Illness perception as a determinant of medication adherence in adult Turkish patients with familial Mediterranean fever

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Abstract

Objective

Familial Mediterranean fever (FMF) requires lifelong colchicine therapy, yet suboptimal adherence remains a major challenge. Illness perception shaped by psychological representations of disease may affect adherence. This study aimed to investigate illness perception and adherence association in adult Turkish patients with FMF.

Methods

This cross-sectional study included 304 adult FMF patients followed at Kartal Dr. Lutfi Kirdar City Hospital between 2022 and 2024. Medication adherence and illness perception were evaluated by Medication Adherence Scale for FMF (MASIF) and the Brief Illness Perception Questionnaire (Brief-IPQ). Demographic, clinical, and laboratory data were collected. Statistical analyses included chi-square, t-test, Mann-Whitney U test, correlation analysis and multivariate logistic regression.

Results

The cohort included 210 (69.1%) females and 94 (30.9%) males with a mean age of 35.8±12.1 years. Overall, 75.3% of patients showed good adherence, with a mean MASIF score of 67.1±9.6. Median Brief-IPQ score was 44 (IQR 16.0), the highest in the "timeline" domain and the lowest in "illness comprehensibility". A significant negative correlation was found between MASIF and Brief-IPQ scores ($r=-0.374$, $p<0.001$). Patients with good adherence had significantly lower illness perception scores, particularly in "personal control", "treatment control" and "illness comprehensibility" domains ($p<0.001$). Multivariate logistic regression confirmed these domains as independent predictors of adherence.

Conclusion

Medication adherence among adult Turkish patients with FMF was relatively high but closely influenced by illness perception. Patients with clearer disease understanding and positive control beliefs demonstrated better adherence. Addressing illness perception through education and psychosocial support may enhance adherence and improve long-term outcomes in FMF.

Key words

colchicine, familial Mediterranean fever, illness perception, medication adherence

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Introduction

Familial Mediterranean fever (FMF) is an autosomal recessive inherited, autoinflammatory disease characterised by recurrent self-limiting episodes of fever and serositis primarily affecting individuals of Mediterranean origin (1, 2). Patients experience asymptomatic periods between acute attacks, but subclinical inflammation persists during these attack-free intervals. Amyloidosis is a serious long-term complication of FMF, which may develop, especially in non-compliant and untreated patients (3). The cornerstone of FMF management is colchicine, which noticeably decreases the frequency and severity of attacks and precludes development of amyloidosis in patients diagnosed and treated appropriately (4, 5). In the pre-colchicine period, most of the patients died because of the amyloidosis and its related factors before the age of 50 years (6). However, despite its proven efficacy, adherence to colchicine is suboptimal among both paediatric and adult patients (7, 8). Poor adherence increases attack frequency, disrupts daily functioning, and elevates healthcare costs, highlighting the importance of understanding factors influencing adherence (9).

Factors influencing medication adherence are multifaceted and encompass patient-related, therapy-related, socioeconomic determinants and healthcare system-related components (10). Among these, illness perception is one of patient-related factors which includes patients' subjective interpretation of their disease influenced by social, emotional and cognitive factors (11, 12). It constructs patients' attitudes toward treatment, their beliefs about its benefits, and their willingness to adhere to prescribed regimens. Patients who view their disease as serious and believe in the benefits of treatment, are more likely to adhere, whereas underestimation of disease severity may reduce adherence (13, 14). Hence, in chronic diseases like FMF, adherence behaviours and coping strategies may be directly influenced by illness perception. Earlier studies have shown that the perception of illness considerably impacts adherence to medication in different chronic diseases such as diabetes mellitus (15) and ischaemic stroke (16). Based on the literature, better adherence is associated with a stronger belief in treatment control and a greater personal understanding of the illness. In rheumatoid arthritis and coronary artery disease, studies have revealed similar relationships, demonstrating that patients' views on their illness, including their perception of its severity, the advantages of treatment, and their emotional reactions, are indicators of their treatment adherence (17, 18). The research suggests that the psychological understanding of illness consistently influences treatment choices, irrespective of the type of disease. Nevertheless, research on this relationship in adult FMF populations has been limited, despite the chronic and lifelong nature of FMF.

