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THE RELATIONSHIP BETWEEN HEALTH LITERACY AND THE RATIONAL USE OF MEDICINES AMONG INDIVIDUALS WITH CHRONIC DISEASES

Elif Güzel Turan[1], Sıla Gül[1], Nurten Terkes[2]

[1]Burdur Bucak District Health Directorate, Family Medicine, Burdur, Türkiye

[2]Department of Internal Medicine Nursing, Mehmet Akif Ersoy University, Bucak Health School, Burdur, Türkiye

Correspondence:

Elif Güzel Turan (e-mail: elifguzel0761@gmail.com)

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Ankara Yıldırım Beyazıt University Faculty of Medicine
Department of Family Medicine

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Abstract

Objectives: This study aimed to establish the connection between health literacy and the appropriate use of medications among individuals suffering from chronic diseases.

Materials and Methods: This descriptive and correlational study examined individuals with at least one chronic disease who presented to family medicine units in the Bucak District of Türkiye. The required sample size was calculated at 95% confidence and a 5% margin of error, and 386 participants were needed. Ultimately, data were collected from 488 participants. Data were obtained using the 'Health Literacy Scale' and the ' Rational Use of Medicines Scale'.

Results: A mean score of 35.89±5.38 was achieved on the rational use of medicines, indicating a moderate level of awareness. The mean Health Literacy Scale score was 104.66 ± 15.49, indicating a high level of health literacy among participants. A test of the connection between health literacy and sensible drug use showed a strong link ($r=0.60$, $p<.001$). Health literacy and rational use of medicines scores differed significantly according to age, educational status, and occupation ($p<.001$).

Conclusion: Increased health literacy among people with chronic diseases positively influences rational use of medicines behaviours. In this context, the implementation and dissemination of education programs and counselling services aimed at improving health literacy in primary healthcare settings are recommended to promote rational use of medicines, support treatment adherence, and reduce preventable medication-related problems.

Keywords: Chronic disease, health literacy, primary healthcare.

Introduction

Chronic diseases are commonly defined as conditions that are usually slow in progression, extend over many years, have a low probability of complete cure, and often lead to permanent loss of function. Socioeconomic, environmental, personal, and genetic factors jointly play a role in their onset and progression.[1] On a global scale, noncommunicable diseases accounted for at least 43 million deaths in 2021; this figure represents approximately three-quarters of all non-pandemic deaths worldwide.[2] In Türkiye, the prevalence of having at least one chronic disease is high among older adults (≥65 years).[3] When it comes to managing chronic diseases, health literacy plays a crucial role in determining an individual's ability to access, understand, evaluate, and apply health-related information.[4] In a nationwide study conducted by the General Directorate of Public Health Promotion of the Turkish Ministry of Health, approximately 70% of the population was reported to have substandard or suboptimal levels of health literacy.[5] Low health literacy adversely affects the use of preventive services, self-management of chronic conditions, and informed decision-making based on reliable information.[6,7] Advances in medicine have increased both the number and diversity of medications, while the need to ensure that treatments are delivered effectively, safely, and cost-effectively has brought the concept of Rational Use of Medicines to the forefront. Irrational use encompasses practices such as unnecessary prescribing, inappropriate dosage or duration, and poor management of multiple medication use (polypharmacy). These practices increase adverse effects and drug–drug interactions, fuel antimicrobial resistance, and impose an additional economic burden on health systems.[8,9] In Türkiye, rational use of medicines is also supported institutionally through national policies and educational materials.[10] The literature indicates a significant, positive association between health literacy and appropriate medication use: individuals with higher health literacy levels are more likely to use medicines with the correct indication, dose, and duration, to comprehend medication safety information, and to adhere to treatment regimens.[11,12] Therefore, strengthening health literacy, particularly among individuals with chronic diseases, constitutes a strategic lever for promoting rational use of medicines.[7,9] The objective of this study is to assess the correlation between health literacy levels and the judicious utilisation of medications among individuals afflicted with at least one chronic condition. The findings are expected to inform evidence for the design of targeted education and counselling programs in chronic disease management, as well as for policies that support the rational use of medicines.

Materials and Methods

Study Design and Population

This study employed a descriptive, cross-sectional design. The target population consisted of all individuals with at least one chronic disease who presented to the [Bucak Central Family Medicine Units, District of Burdur] during the study period [15.07.2025-18.01.2026].

