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Comparison of Biopsychosocial Characteristics of Children with Juvenile Idiopathic Arthritis According to Common Disease Subtypes

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What is already known on this topic?

- *Juvenile idiopathic arthritis (JIA) is a chronic autoimmune disorder that can have significant physical and psychosocial effects on the patient.*
- *Since there are variable clinical findings, disease course, and management according to different subtypes of JIA, each subtype should be evaluated separately.*
- *The Juvenile Arthritis Biopsychosocial Questionnaire (JAB-Q) is one of the important scales that can holistically evaluate the functional and psychosocial status of JIA patients.*

What this study adds to this topic?

- *Polyarticular JIA patients had higher Child Health Assessment Questionnaire, JAB-Q psychosocial status, and child form total scores than systemic JIA patients and higher JAB-Q child psychosocial status scores than oligoarticular JIA patients.*
- *The JAB-Q fatigue score was higher in enthesitis-related arthritis patients than in systemic JIA patients.*
- *The JAB-Q family form total scores were higher in systemic JIA patients' parents than in oligoarticular JIA patients' parents.*

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ABSTRACT

Objective: In this study, we assessed the functional and biopsychosocial characteristics of juvenile idiopathic arthritis (JIA) patients according to disease subtypes.

Materials and Methods: Child Health Assessment Questionnaire (CHAQ), Juvenile Arthritis Disease Activity Score-71 (JADAS-71), and Juvenile Arthritis Biopsychosocial Questionnaire (JAB-Q) scales were administered to 304 JIA patients, and the subscale of JAB-Q was administered to their families.

Results: The median age of JIA patients at diagnosis was 7.9 (5.5-13) years (female/male = 1.3). Most patients were under treatment (68.7%) and had inactive disease (69.3%). While there was no significant difference between JADAS-71 scores according to the JIA subtypes, total CHAQ scores in polyarticular JIA patients were higher than in systemic JIA patients (P = .005). Enthesitis-related arthritis (ERA) patients had higher JAB-Q fatigue total scores compared to systemic JJIA patients (P = .001). Juvenile Arthritis Biopsychosocial Questionnaire—child psychosocial status scores were higher in polyarticular JIA patients than oligoarticular and systemic JIA patients (P = .004 and P = .003, respectively), and they had higher JAB-Q child form total scores than systemic JIA patients (P = .006). In addition, systemic JIA patients' parents had higher JAB-Q family total scores compared to oligoarticular JIA patients' parents (P = .03).

Conclusion: Our results suggest that polyarticular JIA patients had higher CHAQ, JAB-Q psychosocial status, and child form total scores, and the JAB-Q fatigue score was higher in ERA patients. Also, JAB-Q—parent scores were higher in systemic JIA patients' parents. Biopsychosocial characteristics should be evaluated in both JIA patients and their parents.

Keywords: Disease subtype, Juvenile Arthritis Biopsychosocial Questionnaire, juvenile idiopathic arthritis

INTRODUCTION

Juvenile idiopathic arthritis (JIA) is a general term for chronic arthritis of unknown etiology that begins before the age of 16 and affects the child's health biologically, psychologically, and socially.[1,2] It is a heterogeneous rheumatologic disease, and according to the International League of Associations for Rheumatology (ILAR), it is classified into 7 subtypes: oligoarticular JIA, rheumatoid factor (RF)-positive and -negative polyarticular JIA, enthesitis-related arthritis (ERA), systemic JIA, psoriatic arthritis, and undifferentiated arthritis.[3] Systemic JIA is characterized by systemic symptoms, such as high fever, rash, arthritis, lymphadenopathy (enlarged lymph nodes), and inflammation of internal organs. Oligoarticular JIA is divided into 2 categories, which include inflammation of ≤4 joints during the course of the disease (persistent oligoarthritis) or inflammation of >4 joints after the first 6 months of the disease

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(extended oligoarthritis). Rheumatoid factor-positive polyarticular JIA includes inflammation of ≥5 joints and RF positivity, while RF-negative polyarticular JIA similarly involves inflammation of ≥5 joints but negative RF. Psoriatic arthritis, which is a relatively rare subtype in children, is considered a coexistence of both arthritis and psoriasis in one patient. The term undifferentiated JIA is used when the features of JIA do not fit into any of these defined subtypes or when features overlap across more than 1 subtype. The distribution of these JIA subtypes varies significantly across the world by region and ethnicity.[4]

Juvenile idiopathic arthritis is a chronic autoimmune disorder that has major implications on a child's physical well-being and psychosocial integration.[5-7] Young patients who have often experienced painful chronic conditions during childhood and adolescence may face several challenges throughout their lives.[8,9] Due to the intense pain and limitation of movement, they may be deprived of some social and educational activities. This may hinder their psychosocial development and future success. As a result, the impact of the disease on the entire life course is quite significant.