Understanding the interaction between illness perception and adherence can help us create tailored interventions, promote shared decision-making, and improve patient outcomes. However, most of the existing research on FMF predominantly focuses on paediatric cases, resulting in a gap concerning adult populations. Therefore, this study aimed to examine the association between illness perception and medication adherence in adult Turkish patients with FMF using validated measurement tools. Understanding the perceptual aspects that affect adherence could help create focused educational and behavioural methods to improve disease management.

Material and methods

Study design and participants

In this cross-sectional study, we evaluated 304 adult FMF patients who were followed up at the Rheumatology Outpatient Clinic of Kartal Dr Lutfi Kirdar City Hospital between January 2022 and 2024. All patients aged ≥ 18 years old and fulfilled the Tel Hashomer criteria (19). Patients with a coexisting rheumatologic disorder, malignancy, psychiatric disease or pregnancy were excluded.

Data collection

The sociodemographic characteristics

Table I. Association between sociodemographic characteristics and medication adherence in patients with familial Mediterranean fever.

Socio-demographic variables		Overall n (%)	Adherent n (%)	Non-adherent n (%)	*p*
Age (mean ± SD) (years)		35.8 ± 12.1	36.6 ± 12.0	33.1 ± 12.0	0.063*
Gender	male	94 (30.9)	70 (30.6)	24 (32.0)	0.886**
	female	210 (69.1)	159 (69.4)	51 (68.0)	
Education level	8 years and below	109 (35.9)	88 (38.4)	21 (28.0)	0.127**
	9 years and above	195 (64.1)	141 (61.6)	54 (72.0)	
Marital status	single	116 (38.2)	81 (35.4)	35 (46.7)	0.100**
	married	188 (61.8)	148 (64.6)	40 (53.3)	
Income[#]	< minimum wage	52 (17.1)	38 (19.8)	14 (23.3)	0.780**
	minimum wage	88 (34.6)	67 (34.5)	21 (35.0)	
	> minimum wage	114 (44.9)	89 (45.9)	25 (41.7)	
Employment	yes	164 (53.9)	108 (47.2)	32 (42.7)	0.508**
	no	140 (46.1)	121 (52.8)	43 (57.3)	
Age at FMF diagnosis (median) (IQR) (years)		20 (0-63)	20.0 (18.0)	20.0 (16)	0.596***
Treatment	colchicine	298 (98.0)	224 (97.8)	74 (98.7)	1.000**
	anti- IL-1 therapies	6 (2.0)	5 (2.2)	1 (1.3)	
FMF attack within last 3 months	yes	164 (53.9)	121 (52.8)	43 (57.3)	0.508**
	no	140 (46.1)	108 (47.2)	32 (42.7)	
Disease severity according to ISSF	mild disease	194 (63.8)	143 (62.4)	51 (68.0)	0.580**
	intermediate disease	77 (25.3)	59 (25.8)	18 (24.0)	
	severe disease	33 (10.9)	27 (11.8)	6 (8.0)	
Amyloidosis[##]	yes	11 (3.7)	8 (3.5)	3 (4.2)	0.730**
	no	288 (94.7)	219 (96.5)	69 (95.8)	

Values are presented as n (%), mean ± SD, or median (IQR) unless otherwise specified.
* Student's t test, ** Chi-square test, ***Mann Whitney U test.
[#] 50 cases missing; [##]5 cases missing.
IQR: interquartile range; ISSF: international severity scoring system for familial Mediterranean fever.

(age, sex, education, employment status and income) and clinical features (age at first symptoms and at diagnosis, MEFV mutation type, clinical manifestations, inflammatory markers between attack periods, treatments for FMF, number and type of attacks in the last 3 months, disease severity and amyloidosis status) were collected using structured forms and verified through electronic medical records. Disease severity was evaluated with the International Severity Scoring System for FMF (ISSF) (20).