The sample size was determined a priori based on estimation of a population proportion using a 95% confidence level and a 5% margin of error, consistent with commonly used sample size tables/formulas for cross-sectional surveys. Assuming the most conservative scenario (p = 0.500, q = 0.50) and Z = 1.96, the required sample size was calculated using:

$$n = \frac{Z^2\, p(1-p)}{d^2}$$

Where Z = 1.96, p = 0.500, and d = 0.05, yielding a minimum sample size of approximately 384, which was rounded up to 386 participants. Ultimately, 488 eligible participants were included. Data were collected through face-to-face personal interviews conducted by the researchers in the family medicine units. Prior to participation, all individuals were informed about the study, and written informed consent was obtained. The study procedures were conducted in accordance with the principles of the Declaration of Helsinki.

Participants were eligible if they were aged ≥18 years, had at least one physician-diagnosed chronic disease, they had to be able to communicate in Turkish, could complete a face-to-face interview, and provide written informed consent. Individuals were excluded if they were unable to participate in the interview due to severe cognitive impairment or a condition limiting reliable communication, had an acute medical condition requiring urgent care at the time of recruitment, declined participation/consent, or provided incomplete responses to the main study measures.

Data Collection Tool

Study data were collected using an Individual Identification Form, the Health Literacy Scale, and the Rational Use of Medicines Scale, all of which were developed or selected based on a review of the relevant literature. Individual ıdentification form was developed by the researchers and includes descriptive characteristics of the participants such as age, sex, educational status, occupation, and place of residence. The Rational Use of Medicines Scale was developed by Demirtaş et al.[13] to assess rational use of medicines and consists of 21 items. Responses are scored as follows: “Yes”=2 points, “I don’t know”=1 point, and “No”=0 points. The lowest score

you can get is 34; individuals scoring 35 points or above are considered to have adequate knowledge regarding the rational use of medicines. The Cronbach's alpha reliability coefficient of the scale was reported as 0.78. The original version of the Health Literacy Scale was developed by Toçi, Bruzari, and Sørensen[14], and its Turkish validity and reliability study was conducted by Aras and Temel (2017).[15] The scale consists of 25 items and comprises four sub-dimensions: Access (5-25 points), Understanding (7-35 points), Appraisal (8-40 points), and Application (5-25 points). Scores for the total scale range from 25 to 125.

Data Analyses

Data were entered into the SPSS 22.0 statistical software package (IBM Corp., Armonk, NY, USA). It was used numbers, percentages, means and standard deviations to describe the data. Independent samples t-tests and one-way analysis of variance (ANOVA) were employed when the assumptions of parametric tests were met. When these assumptions were not met, the Mann–Whitney U test and Kruskal–Wallis test were used. The chi-square test was applied to compare categorical variables. To examine the independent association between health literacy and rational use of medicines, we conducted multivariable linear regression analyses with the Rational Use of Medicines (RUM) total score as the dependent variable. Health Literacy (HL) total score was entered as the main predictor (scaled per 10-point increase). Models were adjusted for age category (<40, 40–59, ≥60), gender, marital status, educational status, and occupation. Given the bounded nature of scale scores and potential heteroskedasticity, heteroskedasticity-robust (HC3) standard errors and 95% confidence intervals were reported. As a sensitivity analysis, binary logistic regression was performed using adequate RUM (RUM ≥35) as the outcome. For all analyses, a p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

The Non-Interventional Clinical Research Ethics Committee of Burdur Mehmet Akif Ersoy University provided its ethical approval for the study (Meeting date: 05.02.2025; Meeting No: 2025/2; Decision No: GO 2025/1041). Follow the Helsinki Declaration ethical standards.

Results

The study included 55.3% women and 44.7% men. The majority were married (77.2%), while 22.8% were single. In terms of age, 39.6% were between 40 and 60 years, and 33.8% were younger than 40 years. Regarding educational status, primary school graduates constituted the largest group (44.5%), followed by those with a university degree or higher (35.5%). With respect to occupation, 30.7% of the participants were civil servants and 28.7% were housewives (Table 1).

Table 1. Demographic characteristics of the participants

Variables	*n*	*%*
Educational status		
Primary school	217	44.47
Secondary school	28	5.74
High school	70	14.34
University or higher	173	35.45
Gender		
Female	270	55.33
Male	218	44.67
Occupation		
Housewife	140	28.69
Retired	89	18.24
Civil servant	150	30.74
Worker / Self-employed	109	22.34
Marital status		
Married	377	77.25
Single	111	22.75
Age		
< 40 years	165	33.81
40–60 years	193	39.55
> 60 years	130	26.64

The mean total score on the Rational Use of Medicines Scale was 35.89±5.38, indicating a moderate level of awareness regarding rational use of medicines. The mean total score on the Health Literacy Scale was 104.66±15.49, suggesting a high level of health literacy among the participants. Reliability analyses showed that Cronbach's alpha coefficients for the subscales of the Health Literacy Scale ranged from 0.78 to 0.95, indicating high internal consistency. The Cronbach's alpha coefficient calculated for the Rational Use of Medicines Scale was 0.79, which is considered acceptable (Table 2).