The heterogeneous nature of JIA creates differences in pathogenetic mechanisms, clinical findings, disease course, and disease management according to subtypes.[10,11] To choose the best assessment and therapy, it is crucial to take into account the subtypes of JIA independently.[12] Although there are several pharmacological studies specific to the disease subtype,[13-16] the literature examining the psychosocial characteristics according to the disease subtypes is insufficient.[17,18]

Many tools are used to assess disease severity, disability, and quality of life in JIA. In this study, we aimed to compare the biopsychosocial and functional characteristics of Turkish children with JIA according to disease subtypes using various scales.

MATERIALS AND METHODS

This cross-sectional study was approved by the Ethics Committee of Hacettepe University (GO 18/743). All participants and their families were informed in detail about the study, and both written and verbal consents were obtained from each child's parent. Ethical approval guidelines for human subjects were followed following the Declaration of Helsinki.

Participants

The patients with JIA (diagnosed under 16 years) who had been followed between April 2018 and December 2022 and their parents were included in this study. An expert pediatric rheumatologist diagnosed patients with JIA subtypes according to the ILAR classification criteria.[19] The patients were assessed in the Department of Pediatric Rheumatology and the Department of Physical Therapy and Rehabilitation. The Child Health Assessment Questionnaire (CHAQ) and Juvenile Arthritis Biopsychosocial Questionnaire (JAB-Q) were administered to all patients. In addition, disease activities were evaluated with the Juvenile Arthritis Disease Activity Score-71 (JADAS-71). Family forms, one of the JAB-Q subscales, were answered by the families. Children or their parents who could not understand and complete the questionnaire and were illiterate in Turkish were excluded from this study. A total of 304 JIA patients (female/male = 1.3) and 1 parent for each patient were included in the final study. The median age of the patients at diagnosis and during the evaluation was 7.9 (5.5-13) and 13 (8-16) years, respectively. Demographic data, last clinical manifestations, laboratory findings [C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and antinuclear antibody (ANA)], and final treatment of all patients were recorded.

Measurements (Instruments)

Juvenile Arthritis Disease Activity Score-71

The JADAS-71 was developed by international expert pediatric rheumatologists to monitor the disease course in JIA and to evaluate the efficacy of therapeutic interventions in patients. It was used to evaluate the disease activity of patients with non-systemic JIA. The JADAS-71 consists of 4 scores: active joint count (71 joints), visual analog score (VAS) for physician global assessment (0-10), VAS for patient/parent global assessment of well-being (0-10), and adjusted ESR. It includes global physician assessment, parent/patient global assessment, active joint count, and ESR and measures 71 joints and is scored between 0 and 101 points.[20] The JADAS-71 score was defined as ≤1 to indicate inactive disease activity status. For high disease activity, cutoff values were reported as >4.2 for oligoarticular JIA and >10.5 for polyarticular JIA.[21] High disease activity was considered as >4.2 for oligoarticular JIA and >10.5 for other non-systemic JIA subtypes.[21]

Juvenile Arthritis Biopsychosocial Questionnaire

The JAB-Q was used to assess the biopsychosocial status of the patients and their parents.[22] The JAB-Q is a multidimensional questionnaire, and it has 3 parts: clinician, child (patient), and parent (family) forms. Both Turkish (original) and English versions of the questionnaire are available (supplementary file). The clinician form was filled out by physicians and physiotherapists, the child form was filled out by children with JIA, and the parent form was filled out by one of the child's parents. The child form evaluates parameters such as pain severity, disease activity, joint status, functional assessment, psychosocial status assessment, school status, and fatigue. The result can be presented as a total score by summing all measured parameters and/or as separate scores. The child form contains 26 questions in total (the total score is between 0 and 52). The family form evaluates the biopsychosocial status of the parent from their perspective and scores between 0 and 38. Higher scores indicate worse results on all parameters of the JAB-Q.