Assessment of medication adherence

Medication adherence was measured by using the Medication Adherence Scale for Familial Mediterranean Fever (MASIF). MASIF includes 18 items which are grouped into 4 sub-dimensions: knowledge about the medication (1st, 10th, 13th and 16th items), adherence to the treatment (2nd, 5th, 6th, 8th, 15th and 17th items), barriers to drug use (4th, 7th, 12th, 14th and the 18th items), factors that may increase compliance (3rd, 9th and 11th items). Each item is answered on a Likert scale (1 = strongly agree, 2 = agree, 3 = no idea, 4 = disagree, 5 = strongly disagree). The total score of the scale ranges from 18 to 90. The cut-off point is determined as 60 points and higher scores indicate better treatment adherence. A total score over 60 is accepted as "good medication adherence" and a score below 60 points is considered as "bad medication adherence" (21, 22).

Assessment of illness perception

Brief illness perception questionnaire (brief IPQ) was used for the assessment of the cognitive and emotional representations of illness (23) which was translated to Turkish and validated by Kocaman *et al*. (24). The brief IPQ uses a single-item scale approach to assess perceptions on a continuous linear scale and has nine items; which of first 8 are rated using a 0 to10 response scale. The 9th item is an open-ended question which asks patients to list the three most important causal factors in their illness. Five of the items assess cognitive illness representations: consequences (item 1), timeline (item 2), personal control (item 3), treatment control (item 4), and identity (item 5). Item 6 (concern) and item 8 (emotions) assess emotional representations and item 7 assesses illness comprehensibility. The illness perception score is got by calculating the values given to first eight items. Higher total scores indicate a more threatening perception of illness. All questionnaires were administered face-to-face by trained healthcare professionals during outpatient

visits, typically taking 10-15 minutes per participant.

Statistical analyses

The SPSS version 21.0 (IBM Corp, Armonk, NY, USA) package program was used for statistical analyses. Categorical variables were expressed as n (%), while continuous variables were presented as mean ± standard deviation (SD) or median (interquartile range, IQR) based on distribution. Normality was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Categorical variables were compared using the Chi-square or Fisher's exact tests. For normally distributed parameters, Student's t-test was used, while the Mann-Whitney U test was used for non-normally distributed parameters. Correlations between MASIF and Brief-IPQ scores were analysed using Pearson or Spearman correlation coefficients depending on distribution. Variables significantly associated with adherence in univariate analysis were entered into a multivariate logistic regression model to identify independent predictors of adherence. All tests were two-tailed, and a p-value <0.05 was considered statistically significant.

Ethical considerations

The study protocol was approved by the Ethics Committee of Kartal Dr Lutfi Kirdar City Hospital (approval number is 2021/514/204/7). Written informed consent forms of patients were obtained according to Declaration of Helsinki.

Results

Demographic and clinical features

A total of 304 patients were included in the study, of whom 210 (69.1%) were female and 94 (30.9%) were male, with a mean age of 35.8±12.1 years. The median age at FMF diagnosis was 20 years (IQR: 0–63). A total of 164 (53.9%) participants reported an attack within the last three months. Most patients (n=298, 98.0%) were receiving colchicine treatment while only six (2.0%) were under anti–IL-1 treatment. Disease severity was classified as mild in 194 (63.8%), intermediate in 77 (25.3%) and severe in 33 (10.9%) patients according to ISSF. Amyloidosis was detected in 11 (3.7%) cases. Table I details the relationship between socio-demographic and clinical features with medication adherence.

Table II. Assessment of medication adherence and its sub-dimensions in participants.

Medication adherence [n (%)]	"**adherent**"	229 (75.3)
	"**non-adherent**"	75 (24.7)
Overall score obtained in the MASIF scale (18-90) (mean ± SD)		67.1 ± 9.6
The sub-dimensions of MASIF scale (min-max score)		
*Knowledge about medication (4-20) (mean ± SD)		16.4 ± 2.4
*Adherence to treatment (6-30) (mean ± SD)		21.5 ± 4.5
*Barriers to drug use (5-25) (mean ± SD)		16.0 ± 3.6
*Factors that may increase adherence (3-15) (mean ± SD)		12.9 ± 3.5

Values are presented as n (%), mean ± SD unless otherwise specified.
MASIF: medication adherence scale for familial Mediterranean fever.

Table III. Comparison of illness perception and its items between medication-adherent and non-adherent participants.

