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Medication Adherence to the Pharmacological Treatment and Health Literacy in Patients with Rheumatoid Arthritis

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Abstract

Background: Treatment adherence is a critical factor in controlling symptoms and determining the success of treatment in chronic disease management.

Objectives: The aim of this study was to investigate the relationship between health literacy levels and adherence to pharmacological treatment in patients with Rheumatoid Arthritis (RA).

Methods: This cross-sectional study included 196 patients. The mean age of participants was 47.35 ± 15.95 years. Socio-demographic and clinical characteristics of the patients were recorded. Health literacy levels were assessed using the Türkiye Health Literacy-32 (THL-32) Scale. Medication adherence to the pharmacological treatment was assessed using the Medication Adherence Report Scale (MARS).

Results: THL-32 and MARS scores were compared according to the demographic characteristics, and a significant difference was found between the education level and place of residence groups. A multivariate regression model was used to assess the connection between them. Health literacy was found to be 3.88 times higher in urban areas compared to rural areas, 4.12 times higher in those with high school education compared to primary school, and 4.39 times higher in those with higher education compared to other levels. In terms of medication adherence, it was found to be 4.18 times higher in urban areas compared to rural areas, 3.1 times higher in those with high school education compared to primary school, and 3.6 times higher in those with higher education compared to other levels.

Conclusion: This study demonstrated that health literacy is positively associated with medication adherence in patients with rheumatoid arthritis. These findings highlight the importance of focusing on health literacy to improve adherence to treatment. Health professionals should prioritize enhancing health literacy to support better disease self-management and treatment outcomes.

Keywords: Rheumatoid Arthritis, Health Literacy, Medication Adherance, Chronic Disease

1. Background

Treatment adherence is a key factor in managing chronic diseases, influencing both symptom control and treatment success. It refers to the extent to which patients follow medical advice from healthcare professionals. High adherence is essential for achieving positive therapeutic outcomes. According to the World Health Organization (WHO), long-term medication adherence is lower in developing countries. Non-adherence occurs when patients stop taking their medications without medical guidance, or use them incorrectly, inconsistently, or with delays. Poor adherence is a major barrier to effectively treating chronic conditions. Adherence to prescribed drugs is influenced by many factors (patients' beliefs, communication, and financial difficulties etc.).[1] The concept of health literacy was first coined by Simond.[2] Health literacy refers to the cognitive and social skills needed to access, understand, and apply health information to maintain or improve one's health, as well as recover from illness. Low health literacy can hinder medication adherence, leading to more frequent hospitalizations and overuse of emergency services, which in turn increases healthcare costs.[3,4] Health literacy constitutes a significant component of the cognitive and functional skills required for adequate adherence to medication, emerging as a crucial factor in health outcomes. Health literacy involves not only reading, but also the ability to apply listening, analytical thinking, and decision-making skills in health-related situations.

2. Objectives

The goal of this study was to investigate the relationship between health literacy levels and adherence to pharmacological treatment in patients with Rheumatoid Arthritis (RA).

3. Methods

3.1. Study Design and Patient Selection

This cross-sectional study included 196 patients diagnosed with RA based on the 2010 American College of

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Rheumatology/European league against rheumatism criteria,[5] who were followed in a rheumatology clinic. The mean age of participants was 47.35 ± 15.95 years. The study followed the STROBE guidelines for conducting and reporting observational studies. Patients with incomplete medical records, concurrent autoimmune, neurologic, or endocrinologic diseases, malignancies, active infections, systemic diseases like diabetes, psychiatric disorders, or cognitive impairments were excluded. Socio-demographic variables and clinical characteristics were recorded.

3.2. Assessment Scales

Participants' health literacy levels were evaluated with the Türkiye Health Literacy-32 (THL-32) Scale. TSOY-32 is a scale consisting of 32 questions that evaluates two dimensions and four processes. The Health Literacy Scale used in European countries was developed into the THY-32 Scale by Okyay and Abacıgil in 2016 through validity and reliability studies in Türkiye. Each question is marked as very easy (1), easy (2), difficult (3), very difficult (4), or I don't know (5). For ease of calculation, the total score is standardized with a score ranging from 0 to 50 with the help of the following index formula: Index=(arithmetic mean -1) x 50/3 [Cut-off values are as follows: 0-25 point 'insufficient health literacy level', 25-33 point 'limited health literacy level', 33-42 'sufficient health literacy level', 42-50 'excellent health literacy level'.[6]

Medication adherence was assessed using the Medication Adherence Report Scale (MARS). The scale uses a 5-point Likert response format ranging from 1 ("always") to 5 ("never"). The total MARS score ranges from 5 to 25, with a lower score indicating poorer adherence.[7,8] This study used the Turkish version of MARS, which has been validated for chronic diseases and long-term medication adherence. The internal consistency coefficient of the Turkish version was found to be 0.78, with item correlations ranging from 0.35 to 0.71, similar to the original version.[8] In this study, the Cronbach's α for MARS was 0.95, indicating excellent internal consistency.