Childhood Health Assessment Questionnaire

The CHAQ was used to evaluate disability levels. The CHAQ measures functional ability in 8 activities of daily living: dressing and grooming, arising, walking, eating, hygiene, reach, grip, and activities. Each question has a 4-level scale between 0 (no difficulty), 1 (with some difficulty), 2 (with much difficulty), and 3 (unable to perform). Higher scores are associated with higher disease activity. A CHAQ score ≥1 was considered as a severe disability.[23,24] The CHAQ is a scale with Turkish validity and reliability, whereas JADAS-71 and JAB-Q are not yet valid in Turkish.[23]

Statistical Analysis

Data analyses were performed by the Statistical Package for the Social Sciences software version 26.0 (IBM Corp., Armonk, NY, USA). The Kolmogorov–Smirnov test was used to test for

normality. Descriptive statistics were presented as medians (25th-75th percentiles) for quantitative variables that do not show a normal distribution and numbers and percentages (%) for qualitative variables. When the data do not follow a normal distribution, the Mann–Whitney *U*-test is used to compare 2 independent groups and the Kruskal–Wallis test to compare more than 2 groups. The correlations between scales were assessed with Spearman's rank-order correlation. A $P < .05$ was considered statistically significant for both tests. In the post hoc analysis, Bonferroni adjustment for multiple comparisons was used.

RESULTS

Patients and Their Disease Characteristics

Oligoarticular JIA (38.8%) was the most common subtype in the patients, followed by polyarticular JIA (22%), ERA (21.7%), systemic JIA (14.8%), and psoriatic arthritis (2.6%). Most of the systemic JIA patients (75.6%) had monocyclic disease courses, and some (24.4%) had polycyclic disease courses. Twenty-two patients (7.2%) had comorbidities such as osteoporosis (n = 4), osteopenia (n = 3), allergic asthma (n = 3), allergic rhinitis (n = 2), chronic urticaria (n = 2), depression (n = 2), Hashimoto's thyroiditis (n = 2), autoimmune hepatitis (n = 1), diabetes mellitus (n = 1), and anxiety disorder (n = 1). Most patients were under treatment (68.7%), and acute phase reactants were negative (91.8%). The median disease duration was 5 (2.5-8) years. The detailed characteristics of the JIA patients are shown in Table 1.

There were some differences in demographic and clinical characteristics according to the JIA subtypes. Patients with ERA were older ($P = .004$, the median age of 15.1 years vs. 11.2, 13.5, and 9.2 years for oligoarticular JIA, polyarticular JIA, and systemic JIA, respectively) and had shorter disease duration ($P = .006$, the median duration of 3.8 years vs. 5.3, 5.6, and 7.2 years for oligoarticular JIA, polyarticular JIA, and systemic JIA, respectively) compared to other disease subtypes. Of the 251 children diagnosed with non-systemic JIA, 69.3% (n = 174) had inactive disease, and 30.7% (n = 77) had high disease activity, according to the JADAS-71.

Outcome Measures of the Patients

While no significant difference was found between JADAS-71 scores according to JIA subtypes ($P = .125$), polyarticular JIA patients had higher CHAQ total scores compared to systemic JIA patients ($P = .005$) (Table 2).

There were no significant differences between the pain severity, disease activity, and functional status subscores of the JAB-Q child form according to the JIA subtypes ($P > .05$). However, there were some differences in the fatigue total, psychosocial status, and total scores of the JAB-Q child form according to the JIA subtypes ($P < .001$) (Table 2). Patients with ERA had higher fatigue total scores compared to systemic JIA patients ($P = .001$). Patients with polyarticular JIA had higher child psychosocial status scores compared to oligoarticular and systemic JIA patients ($P = .004$ and $P = .003$, respectively). Patients with polyarticular JIA had higher child form total scores compared to systemic JIA patients ($P = .006$). In addition, systemic JIA patients' parents had higher JAB-Q family total scores than the parents of children with oligoarticular JIA ($P = .03$).