A strong, positive correlation was found between the Rational Use of Medicines Scale scores and Health Literacy Scale scores ($r=0.60$, $p<0.001$). This finding indicates that as health literacy increases, individuals' rational use of medicines behaviours also improve (Table 3).

Table 2. Descriptive statistics and reliability coefficients for continuous variables

Variables	*M*	*SD*	SE_M	Min	Max	Skewness	Kurtosis	α	Lower Bound	Upper Bound
Rational Use of Medicines Scale	35.89	5.38	0.24	20.00	42.00	-0.87	-0.24	.95	.94	.95
Health Literacy Scale	104.66	15.49	0.70	63.00	125.00	-0.60	-0.35	.89	.88	.90
Understanding	27.87	5.65	0.26	13.00	35.00	-0.53	-0.42	.88	.87	.89
Appraisal	33.68	5.49	0.25	22.00	40.00	-0.55	-0.97	.91	.90	.92
Access	21.13	3.81	0.17	8.00	25.00	-0.96	0.47	.78	.75	.80
Application	21.98	2.82	0.13	13.00	25.00	-1.07	0.84	.79	.77	.81

*M = mean; SD = standard deviation; SE_M = standard error of the mean; Min = minimum; Max = maximum; skewness = skewness coefficient; kurtosis = kurtosis coefficient; α = Cronbach's alpha; lower bound = lower bound of the 95% confidence interval for α; upper bound = upper bound of the 95% confidence interval for α.

Table 3. Pearson correlation between rational use of medicines and health literacy scale scores

Combination	*r*	95.00% CI	*n*	*p*
Rational Use of Medicines Scale – Health Literacy Scale	.60	[.54, .65]	488	<0.001

*r = Pearson correlation coefficient; 95.00% CI = 95% confidence interval; n = sample size; p = p value (level of significance).

Table 4 presents comparisons of the Rational Use of Medicines (RUM) and Health Literacy (HL) total scores across sociodemographic groups. For RUM, females had significantly higher scores than males (37.08±5.26 vs 34.42±5.19; t(486)=5.58, p<0.001, d=0.51). Single participants also had higher RUM scores compared with married participants (37.35±4.35 vs 35.46±5.58; Welch t(226.8)=-3.75, p<0.001, d=-0.35). RUM scores differed significantly by occupation (F(3,484)=41.37, p<0.001, ηp^2=0.20), age group (F(2,485)=69.14, p<0.001, ηp^2=0.22), and educational status (F(3,484)=49.88, p<0.001, ηp^2=0.24). The highest RUM mean was observed among participants with university education or higher (39.21±2.73) and those aged <40 years (38.52±3.08), whereas the lowest mean was observed in the ≥60 age group (32.00±6.44) and among retired participants (32.43±5.90).

Table 4. Comparison of rational use of medicines and health literacy scale scores by sociodemographic characteristics

		Rational Use of Medicines Scale (RUM total score)					
Variable	**Category**	**n**	**Mean**	**SD**	**Test (df)**	**p**	**Effect size**
Sex	Female	270	37.08	5.26	t(486)=5.58	<0.001	d=0.51
	Male	218	34.42	5.19			
Marital status	Married	377	35.46	5.58	t(226.8)=-3.75	<0.001	d=-0.35
	Single	111	37.35	4.35			
Occupation	Housewife	140	34.30	5.81	F(3,484)=41.37	<0.001	ηp^2=0.20
	Retired	89	32.43	5.90			
	Civil servant	150	38.96	2.85			
	Worker/Self-employed	109	36.54	4.59			
Age group	<40	165	38.52	3.08	F(2,485)=69.14	<0.001	ηp^2=0.22
	40–59	193	36.27	4.61			
	≥60	130	32.00	6.44			
Educational status	Primary school	217	33.81	5.85	F(3,484)=49.88	<0.001	ηp^2=0.24
	Middle school	28	31.75	5.41			
	High school	70	35.80	4.39			
	University or higher	173	39.21	2.73			
		Health Literacy Scale (HL total score)					
Variable	**Category**	**n**	**Mean**	**SD**	**Test (df)**	**p**	**Effect size**
Sex	Female	270	105.11	16.20	t(486)=0.72	0.475	d=0.07
	Male	218	104.11	14.58			
Marital status	Married	377	104.00	15.60	t(486)=-1.74	0.082	d=-0.19
	Single	111	106.91	14.97			
Occupation	Housewife	140	96.10	15.31	F(3,484)=45.61	<0.001	ηp^2=0.22
	Retired	89	101.93	17.49			
	Civil servant	150	114.60	10.64			
	Worker/Self-employed	109	104.22	11.68			
Age group	<40	165	110.56	11.56	F(2,485)=41.27	<0.001	ηp^2=0.15
	40–59	193	105.82	11.86			
	≥60	130	95.46	19.87			
Educational status	Primary school	217	95.94	15.38	F(3,484)=70.51	<0.001	ηp^2=0.30
	Middle school	28	104.00	7.24			
	High school	70	106.20	10.75			
	University or higher	173	115.10	11.02			