3.3. Ethical Statement

The study protocol was approved by the Institutional Ethics Committee. Patient confidentiality and anonymity were ensured during data collection and processing, in compliance with the Helsinki Declaration.

3.4. Statistical Analysis

G*power (V3.1.9.2) was used to calculate the sample size of the study, and a minimum sample size of 115 participants at an α = 0.05 and a power of 80%.[9,10] The collected data were analysed using SPSS software (version 23.0). Normality of distribution was assessed with the Kolmogorov-Smirnov and Shapiro-Wilk tests. Mann-Whitney U and Kruskal-Wallis tests were used for non-normally distributed data. The Spearman's rho correlation coefficient was used to assess relationships between non-normally distributed scales. Continuous variables were presented as mean ± standard deviation or median (range). Categorical variables were analyzed with chi-square tests. Correlation between MARS and THL-32 and levels was calculated using Spearman correlation coefficient. Multivariate binary logistic regression analysis was performed using the Enter approach. All variables which were found to be significant in univariate analyses were included in the regression model. Odds Ratios (OR) were considered significant at 95% Confidence Interval (CI) and $P<0.05$.

4. Results

Table 1 shows the distribution of patients based on socio-demographic and clinical characteristics. A total of 196 patients diagnosed with RA were included in the study. Of the 196 participants, 56.6% were female, and 43.4% were male. The mean age was 47.35 ± 15.95 years, with ages ranging from 18 to 65 years. Most participants were overweight (n = 90; 45.9%), and the majority had a job providing a monthly income (84.2%). The participants had been living with RA for varying lengths of time, from less than one year to over ten years, with the most common duration being 1 to ≤5 years (42.9%). Over half of the patients receiving pharmacological treatment for RA had insufficient or limited health literacy levels (Table 1).

As shown in Table 2, THL-32 and MARS scores were compared according to the demographic characteristics of the patients, and a significant difference was found between the education level and place of residence groups, which are categorical variables in demographic data, and the THY-32 and MARS score ($P<0.001$ and 0.023, respectively) (Table 2).

A statistically significant positive correlation was found between THY-32 score and MARS. The study results were showed that the health literacy was related to adherence to pharmacological treatment in RA patients. Multivariate regression analysis to determine factors associated with health literacy and medication adherence (please of residency and level of education) has been presented in Table 3. Health literacy was found to be 3.88 times (95% CI: 1.61-14.85) higher in urban areas compared to rural areas, 4.12 times (95% CI: 1.37-12.35) higher in those with high school education compared to primary school, and 4.39 times (95% CI: 1.50-12.80) higher in those with higher education compared to other levels. In terms of medication adherence, it was found to be 4.18 times (95% CI: 1.92-11.171) higher in urban areas compared to rural areas, 3.1 times (95% CI: 1.57-6.11) higher in those with high school education compared to primary school, and 3.6 times (95% CI: 1.12-11.61) higher

Table 1. Distribution of Patients according to Socio-Demographic and Clinical Characteristics

Characteristic		n (%)	Mean+SD
Age (year)		196	47.35 ± 15.95
Gender	Female	111 (56.6)	
	Male	85 (43.4)	
Body mass index (kg/m²)			26.91 ± 3.76
	Low weight	5 (2.6)	
	Normal weight	60 (30.6)	
	Overweight	90 (45.9)	
	1st degree obese	38 (19.4)	
	2nd degree obese	3 (1.5)	
Education	Primary-MiddleSchool	90 (45.9)	
	High School	65 (33.2)	
	University	41 (20.9)	
Occupational status	Employee	165 (84.2)	
	Unemployed	31 (15.8)	
Marital status	Single	24 (12.2)	
	Married	143 (73)	
	Divorced/widowed	29 (14.8)	
Place of residence	Urban	169 (86.2)	
	Rural	27 (13.8)	
Disease duration	≤1 year	45 (23)	
	1-≤5 year	84 (42.9)	
	5-≤10 year	41 (20.9)	
	>10 year	26 (13.3)	
THL-32	Insufficient	59 (30.1)	
	Limited	53 (27.1)	
	Sufficient	47 (23.9)	
	Excellent	37 (18.9)	

SD: Standard deviation; THL-32: Türkiye Health Literacy-32

Table 2. Comparison of THL-32 and MARS Scores according to the Demographic Characteristics of Patients