Table 1. Characteristics of the Patients with Juvenile Idiopathic Arthritis

	JIA Patients (n = 304)
Age at diagnosis, years, median (25th-75th percentiles)	7.9 (5.5-13)
Age during evaluation, years, median (25th-75th percentiles)	13 (8-16)
Gender, female, n (%)	172 (56.6)
BMI (kg/m^2), median (25th-75th percentiles)	19.8 (16.3-21.7)
JIA subtypes, n (%)	
Oligoarticular JIA	118 (38.8)
Polyarticular JIA	67 (22)
Enthesitis-related arthritis	66 (21.7)
Systemic JIA	45 (14.8)
Psoriatic arthritis	8 (2.6)
Comorbidity, n (%)	22 (7.2)
JIA-related other diseases, n (%)	
Uveitis	31 (10.2)
Psoriasis	8 (2.6)
Inflammatory bowel disease	7 (2.3)
JADAS-71 at diagnosis, median (25th-75th percentiles)	7.5 (2-11)
Musculoskeletal findings during evaluation, n (%)	37 (12.1)
Morning stiffness (≥15 minutes)	28 (9.2)
Myalgia	97 (31.9)
Arthralgia	51 (16.8)
Arthritis	
Laboratory findings during evaluation, median (25th-75th percentiles)	
CRP, mg/dL (range: 0-0.8)	0.3 (0.2-1.1)
ESR, mm/h (range: 0-20)	5 (2.5-8)
ANA positivity (≥ 1/160)	127 (41.8)
JADAS-71 during evaluation, median (25th-75th percentiles)	2 (0-6)
Disease duration, years, median (25th-75th percentiles)	5 (2.5-8)
Treatment during evaluation, n (%)	
Drug free	95 (31.3)
NSAID	52 (17.1)
Corticosteroid	49 (13.8)
Methotrexate	78 (25.7)
Sulfasalazine	7 (2.3)
Biologic drugs	100 (32.9)
Etanercept	52 (17.1)
Adalimumab	17 (5.6)
Tocilizumab	15 (4.9)
Canakinumab	9 (3)
Anakinra	6 (2)
Abatacept	1 (0.3)

ANA, antinuclear antibody; BMI, body mass index; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; JADAS-71, Juvenile Arthritis Disease Activity Score-71; JIA, juvenile idiopathic arthritis; NSAID, nonsteroidal antiinflammatory drugs.

Relationships Between Juvenile Arthritis Biopsychosocial Questionnaire and Other Scales

A high level of correlation was found between the patients' median CHAQ total score, JAB-Q joint function, and JAB-Q functional status scores ($P < .01$, $r = 0.720$ and $r = 0.699$,

Table 2. Comparison of Patient-Reported Outcome Measures in Children with Juvenile Idiopathic Arthritis Within Subtypes

	Oligoarticular JIA (n = 118)	Polyarticular JIA (n = 67)	ERA (n = 66)	Systemic JIA (n = 45)	P^0	P^1	P^2	P^3	P^4	P^5	P^6
JADAS-71 (0-101), median (25th-75th percentiles)	3 (0-29)	3.8 (0-31)	1 (0-22)	—	.125	—	—	—	—	—	—
JAB-Q, median (25th-75th percentiles)											
Pain severity (0-10)	0 (0-10)	0 (0-10)	0 (0-9)	0 (0-8)	.295	—	—	—	—	—	—
Disease activity (0-10)	2 (0-10)	2 (0-10)	2 (0-9)	1 (0-7)	.125	—	—	—	—	—	—
Functional status (0-66)	2 (0-22)	3 (0-30)	1 (0-23)	1 (0-33)	.076	—	—	—	—	—	—
Fatigue total (0-16)	2 (0-11)	3 (0-10)	4 (0-12)	2 (0-8)	**.022**	.425	.088	.141	.359	.029	**.001**
Child psychosocial status (0-52)	10 (0-43)	13 (3-38)	10 (0-30)	9 (1-32)	**.010**	**.004**	.575	.480	.053	**.003**	.252
Child form total (0-164)	18 (0-69)	24 (5-73)	20 (2-75)	17.5 (3-77)	**.048**	.042	.645	.275	.163	**.006**	.150
Family form total (0-38)	9.5 (1-28)	12 (2-25)	12.5 (2-27)	13 (2-28)	**.010**	.052	.026	**.003**	.708	.239	.434
CHAQ (0-3), median (25th-75th percentiles)	0.36 (0-2.7)	0.25 (0-3)	0.25 (0-2.5)	0.11 (0-1.9)	**.026**	.014	.830	.387	.029	**.005**	.557