*M = mean; SD = standard deviation; t = t-test statistic; p = p value (level of significance); d = Cohen's d (effect size); SS = sum of squares; df = degrees of freedom; F = ANOVA F statistic; ηp^2 = partial eta squared (effect size).

For HL, there were no statistically significant differences by sex (105.11±16.20 vs 104.11±14.58; t(486)=0.72, p=0.475, d=0.07) or marital status (104.00±15.60 vs 106.91±14.97; t(486)=-1.74, p=0.082, d=-0.19). However, HL scores differed significantly by occupation (F(3,484)=45.61, p<0.001, ηp^2=0.22), age group (F(2,485)=41.27, p<0.001, ηp^2=0.15), and educational status (F(3,484)=70.51, p<0.001, ηp^2=0.30). Participants with university education or higher had the highest HL scores (115.10±11.02), while the ≥60 age group had the lowest HL mean (95.46±19.87).

In the multivariable linear regression model, higher health literacy was independently associated with higher rational use of medicines. Specifically, each 10-point increase in HL total score was associated with a 1.44-point increase in the RUM total score (B=1.435, SE=0.154, 95% CI 1.133–1.737, p<0.001). Compared with females, males had significantly lower RUM scores (B=−2.853, 95% CI −3.697 to −2.008, p<0.001). Single participants had slightly lower RUM scores than married participants after adjustment (B=−0.862, 95% CI −1.666 to −0.058, p=0.036). Relative to primary education, secondary education was associated with lower RUM scores (B=−2.973, p<0.001), whereas university education or higher was associated with higher RUM scores (B=1.783, p=0.003); high school education was not significant (p=0.211). Regarding occupation, being a worker/self-employed was associated with higher RUM scores compared with housewives (B=1.586, p=0.014), while being retired or a civil servant was not significant (p>0.050). Participants aged ≥60 years had significantly lower RUM scores than those aged 40–59 years (B=−2.720, p<0.001), whereas the <40 age group did not differ significantly (p=0.172). Overall, the model explained 52.2% of the variance in RUM scores (R^2=0.522; adjusted R^2=0.511) (Table 5).

Table 5. Multivariable linear regression model predicting Rational Use of Medicines (RUM) total score

Predictor	B	SE	CI_low	CI_high	p
HL total (per 10 points)	1.435	0.154	1.133	1.737	<0.001
Gender: male (ref=female)	-2.853	0.430	-3.697	-2.008	<0.001
Marital status: single (ref=married)	-0.862	0.409	-1.666	-0.058	0.035
Education: secondary (ref=primary)	-2.973	0.721	-4.390	-1.557	<0.001
Education: high school (ref=primary)	-0.809	0.645	-2.077	0.459	0.210
Education: university+ (ref=primary)	1.783	0.594	0.616	2.951	0.002
Occupation: retired (ref=housewife)	0.493	0.838	-1.154	2.140	0.556
Occupation: civil servant (ref=housewife)	0.302	0.721	-1.115	1.720	0.675
Occupation: worker/self-employed (ref=housewife)	1.586	0.641	0.327	2.846	0.013
Age: <40 (ref=40–59)	0.618	0.452	-0.270	1.505	0.172
Age: ≥60 (ref=40–59)	-2.720	0.750	-4.193	-1.246	<0.001
Model fit	R^2=0.522; Adjusted R^2=0.511; n=488				

*B: unstandardized coefficient; SE: standard error; CI: 95% confidence interval. HL was scaled per 10-point increase. Reference categories: female (gender), married (marital status), primary (education), housewife (occupation), and age 40–59 years (age group).