The items of Brief IPQ	*Overall (n=304) (median score) (IQR)*	*Adherent (n=229) (median score) (IQR)*	*Non-adherent (n=75) (median score) (IQR)*	*p*
Consequences	6 (4.0)	6 (4.0)	7 (3.0)	0.054
Timeline	10 (0.0)	10 (0.0)	10 (0.0)	0.934
Personal control	4 (5.0)	3 (5.0)	5 (3.0)	**<0.001****
Treatment control	1 (4.0)	1 (2.0)	3 (4.5)	**<0.001****
Identity	6 (4.25)	7 (4.0)	7 (4.0)	0.463
Concern	7 (4.0)	7 (4.0)	8 (5.0)	0.179
Illness comprehensibility	0 (2.25)	0 (2.0)	2 (5.0)	**<0.001****
Emotional response	8 (5.0)	8 (6.0)	9 (4.5)	0.111
Overall illness perception	44 (16.0)	41 (17.0)	50 (13.0)	**<0.001****

Values are presented as median (IQR) unless otherwise specified.
IPQ: illness perception questionnaire; MASIF: medication adherence scale for familial Mediterranean fever; IQR: interquartile range.
**statistically significant variables at p<0.05.

Medication adherence

Based on MASIF, 229 (75.3%) patients showed good medication adherence, while 75 (24.7%) showed poor adherence. The mean MASIF total score was 67.1±9.6. The mean scores of MASIF sub-dimensions [*medication knowledge* (16.4±2.4), *treatment adherence* (21.5±4.5), *barriers to medication usage* (16.0±3.6), *and factors improving adherence* (12.9±3.5)] are presented in Table II. The data indicates that a significant proportion of patients demonstrated good adherence to colchicine.

Illness perception

The median overall illness perception questionnaire (Brief-IPQ) score was 44 (IQR: 16.0). The highest score was observed in the "timeline" item (median = 10), while the lowest score was seen in the "illness comprehensibility" item (median = 0). Patients with good medication adherence had significantly lower total illness perception scores compared to those with poor adherence (41 *vs*. 50, p<0.001). Significant differences were also observed in personal control (3 *vs*. 5, p<0.001), treatment control (1 *vs*. 3, p<0.001), and illness comprehensibility (0 *vs*. 2, p<0.001) subscales. Table III details the comparison of illness perception domains between adherent and non-adherent participants.

Correlation and regression analyses

There was a significant negative correlation between total MASIF and the brief IPQ scores (r=-0.374, p<0.001), indicating that higher illness perception scores were associated with lower medication adherence. In multivariate logistic regression analysis, overall illness perception (OR: 0.966, 95% CI: 0.931–0.986, p=0.007), personal control (OR: 0.932, 95% CI: 0.822–0.981, p=0.028), treatment control

Table IV. Multivariate logistic regression analysis of the relationship between illness perception (and its items) and medication adherence.

	β	*95% CI*	*p*
Overall illness perception	0.966	0.931-0.986	**0.007****
Personal control	0.932	0.822-0.981	**0.028****
Treatment control	0.879	0.752-0.931	**0.033****
Illness comprehensibility	0.787	0.681-0.910	**0.001****

**statistically significant variables at $p<0.05$. CI: confidence interval.

(OR: 0.879, 95% CI: 0.752–0.931, $p=0.033$), and illness comprehensibility (OR: 0.787, 95% CI: 0.681–0.910, p = 0.001) were identified as independent predictors of medication adherence. The results emphasize the importance of illness perception dimensions in affecting patients' adherence behaviour (Table IV).

To summarize, the majority of adult FMF patients in this study showed adequate adherence to medication regimens. However, decreased adherence showed a strong association with higher illness perception scores, most notably in areas of personal and treatment control, as well as illness comprehensibility.

Discussion

In our study, most of the patients were adherent to colchicine therapy. The negative correlation between MASIF and brief IPQ scores highlights the impact of patients' illness perceptions on treatment adherence. Patients with better illness perception represented significantly higher adherence, suggesting that cognitive and emotional burdens of the disease influence treatment behaviours. Finally, poor adherence was associated with higher scores in personal control, treatment control, and illness comprehensibility, indicating a more threatening view of the disease among these patients.