CHAQ, Childhood Health Assessment Questionnaire; ERA, enthesitis-related arthritis; JAB-Q, Juvenile Arthritis Biopsychosocial Questionnaire; JADAS-71, Juvenile Arthritis Disease Activity Score-71; JIA, juvenile idiopathic arthritis. Statistically significant values (P < .05) are indicated in bold.
P^0, *P* values of the Kruskal–Wallis test by comparing the 4 groups (*P* < .05); P^1, *P* values of the Mann–Whitney *U*-test by comparing subtype oligoarticular and polyarticular JIA; P^2, *P* values of the Mann–Whitney *U*-test by comparing subtype oligoarticular JIA and ERA; P^3, *P* values of the Mann–Whitney *U*-test by comparing subtype oligoarticular and systemic JIA; P^4, *P* values of the Mann–Whitney *U*-test by comparing subtype polyarticular JIA and ERA; P^5, *P* values of the Mann–Whitney *U*-test by comparing subtype polyarticular and systemic JIA; P^6, *P* values of the Mann–Whitney *U*-test by comparing subtype ERA and systemic JIA. *P* < .008 was defined as indicating a statistically significant difference after post hoc tests. Higher scores indicate worse results on all measures.

respectively). In addition, there was a moderate correlation between the median CHAQ total score and the JAB-Q total score ($P < .01$, $r = 0.583$). However, no correlation was found between the JADAS-71 total score and any parameter of the JAB-Q.

DISCUSSION

In this study, disease activities and biopsychosocial and functional status of patients with JIA according to its subtypes were analyzed using JAB-Q, CHAQ, and JADAS-71. Our results showed that polyarticular JIA patients had higher CHAQ, JAB-Q psychosocial status, and child form total scores than systemic JIA patients and higher JAB-Q child psychosocial status scores than oligoarticular JIA patients. The JAB-Q fatigue score was higher in ERA patients than in systemic JIA patients, while the JAB-Q family form total scores were higher in systemic JIA patients' parents than in oligoarticular JIA patients' parents.

While the axial skeletal system is prioritized in ERA patients, multiple (≥5) joint involvement is present in patients with polyarticular JIA. Compared to other JIA subtypes, both ERA and polyarticular JIA may cause more severe functional impairments.[25,26] This may lead to school absenteeism, especially during periods of active disease, which possibly cause functional limitations. However, due to multiple joint involvements, the psychosocial status of individuals with polyarticular JIA is probably more likely to be impacted than that of patients with other JIA subtypes.[27] In systemic JIA, families can have a higher attrition rate due to life-threatening complications of the disease compared to other subtypes.

Despite differences in JAB-Q scores, there was no significant difference in JADAS-71 scores between JIA subtypes. Only patients with polyarticular JIA had a higher CHAQ score than patients with systemic JIA. It was not unexpected to see similarities in score results according to disease subtypes because most of the patients (69.3%) in our study had inactive disease. Also, the active movements and independence of children with high disease activity in their daily lives may not always be affected.[28] In addition, the improvement in children's psychosocial status may benefit joint functions independent of disease activity, according to a stronger association between JAB-Q psychosocial status and joint function and functional status. The significance of the biopsychosocial component in the treatment of JIA patients is further highlighted by these findings.

Since specific clinical symptoms, the course of the disease, and treatment approaches differ according to JIA subtypes, differences in JADAS-71 scores may be observed, especially during active periods of diseases.[29] A 2012 study evaluated JADAS-71 scores in 352 patients (164 with persistent oligoarticular JIA, 13 with extended oligoarticular JIA, 67 RF-negative polyarticular JIA, 11 RF-positive polyarticular JIA, 28 systemic JIA, 16 ERA, 28 psoriatic arthritis, and 25 undifferentiated arthritis).[30] The median JADAS-71 score of the whole group was 5.3 (2.2-10.1) with a significant difference between median JADAS-71 scores in different JIA subtypes. Patients with persistent oligoarticular JIA had the lowest JADAS-71 score, while the highest score was in patients with RF-negative polyarticular JIA. However, in our study, JADAS-71 scores were measured during follow-up periods and not at the time of diagnosis. This may explain why the difference between JIA subtypes according to JADAS-71 was not detected. Therefore, the period in which the JADAS-71 score is evaluated according to the JIA subgroups and the disease activity at that time must be taken into consideration.

