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Original Article

Juvenile Idiopathic Arthritis: An Insight into Clinical Features and Therapeutic Management in Children

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Abstract

Background: Background:Juvenile idiopathic arthritis (JIA) is a persistent inflammatory condition in children, characterized by diverse clinical features and varying levels of disease severity. In Bangladesh, the major challenges still persist with late diagnosis and restricted availability of advanced treatment options. Timely detection and swift intervention are crucial to enhance long-term results, avert joint injury, and minimize disability.

Methods: This cross-sectional study conducted in the Paediatric Medicine Department of Bangladesh Medical University, evaluating the clinical characteristics, disease severity, and treatment approaches in children with JIA (n=60) diagnosed according to ILAR criteria. Data were gathered through a structured form and examined using SPSS v25, employing descriptive statistics and the Chi-square test ($p < 0.05$). Ethical permission and informed consent were acquired.

Results: Sixty children diagnosed with JIA were examined. The majority were between 5 and 10 years old (46.7%), female (60%), and from rural locations (66.7%). Oligoarticular JIA (46.7%), characterized by joint pain/swelling (91.7%), was the most prevalent. Mild disease severity (41.7%), low activity (33.3%), and Functional Class II (36.7%) were the most common. NSAIDs (83.3%) and methotrexate (75%) were the most commonly used therapies, whereas 70% did not receive biologic treatments. The severity of the disease showed a significant association with age, subtype, duration, and type of treatment, but not with sex.

Conclusion: JIA is a long-lasting childhood rheumatic condition, primarily oligoarticular, characterized by mild to moderate severity. Severity relates to subtype, duration, age, and treatment. Timely identification and enhanced treatment are crucial to decrease disability.

Keywords: Juvenile Idiopathic Arthritis, Clinical Features, Therapeutic Management, Children

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Introduction

Juvenile idiopathic arthritis (JIA) refers to a range of arthritis types that begin before the age of 16, persist for over 6 weeks, and lack a known cause, encompassing various childhood arthritis disorders with shared fundamental characteristics [1]. Estimates of incidence and prevalence differ due to variations in diagnostic criteria, methodologies, data collection challenges, low disease occurrence, and limited sample sizes, showing prevalence rates of 0.07–4.01 per 1000 children and incidence rates of 0.008–0.226 per 1000 children [2,3]. These differences mirror geographic and methodological variations. The

ILAR criteria enhance standardization, yet variability persists in both research and clinical practice [4].

JIA is due to genetic predisposition and immune system imbalance, resulting in persistent synovial inflammation with increased TNF-α, IL-1, and IL-6, which causes damage to cartilage and bone [5,6]. It includes 3 prevalent forms: oligoarticular JIA, impacting a small number of joints and possibly involving uveitis, and polyarticular JIA, which influences over four joints within a six-month period and systemic JIA in which disease appear later. Diagnosis must also exclude infections and cancers [7,8]. Gender inequalities continue to exist in JIA, with girls facing greater risk than boys, and oligoarticular JIA being the predominant subtype [9]. Management of JIA involves NSAIDs, corticosteroids, methotrexate, and biologic treatments that target TNF, IL-1, and IL-6. JAK inhibitors are new therapeutic options, but issues like late diagnosis, toxicity, and restricted access to biologics persist [10,11].

Huang et al. (2024) indicated that immune dysregulation characterized by pro-inflammatory cytokines leads to chronic joint inflammation in juvenile idiopathic arthritis, and that early treatment with DMARDs and biologics enhances remission rates, although some patients persist with disease; likewise, Martini et al. (2022) characterized JIA as a diverse autoimmune disorder marked by better outcomes from prompt diagnosis and biologic treatment, yet with a continued risk for chronic disease and long-term complications in certain patients[2,12].

Islam et al. (2022) stated that patients with juvenile idiopathic arthritis in Bangladesh predominantly exhibited active disease, frequently the oligoarticular and polyarticular forms, with late diagnosis and inadequate access to advanced therapies leading to suboptimal disease management [13].

While global information on Juvenile idiopathic arthritis exists, evidence from Bangladesh is scarce, particularly regarding clinical characteristics, disease activity, and treatment results due to delayed diagnosis and restricted access to advanced therapies. This study seeks to assess the clinical characteristics and treatment of JIA in children in Bangladesh to enhance early detection and care.

