of 40.3 ± 17.5 years and with 52.3% male participants. In total, 61.6% of the patients with AD had moderate to (very) severe AD according to the Patient-Oriented Eczema Measure, 40.2% had a moderate to very large effect on HRQoL, 38.5% perceived their AD as not in control, and 62.5% used systemic therapy for their AD. On the basis of the HLS-EU-Q16, 32.4% had limited HL (8.4% inadequate and 24.0% problematic). According to the NVS, 20.3% had inadequate HL. The correlation between HLS-EU-Q16 and NVS was very weak and not statistically significant (Pearson $r = 0.11$; $P = .06$). Logistic regression analysis adjusted for age and sex showed a positive association between limited HL based on the HLS-EU-Q16 and the group with a (very) large effect on HRQoL (odds ratio [OR], 2.75; 95% CI, 1.32-5.74) (Table II). After adjusting for age and sex, the NVS showed a positive association between limited HL and older age, especially for the group aged 50 years and older (OR, 6.63; 95% CI, 2.97-14.81) compared with the reference group aged 18 to 34 years.

The proportion of patients with limited perception-based HL (32.4%) was higher compared with the proportion with limited performance-based HL (20.3%). The subjective HLS-EU-16 aims to assess a broad range of HL skills compared with the objective NVS, which tests only reading and numeracy skills. However, patients easily overestimate or underestimate their HL with subjective measures.[3] The weak, nonsignificant correlation between the HLS-EU-Q16 and the NVS in patients with AD supports the differences between the 2 measurement instruments, which was previously demonstrated in other populations.[6] We found a positive association between limited HL and HRQoL, which was also demonstrated in a population with atopic diseases in the Dutch general population, whereas they used a generic instrument for assessing HRQoL.[10] In general, the symptoms of AD often have a negative impact on a patient's HRQoL.[1] Furthermore, increased symptoms resulting from difficulties with self-management because of limited HL might indirectly lead to a decline in quality of life. Therefore, the patient's symptoms could serve as a potential confounding factor, making it challenging to differentiate between the direct impact of limited HL and the influence of symptoms on the quality of life. In our analysis we could not demonstrate an association between patient-reported severity of AD and limited HL. However, if we had used an

TABLE I. Characteristics of the study population

Characteristics	Total study population (N = 322)
Age (y), mean ± SD	43.6 ± 16.2
Age range (y), n (%)	
18-34	114 (36.1)
35-50	89 (28.2)
>50	113 (35.8)
Missing, n	*6*
Sex	
Male, n (%)	171 (53.1)
Missing, n	*0*
POEM, median [IQR]	10 [4-15]
Clear or mild (0-7), n (%)	117 (38.5)
Moderate (8-16), n (%)	123 (40.5)
(Very) severe (17-28), n (%)	64 (21.1)
Missing, n	*18*
DLQI, median [IQR]	4 [1-8]
No/small effect (0-5), n (%)	143 (59.8)
Moderate effect (6-10), n (%)	52 (21.8)
(Very) large effect (11-30), n (%)	44 (18.4)
Missing, n	*83*
ADCT, median [IQR]	5 [2-9]
In control (<7), n (%)	193 (61.5)
Not in control (≥7), n (%)	121 (38.5)
Missing, n	*8*
Treatment,* n (%)	
Only topical treatment	100 (33.4)
Systemic treatment†	187 (62.5)
No treatment	12 (4)
Missing, n	*23*
HLS-EU-Q16, median (IQR)	14 [12-16]
Inadequate (0-8), n (%)	25 (8.4)
Problematic (9-12), n (%)	71 (24.0)
Adequate (≥13), n (%)	200 (67.6)
Missing, n	*26*
NVS, median [IQR]	6 [4-6]
Inadequate HL (<4), n (%)	61 (20.3)
Adequate HL (≥4), n (%)	240 (79.7)
Missing, n	*21*

ADCT, Atopic Dermatitis Control Tool; *DLQI*, Dermatology Life Quality Index; *IQR*, interquartile range; *POEM*, Patient-Oriented Eczema Measure.
*Patients on ultraviolet therapy (n = 3) were excluded from the systemic group and patients with antihistamines as the only systemic treatment were reclassified to the group of topical treatment only.
†Including ciclosporin, methotrexate, prednisolone, dupilumab, tralokinumab, baricitinib, upadacitinib, and abrocitinib.

objective outcome measure of disease severity or increased the sample size, an association between limited HL and severity of AD could have been possible.