While CHAQ is not specifically designed to differentiate between JIA subtypes, the functional limitations observed by children may vary depending on the JIA subtype.[31] In a study by Sontichai et al,[32] CHAQ was evaluated during active disease in 139 JIA patients consisting of ERA (30.9%), systemic JIA

(28.1%), oligoarticular JIA (16.5%), RF-negative polyarticular JIA (15.1%), RF-positive polyarticular JIA (6.5%),and undifferentiated arthritis (2.9%). Rheumatoid factor-negative polyarticular JIA patients had the highest CHAQ, followed by systemic JIA, RF-positive polyarticular JIA, and ERA, while oligoarticular JIA had the lowest CHAQ. Depending on the activation of the disease in the evaluation process of the patients' CHAQ scores, differences may be detected between the JIA subgroups.

Despite some differences in these scores, it is difficult to clearly distinguish patients according to the JIA subtypes, in terms of both functional and biopsychosocial characteristics, because many JIA subtypes have overlapping findings. For example, oligoarthritis or polyarthritis may be seen in ERA, as well as axial skeletal system involvement in psoriatic arthritis. Most importantly, systemic JIA with a persistent course shares very similar clinical features with polyarticular JIA and may lead to similar complications in the long term. Therefore, we included only patients with systemic JIA without a persistent disease course in our study.

When we evaluated relationships between JAB-Q and other scales, there was a moderate correlation between CHAQ total scores and JAB-Q total scores and a high correlation between JAB-Q subscales assessing joint functions and functional status and CHAQ total scores. Since both CHAQ and JAB-Q are used for assessing the functional and pain status of the disease, the relationship between them is expected to be stronger. The JAB-Q is very similar to the CHAQ, especially in measuring the effects of activities of daily living, functioning, and disease on function. However, the patients' biopsychosocial characteristics can only be evaluated with JAB-Q. When evaluating the biopsychosocial characteristics of the children and their families, the correlation in the subscores and total scores of the JAB-Q and CHAQ may offer clinicians a practical alternative. On the other hand, there was no correlation between JADAS-71 and JAB-Q. The JADAS-71 is a scale used only to measure disease activity. Increased disease activity does not mean that the child's life will always be adversely affected. Just as the CHAQ scores of JIA patients may be low even though the disease is active, there is a similar situation here.[28]

Finally, it should be noted that the management of JIA requires a comprehensive approach that addresses not only the medical aspects but also the psychosocial and developmental needs of patients.[33] It would be beneficial for all children with JIA to receive comprehensive care that addresses the medical, physical, psychological, and social aspects of their condition with a multidisciplinary team approach, including pediatric rheumatologists and physiotherapists. This team collaboration will ensure a holistic approach in JIA management by improving treatment outcomes and the overall quality of life for the affected children. In addition, the importance of the family factor should not be overlooked. In addition to educating the patient, family education should start at the same time as the therapy. There is a need for further studies addressing this point.[34,35]

This study has several limitations. First, it can be questioned whether definitively correct answers can be obtained from individuals responding to comprehensive surveys like this one. Second, due to the scarcity of prior studies on this subject, it cannot be compared with other studies. Third, since JAB-Q is a recently validated scoring system, there are not many physiotherapists who have received training in it, and its usage is not yet very common. In addition, the assessment duration of the scoring system is relatively long and may reduce the frequency of preference. Finally, since this study was planned as a cross-sectional study, the sensitivity of the JAB-Q to patients' current treatment in a certain time interval and the limitations of using the scale during this period could not be evaluated.

CONCLUSION

In conclusion, in this study, the biopsychosocial and functional characteristics, disease activity, and family impacts were evaluated holistically according to the disease subtypes of JIA patients. Especially the high scores of the polyarticular JIA and ERA patients from the JAB-Q child form scales and the parents of systemic JIA patients from the JAB-Q family form scale are remarkable. In patients with polyarticular JIA and ERA, being more careful in these aspects compared to other disease subgroups will be beneficial in terms of reaching the correct diagnosis and reducing unnecessary referrals. It would also be good to support the families of systemic JIA patients in terms of biopsychosocial aspects. Biopsychosocial characteristics should be evaluated in both JIA patients and their parents. However, more multicentral and prospective researches is required to provide the basis for developing management strategies that can address the biopsychosocial demands of JIA patients.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of Hacettepe University (Approval No: GO 18/743).

Informed Consent: Both written and verbal consents were obtained from each participant.

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