		THL-32		MARS	
		Mean±SD	*p*	Mean±SD	*p*
Total		29.02 ± 11.07		16.84 ± 5.38	
Gender	Female	29.48 ± 11.2	0.846*	16.49 ± 5.35	0.299*
	Male	28.84 ± 9.6		17.29 ± 5.41	
Body mass index (kg/m²)	Low weight	37.7 ± 12.4		21.54 ± 6.82	
	Normal weight	39.14 ± 11.38		22.14	
	Overweight	26.36 ± 10.2	0.376**	15.37	0.911**
	1st degree obese	19.85 ± 8.8		13.26	
	2nd degree obese	27.46 ± 9.7		15.41	
Education	Primary-MiddleSchool	20.83 ± 9.2		12.78	
	High School	30.82 ± 10.9	<0.001**	17.14	0.023**
	University	43.94 ± 8.7		24.87	
Occupational status	Çalışıyor	28.81 ± 7.6	0.682*	16.22	0.487*
	Çalışmıyor	30.78 ± 12.1		17.81	
Marital status	Single	31.75 ± 11.8		18.16	
	Married	28.46 ± 8.3	0.762**	16.23	0.643**
	Divorced/widowed	29.51 ± 7.9		18.72	
Place of residence	Urban	30.14 ± 10.4	0.023*	17.46	0.014*
	Rural	21.54 ± 7.3		12.96	
Disease duration	≤1 year	29.64 ± 8.4		16.71	
	1-≤5 year	28.48 ± 9.7	0.598**	18.92	0.782**
	5-≤10 year	26.74 ± 8.8		14.25	
	>10 year	25.14 ± 7.4		14.36	
THL-32	Insufficient	22.64 ± 5.2		12.82	
	Limited	27.33 ± 7.4	0.032**	15.73	0.014**
	Sufficient	34.14 ± 6.5		19.42	
	Excellent	42.81 ± 5.1		21.14	

SD: Standard deviation; THL-32: Türkiye Health Literacy-32; MARS: Medication Adherence Report Scale. *Statistically significant according with Mann-Whitney's; **statistically significant according with Kruskal-Wallis's; $P<0.05$.

in those with higher education compared to other levels.

The correlations between the medication adherence scale and the health literacy scale and levels of the individuals participating in the study are shown in Table 4. A positive correlation and significant relationship was found between the mean score obtained in MARS and the mean scores of THL-32 and its levels (insufficient, limited, sufficient and excellent). A high level of positive

significant relationship was found between MARS; THL-32 and THL-32 Excellent (r = 0.746; r = 0.647), and a moderate level of positive significant relationship was found for other levels (r = 0.496; r = 0.521; r = 0.564; respectively). A positive and highly significant relationship was found between the mean scores of THL-32 and its levels (r = 0.724; r = 0.656; r = 0.768; r = 0.698, respectively).

Table 3. Logistic Regression Analysis of Place of Residence and Education Level on THL-32 and MARS Scores

		THL-32			MARS		
Variables		**OR**	**%95Confidence Interval**	***p***	**OR**	**%95Confidence Interval**	***p***
Place of residence	Rural	-		0.02			0.01
	Urban	3.88	1.61-14.85		4.18	1.92-11.71	
Educational Status	Primary-MiddleSchool	-		0.01	-		0.02
	High School	4.12	1.37-12.35		3.10	1.57-6.11	
	University	4.39	1.50-12.80		3.60	1.12-11.61	
	Cox & Snell R^2 value 0,43 Nagelkerke R^2 value 0,36				Cox & Snell R^2 value 0,38 Nagelkerke R^2 value 0,46		

THL-32: Türkiye Health Literacy-32; MARS: Medication Adherence Report Scale; OR: odd ratio; P<0.05.

Table 4. Correlations between MARS and THL-32 and their Levels

	MARS-5	**THL-32 Total**	**THL-32 Insufficient**	**THL-32 Limited**	**THL-32 Sufficient**	**THL-32 Excellent**
MARS-5	1					
THL-32 Total	0.746	1				
THL-32 Insufficient	0.496	0.724	1			
THL-32 Limited	0.521	0.656	0.743	1		
THL-32 Sufficient	0.564	0.768	0.631	0.647	1	
THL-32 Excellent	0.647	0.698	0.703	0.765	0.662	1

THL-32: Türkiye Health Literacy-32; MARS: Medication Adherence Report Scale.

5. Discussion

RA is the most common chronic inflammatory disease requiring regular medication use. Recent advancements in drug therapies have significantly improved patient outcomes, prognosis, and quality of life. Despite these advancements, treatment adherence and patients' beliefs about their medications remain crucial factors in managing RA. Medications used for RA often have serious side effects, making proper adherence essential. Health literacy plays a critical role in ensuring that patients understand how to use medications correctly, including the proper dosage and administration. Incorrect dosages can reduce treatment effectiveness or cause serious health issues, undermining adherence to prescribed therapies.