For the NVS, a significant association between limited HL and older age was shown, which was demonstrated previously in a validation study.[6] In a clinical setting, preferably both performance-based and perception-based instruments should be used to have a broad measurement scope. If health care providers know which patients have limited HL, they could tailor communication and support them in developing more skills to improve their self-management. Health care organizations could simplify patient information leaflets and systems to make it easier for patients to navigate the health care system.

A strength of our study is the clinical population, with AD cases identified from medical records. Moreover, limited HL was assessed with different domains of HL. Limitations of this study

TABLE II. Factors associated with limited HL based on HLS-EU-Q16 and NVS: logistic regression analyses

Factors	HLS-EU-Q16						NVS					
	Limited HL (range 0-12) based on HLS-EU-Q16, n (%) (n = 96)	Adequate HL (range 13-16) based on HLS-EU-Q16, n (%) (n = 200)	Univariate crude OR (95% CI)	P value	Adjusted OR (95% CI), adjusted for age and sex	P value	Limited HL (range 0-3) based on NVS, n (%) (n = 61)	Adequate HL (range 4-6) based on NVS, n (%) (n = 240)	Univariate crude OR (95% CI)	P value	Adjusted OR (95% CI), adjusted for age and sex	P value
Age (y), mean ± SD	43.24 ± 17.4	43.16 ± 15.2	1.00 (0.99-1.02)	.97	1.00 (0.99-1.02)	.92	53.9 ± 17.1	40.5 ± 14.6	**1.06 (1.04-1.08)**	**<.01**	**1.06 (1.04-1.08)**	**<.001**
Age range (y), n (%)												
18-34	40 (42.6)	66 (33.7)	1		1		9 (15.0)	99 (42.1)	1		**1**	
35-50	19 (20.2)	63 (32.1)	**0.50 (0.26-0.95)**	**.034**	**0.50 (0.26-0.96)**	**.038**	14 (23.3)	69 (29.4)	2.23 (0.92-5.45)	.078	2.36 (0.96-5.80)	.06
>50	35 (37.2)	67 (34.2)	0.86 (0.49-1.52)	.61	0.88 (0.50-1.56)	.66	37 (61.7)	67 (28.5)	**6.08 (2.75-13.41)**	**<.01**	**6.63 (2.97-14.81)**	**<.001**
Sex, n (%)												
Male	50 (52.1)	109 (54.5)	1		1		28 (45.9)	131 (54.6)	1		1	
Female	46 (47.9)	91 (45.5)	1.10 (0.68-1.80)	.70	1.18 (0.72-1.94)	.51	33 (54.1)	109 (45.4)	1.42 (0.81-2.49)	.23	1.64 (0.89-3.03)	.11
POEM, median [IQR]	10.5 [5-16]	9 [4-15]	1.02 (0.99-1.06)	.25	1.02 (0.98-1.06)	.29	8 (9.5)	10 (11)	**0.95 (0.91-0.99)**	**.027**	0.96 (0.92-1.01)	.13
Clear/mild	33 (34.4)	79 (39.5)	1		1		28 (48.3)	86 (35.8)	1		1	
Moderate	40 (41.7)	82 (41.0)	1.17 (0.67-2.03)	.58	1.16 (0.67-2.03)	.60	22 (37.9)	100 (41.7)	0.68 (0.36-1.27)	.22	0.68 (0.34-1.34)	.26
(Very) severe	23 (24.0)	39 (19.5)	1.41 (0.73-2.72)	.30	1.42 (0.72-2.77)	.31	8 (13.8)	54 (22.5)	0.46 (0.19-1.07)	.07	0.56 (0.22-1.42)	.22
ADCT, median [IQR]	6 [3-11]	4 [2-8]	1.04 (1.00-1.09)	.074	1.04 (0.99-1.09)	.09	4 (7)	5 (6)	0.95 (0.89-1.01)	.01	0.95 (0.89-1.01)	.12