METHODOLOGY

This was a hospital-based cross-sectional observational study conducted over a period of two years (January 2024 to December 2025) to evaluate the clinical features, disease severity, and therapeutic management patterns among children with Juvenile Idiopathic Arthritis (JIA). The study was carried out in the Paediatric Medicine Department of Bangladesh Medical University in Shahbag, Dhaka, Bangladesh, which serves as a referral center for pediatric rheumatologic and chronic musculoskeletal disorders.

The study population included children aged ≤16 years who were diagnosed with JIA according to the International League of Associations for Rheumatology (ILAR) criteria. The diagnosis required onset of arthritis before 16 years of age, persistence of symptoms for at least six weeks, and exclusion of other causes of chronic arthritis such as infections, malignancies, or other rheumatologic diseases. Patients were recruited during the study period using a purposive sampling technique, and a total of 60 eligible children were included. Children with incomplete clinical records, secondary causes of arthritis, or whose parents/guardians did not provide informed consent were excluded from the study.

Data were collected using a structured, pre-tested data collection form developed according to the study objectives. Information was obtained from medical record review, clinical examination findings, and interviews with parents or guardians when necessary to complete missing information. The collected variables included sociodemographic characteristics (age, sex, residence, family history of arthritis, and duration of illness), clinical features (pattern of joint involvement, JIA subtype, presenting symptoms, and extra-articular manifestations), disease-related parameters (disease severity, disease activity status, and functional class), and treatment patterns including use of NSAIDs, corticosteroids, conventional disease-modifying antirheumatic drugs (DMARDs), biologic agents, and supportive therapies such as physiotherapy.

Disease severity was assessed clinically based on overall joint involvement, symptom burden, and degree of functional impairment. Patients were classified into three categories: mild, moderate, and severe.

- Mild: Few joints involved, minimal symptoms, no functional limitation
- Moderate: Multiple joint involvement, pain and stiffness, mild functional limitation
- Severe: Extensive joint involvement, high disease activity, marked functional impairment ± systemic features.

Disease activity was evaluated based on clinical evidence of active arthritis, number of active joints, and overall inflammatory status at the time of assessment. Patients were categorized into four groups: inactive disease, low activity, moderate activity, and high disease activity.

- Inactive disease: No active arthritis
- Low activity: Mild symptoms, minimal inflammation
- Moderate activity: Multiple active joints
- High activity: Severe poly/systemic disease

Functional ability was assessed using a standard functional classification system based on the child's ability to perform daily physical activities. Patients were classi

fied into four functional classes (Class I–IV), ranging from no limitation to severe disability.

Functional Class: Clinical Description
- Class I: No limitation
- Class II: Mild limitation
- Class III: Moderate limitation
- Class IV: Severe disability

Data were entered, cleaned, and analyzed using Statistical Package for the Social Sciences (SPSS) software version 25. Descriptive statistics were used to summarize all variables, and results were presented as frequencies and percentages. The association between disease severity and selected variables such as age, sex, disease subtype, duration of illness, and treatment type was analyzed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant.

Ethical approval was obtained from the Institutional Review Board of the respective institution prior to data collection. Written informed consent was obtained from the parents or legal guardians of all participants.

RESULTS:

A total of 60 children diagnosed with Juvenile idiopathic arthritis were included in the study. The findings are presented under sociodemographic characteristics, clinical profile, disease severity, treatment patterns, and factors associated with disease severity.

Table 1 shows that the majority of participants were aged 5–10 years (46.7%), with a female predominance (60%). Most children came from rural areas (66.7%). A positive family history of arthritis was observed in 20% of cases. Regarding disease duration, 36.7% had symptoms for 6–12 months.

Table 1: Sociodemographic Profile of Study Participants (n = 60)

Variables	Categories	Frequency (n)	Percentage (%)
Age (years)	<5 years	10	16.7
	5–10 years	28	46.7
	11–15 years	22	36.7
Sex	Male	24	40.0
	Female	36	60.0
Residence	Urban	20	33.3
	Rural	40	66.7
Family history of arthritis	Yes	12	20.0
	No	48	80.0
Duration of illness	<6 months	18	30.0
	6–12 months	22	36.7
	>12 months	20	33.3

Table 2 demonstrates that involvement of both large and small joints was most common (41.7%). The predominant subtype was oligoarticular JIA (46.7%), followed by polyarticular and systemic types. Joint pain and swelling were the most frequent presenting symptoms (91.7%). Extra-articular manifestations, including fever and uveitis, were present in 30% of cases.