This study aimed to investigate the relationship between health literacy and medication adherence in RA patients. In this study, it has been determined that more than half of the patients receiving pharmacological treatment due to RA have insufficient and limited health literacy levels. A positive correlation between THY-32 scores and MARS scores, indicating that higher health literacy levels were associated with better medication adherence. Additionally, as education levels increased, health literacy improved, and living in urban areas had a statistically significant positive effect on health literacy.

Inadequate health literacy among RA patients may lead to difficulties in obtaining accurate information from reliable sources, which can result in incorrect or insufficient use of medications. This, in turn, can exacerbate symptoms, increase pain, and lead to greater disability. For effective RA management, healthcare providers, especially physiatrists, must recognize the importance of addressing low health literacy levels in their patients. In our study, 30.1% of RA patients had insufficient health literacy, and 27.1% had limited health literacy. These findings are consistent with previous studies, such as those by Alkaya et al., who found that the majority of female RA patients in Turkey had inadequate health literacy levels.[11,12] Similar results have been reported in other studies evaluating health literacy in RA patients.[13,14] Demographic factors such as age, gender, BMI, education level, occupation, marital status, income, and urban/rural living conditions have been shown to influence health literacy. Lower health literacy is particularly common among older women, unmarried individuals, and those with lower educational and income levels. The Turkish Health Literacy Survey and the European Health Literacy Survey both indicate that health literacy tends to decline with age.[6,15,16]

In this study, although the mean age of participants was relatively low, health literacy was still found to be insufficient or limited, with age not significantly affecting health literacy levels. However, as reported in the literature, health literacy levels did increase with higher education. Most of the sample in this study consisted of middle-aged women from urban areas, but a significant proportion was unemployed. This suggests that unemployment and associated low income may have contributed to limited access to health information and services.

There are varying results in the literature regarding the relationship between health literacy and medication adherence in chronic diseases.[17,19] The way chronic diseases are treated can shape patients' beliefs about the role and impact of medications. However, adherence to long-term pharmacologic treatments can be difficult without understanding the medications. Patients need to recognize potential side effects, trust medication, and understand its necessity for managing their disease. In our study, a significant correlation was found between health literacy and medication adherence. The impact of medications on pain and morning stiffness might also have influenced adherence, though these variables were not directly assessed in this study. The increasing number of drugs used in the management of chronic diseases, the use of different doses and applications, and the necessity of taking several drugs at the same time suggest the necessity of health literacy for medication adherence.

5.1. Limitations

Self adminstrated questionnaires are cheap, and a quick method. Unforutnately they are based on patients' self reports.[20] In this study, medication adherence was assessed using a self-administered questionnaire, which is a limitation. The concern is that patients may provide responses that are more positive than their actual behavior, either due to a desire to please the interviewer or other biases. Additionally, this study was designed as a cross-sectional, single-center study. As a result, the findings may not be easily generalizable to other populations. Conducting multi-center studies or including participants from a broader range of backgrounds could improve the generalizability of the results. Medication side effects can influence health literacy, but this study has not directly examined the impact of the side effects on health literacy, and so it is recommended that future research consider medication side effects as an important variable when exploring the relationship between health literacy and treatment adherence. Also, this approach could improve understanding of the challenges patients face in managing their treatment and help develop effective strategies to enhance adherence.

6. Conclusion

Health literacy is one of many factors influencing patients' medication adherence, yet it plays a critical role in helping patients make the most of healthcare services. Effective management of chronic diseases like RA significantly depends on patients' understanding and adherence to treatment plans. When health literacy is insufficient, patients' adherence to prescribed treatments may decline. However, raising awareness about health literacy can lead to significant improvements in medication adherence. Therefore, it is essential for healthcare providers to offer education and support tailored to the individual needs of patients. Various strategies and resources to improve patients' health literacy can play an important role in such situations and positively influence patient outcomes. Additionally, effective communication between patients and healthcare providers is crucial for improving health literacy and promoting better adherence to treatment.

Research Highlights

What Is Already Known?

- Treatment adherence is one of the crucial factors determining the control of symptoms and the success of treatment in managing chronic diseases.
- Poor compliance or noncompliance with medications poses a significant obstacle in the treatment of chronic diseases.

What Does This Study Add?

- Health literacy is only one of many factors that may affect patients' medication adherence. Effective management of chronic diseases such as RA has a significant impact on patients' understanding and implementation of treatment plans.
- It is important for healthcare providers to provide education and support tailored to patients' needs. Various strategies and resources to improve patients' health literacy can play an important role in such situations and positively impact patient outcomes.

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Conflict of Interest Disclosures

The author declares no competing interests.

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