In control	52 (54.2)	128 (64.0)	1		1		40 (66.7)	144 (60.0)	1		1	
Not in control	44 (45.8)	72 (36.0)	1.50 (0.92-2.47)	.12	1.54 (0.93-2.55)	.09	20 (33.3)	96 (40.0)	0.75 (0.41-1.36)	.34	0.76 (0.40-1.46)	.41
DLQI, median [IQR]	7 [2-12]	3 [1-7]	**1.06 (1.01-1.10)**	**.012**	**1.06 (1.01-1.11)**	**.015**	3 (6)	4 (7)	0.97 (0.92-1.03)	.32	0.98 (0.92-1.04)	.55
No/small	33 (45.8)	106 (65.0)	1		1		29 (65.9)	113 (58.9)	1		1	
Moderate	19 (26.8)	33 (20.2)	1.85 (0.93-3.67)	.08	1.95 (0.98-3.91)	.058	7 (15.9)	44 (22.9)	0.62 (0.25-1.52)	.30	0.65 (0.25-1.66)	.37
(Very) large	20 (27.8)	24 (14.7)	**2.68 (1.32-5.45)**	**<.01**	**2.75 (1.32-5.74)**	**<.01**	8 (18.2)	35 (18.2)	0.89 (0.37-2.13)	.79	0.98 (0.38-2.54)	.97
Treatment												
Only topical	27 (29.3)	69 (34.7)	1		1		20 (34.5)	78 (33.2)	1		1	
Systemic	64 (69.6)	120 (60.3)	1.36 (0.80-2.34)	.26	1.31 (0.76-2.26)	.34	33 (56.9)	151 (64.3)	0.85 (0.46-1.58)	.61	1.07 (0.54-2.13)	.85
Systemic treatment												
Nonbiological	17 (17.7)	38 (19.0)	1		1		8 (13.1)	46 (19.2)	1		1	
Biological	47 (49.0)	82 (41.0)	1.28 (0.65-2.52)	.47	1.47 (0.72-2.98)	.29	25 (41.0)	105 (42.7)	1.37 (0.58-3.26)	.48	0.78 (0.30-2.05)	.62

Boldface indicates *P* < .05. *ADCT*, Atopic Dermatitis Control Tool; *DLQI*, Dermatology Life Quality Index; *IQR*, interquartile range; *OR*, odds ratio; *POEM*, Patient-Oriented Eczema Measure.

include the relatively small number of patients and the self-administered questionnaire, with the latter possibly causing selection bias with an underestimation of the extent of the problem because patients with limited HL may have been less likely to respond.

In addition, patients from tertiary referral hospitals likely have higher HL because of exposure to specialized care and therefore greater understanding of medical information. Therefore, it is important to avoid generalizing the results to patients from general practices with probably lower HL, emphasizing the need for tailored interventions across diverse health care settings.

We showed that a considerable proportion of patients with AD showed signs of limited HL, which was associated with impairment in HRQoL and older age. Further research should evaluate the influence of inadequate HL on health outcomes and focus on strategies to improve organizational HL to eventually improve patient-centered care.

DISCLOSURE STATEMENT

Disclosure of potential conflict of interest: The authors declare that they have no relevant conflicts of interest.

> **Clinical implications: Limited HL in patients with AD is associated with reduced quality of life and older age. Targeted interventions addressing HL in these specific groups are needed.**

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