In Turkey, reported medication adherence rates among FMF patients range from 56% to 72% (7,25,26). Most of these investigations were conducted in paediatric populations, and studies focusing on adult patients remain limited. Tekgöz *et al*. found that 66.5% of patients reported regular colchicine use (7). In another study conducted in 2015, colchicine use was reported to be highly regular (>90%) in 38.5% of patients, predominantly regular (75-90%) in 26%, and moderately regular (50-74%) in 21.9% (27). Internationally, medication adherence rates have been reported between 60% to 84% (28, 29). Our adherence rate of 75.3% aligns with these national and international findings. Discrepancies among studies may reflect variations in cultural beliefs, healthcare delivery systems, and patient attitudes across different populations (30). These results underscore the importance of considering sociocultural factors when developing strategies to improve medication adherence.

Illness perception plays a fundamental role in medication adherence (31). The analysis of our study revealed a statistically significant negative correlation (r=-0.374, $p<0.001$) between the MASIF and the brief IPQ scores. Consisted with our findings, the results of a study investigating the factors influencing medication adherence in patients with coronary artery disease, suggest that patients' illness perception can play an important role in predicting self-efficacy in disease management and the level of medication adherence. Similarly, another study performed among patients with rheumatoid arthritis reported that illness-related self-efficacy mediates the pathway between illness perception and medication adherence (18).

Among the items of illness perception, personal control refers to a patient's belief in their ability to manage or control their illness through their own behaviours and efforts, whereas treatment control reflects the belief that the illness can be managed or controlled through professional interventions, such as medications, physician recommendations, or medical care. Our findings showed that patients with positive perceptions of both personal FMF control and FMF treatment exhibited better medication adherence. Previous studies of chronic diseases have also yielded similar results (31). Leventhal's Self-Regulation Model explains the link between personal-treatment control and medication adherence. Patients who believe they can control their illness are more likely to develop active coping strategies. The belief in treatment control leads to the expectation that medication will lead to improvement, reinforcing medication-taking behaviour, eventually making it a habit (32). Illness comprehensibility refers to a patient's subjective understanding of illness, including its causes, consequences, and course. In our study, patients with a sufficient level of illness comprehensibility showed better medication adherence. Although some studies in the literature support this relationship while others do not, particularly in chronic conditions (*e.g.*, FMF, diabetes, hypertension), illness comprehensibility directly influences self-management behaviours, enhancing medication adherence. These findings suggest that individuals with a more comprehensive understanding of their illness show greater adherence to treatment regimens. This may be explained because patients who possess a clearer perception of their condition are more conscious of its consequences for both their health and daily functioning, which reinforces their awareness of the necessity of medication and strengthens their motivation to follow prescribed therapies (33).

This study has certain limitations. It was conducted at a single centre in Istanbul, potentially limiting generalisability. This may restrict the external validity of the results, as cultural and regional factors could influence their applicability to broader populations. Cross-sectional design which precludes longitudinal observation, thereby limiting the ability to assess the dynamic impact of illness perception over time on medication adherence in FMF patients. Furthermore, reliance on self-reported measures introduces the risk of response bias, and psychosocial factors such as family support, health

literacy, and comorbid psychiatric conditions were not systematically evaluated. Strengths include the focus on adult FMF patients, addressing a gap in national data/literature and the use of validated tools (MASIF and brief IPQ) to capture cognitive and behavioural aspects of illness perception and adherence. Another strength of the study is its investigation of the association between multiple dimensions of illness perception and adherence, highlighting the importance for healthcare professionals to consider specific perceptual domains when designing adherence-enhancing interventions.

Conclusion

Illness perception plays a central role in medication adherence among adult FMF patients. Patients with clearer disease understanding and stronger beliefs in personal and treatment control exhibit better adherence to colchicine therapy. Addressing patients' illness perceptions through targeted education and psychosocial support may reduce perceived barriers, enhance self-efficacy, and ultimately promote sustained adherence. Future interventions should focus not only on improving knowledge but also on modifying emotional and cognitive representations to optimize treatment outcomes, leading to a better prognosis and an enhanced quality of life. Considering the importance of controlling disease activity in FMF patients, recognizing the role of illness perception on adherence and planning appropriate strategies to address it should be a key priority for healthcare professionals. To overcome our limitations, future studies should employ stratified sampling across diverse regions, centres, and healthcare settings to strengthen the generalisability of the results, and longitudinal designs are needed to examine the long-term patterns of illness perception among FMF patients.

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