Discussion

In this study, we examined the relationship between health literacy and rational use of medicines among individuals with chronic diseases and evaluated differences according to sociodemographic variables. Our findings indicate a positive and strong association between rational use of medicines and health literacy (r=0.60, p<0.001). This result is consistent with recent evidence suggesting that higher health literacy supports more appropriate/rational use of medicines. For example, a systematic review assessing the relationship between health literacy and medication adherence in adults with chronic disease demonstrated that low health literacy is significantly associated with poor adherence.[16] Similarly, a systematic review conducted in 2025 among adults with type 2 diabetes highlighted the key role of health literacy in determining medication adherence.[17] A recent meta-analysis from Türkiye also reported a moderate positive association between health literacy and rational use of medicines (effect sizes ≈0.21-0.62), which is in line with the correlation observed in our sample (r=0.60).[18] Importantly, this association remained significant after adjustment for sociodemographic factors in the multivariable model, suggesting that health literacy is independently related to rational use of medicines in this population.

In our study, health literacy levels were high, whereas awareness of the rational use of medicines was at a moderate level. This pattern suggests that although individuals have an improved capacity to access and understand information, they may have trouble translating this knowledge into rational medication behaviours in practice. This "knowledge–behavior gap," which is reflected in clinical settings, is one of the key targets of the World Health Organisation's "Medication Without Harm" global patient safety challenge. To reduce serious and preventable medication-related harm, WHO recommends improvements at the individual, team, and system levels across prescribing, administration, and monitoring processes. In particular, the technical report on polypharmacy emphasises the importance of regular medication review in high-risk groups, patient education, and team-based approaches.[9] When considered together with our findings, this framework supports the potential clinical value of structured education and counselling programs that both enhance health literacy and promote rational use of medicines.

The significant differences observed in our study according to age and educational level are also consistent with the literature. We found that rational use of medicines scores were significantly lower among individuals aged ≥60 years, whereas both rational use of medicines and health literacy scores were markedly higher among those with a university degree or higher. Notably, education showed a heterogeneous pattern in adjusted analyses, indicating that differences in rational medicine use may not increase linearly across all education categories. Evidence from studies among patients with hypertension has shown that health literacy tends to decline with advancing age,[19] while research in individuals with obesity has demonstrated a strong positive effect of educational attainment on health literacy,[20] supporting our findings. Furthermore, a study that

identified a positive relationship between eHealth literacy and medication adherence indicated that digital competencies may improve adherence behaviours, particularly in the context of chronic disease management.[21] Taken together, these findings suggest that, in older adults, cognitive, auditory, and visual limitations, as well as the complexity of managing multiple medications, should be specifically addressed; in individuals with lower educational levels, barriers in accessing and critically appraising evidence-based information need to be targeted.

Beyond age and education, sex and marital status were also associated with the rational use of medicines. In the adjusted model, men had lower RUM scores than women, and single participants had slightly lower RUM scores than married participants, whereas differences in health literacy by sex or marital status were not evident. These patterns suggest that factors beyond health literacy (e.g., medication experiences, roles in medication management, or health service interactions) may contribute to rational medicine use. Given national reports indicating that health literacy levels in Türkiye are heavily concentrated in inadequate or problematic categories,5 the need for community-based interventions has long been emphasised. Findings from the European HLS-EU project and its conceptual frameworks also demonstrate that health literacy is closely linked to social determinants such as education, income, and employment.[4] In this context, our results underline the importance of prioritising groups with lower health literacy scores, such as housewives and individuals with lower educational attainment, through multicomponent strategies. This is further supported by the adjusted findings showing occupational differences in rational medicine use, underscoring the need for tailored interventions in primary care. These may include simplified written materials, visual and audio educational content, guided use of eHealth tools, and brief, structured educational interventions delivered in primary care settings.

In conclusion, our findings show that individuals in this sample generally have high levels of health literacy but only moderate awareness of the rational use of medicines. Rational use of medicines was significantly and positively associated with health literacy in this sample. Therefore, interventions aiming to improve health literacy among individuals with chronic diseases may be a promising strategy to support the rational use of medicines.

In line with this, we recommend that healthcare professionals, particularly nurses and physicians working in family medicine units, regularly assess patients' medication use habits and implement education and counselling programs designed to strengthen health literacy. In addition, the use of digital health tools and simplified educational materials may enhance awareness of medication safety, especially among older adults and individuals with lower educational levels.

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Ethical Considerations: The Non-Interventional Clinical Research Ethics Committee of Burdur Mehmet Akif Ersoy University provided its ethical approval for the study (Meeting date: 05.02.2025; Meeting No: 2025/2; Decision No: GO 2025/1041). Follow the Helsinki Declaration ethical standards.

Conflict of Interest: The authors declare no conflict of interest.

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