Table 2: Clinical Features of Study Participants

Clinical Features	Categories	Frequency (n)	Percentage (%)
Joint involvement	Large joints	20	33.3
	Small joints	15	25.0
	Both	25	41.7
Disease subtype	Oligoarticular JIA	28	46.7
	Polyarticular JIA	22	36.7
	Systemic JIA	10	16.7
Common symptoms	Joint pain & swelling	55	91.7
	Morning stiffness	40	66.7
Extra - articular feature	Present	18	30.0
	Absent	42	70.0

Figure 1 demonstrates that mild disease severity was the most common presentation among the study participants, accounting for 41.7% of cases. Moderate disease severity was observed in 36.7% of children, while 21.7% had severe disease.

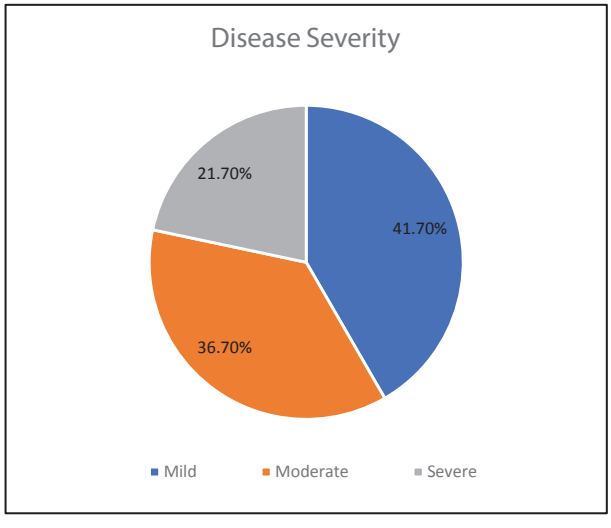

Figure 1: Severity of Disease Activity

Table 3 illustrates the distribution of disease activity among the study participants. Low disease activity was the most common status, observed in 33.3% of children, followed by inactive disease in 30.0% of cases. Moderate disease activity was found in 23.3% of participants, whereas 13.3% had high disease activity.

Table 3: Disease Activity Score of Study Participants

Disease Activity Level	Frequency (n)	Percentage (%)
Inactive disease	18	30.0
Low activity	20	33.3
Moderate activity	14	23.3
High activity	8	13.3

Table 4 shows that the largest proportion of participants belonged to Functional Class II (36.7%), indicating mild limitation in daily physical activities. Functional Class I, representing no functional limitation, was observed in 26.7% of children. Moderate functional limitation (Class III) was present in 25.0% of participants, while severe disability (Class IV) was identified in 11.6% of cases.

Table 4: Functional Status of Study Participants

Functional Class	Frequency (n)	Percentage (%)
Class I	16	26.7
Class II	22	36.7
Class III	15	25.0
Class IV	7	11.6

Table 5 indicates that NSAIDs were the most common initial treatment (83.3%). Methotrexate was the predominant DMARD used (75%). However, 70% of patients did not receive biologic therapy, reflecting limited access to advanced treatment options. Physiotherapy was provided to 58.3% of children.

Table 5: Treatment Pattern of Study Participants

Treatment Type	Categories / Drugs	Frequency (n)	Percentage (%)
Initial therapy	NSAIDs	50	83.3
	Corticosteroids	10	16.7
DMARDs used	Methotrexate	45	75.0
	Other DMARDs	8	13.3
Biologic therapy	TNF inhibitors	12	20.0
	IL-1 / IL-6 inhibitors	6	10.0
	Not used	42	70.0
Supportive therapy	Physiotherapy	35	58.3
	None	25	41.7

Table 6 shows a statistically significant association between disease severity and age group ($p = 0.03$), disease subtype ($p < 0.001$), duration of illness ($p = 0.02$), and treatment type ($p = 0.01$). Severe disease was more commonly observed in children with polyarticular and systemic JIA and in those with longer disease duration. No significant association was found between sex and disease severity ($p = 0.28$).

Table 6: Association Between Disease Severity and Selected Clinical Variables

Variables	Category	Mild n (%)	Moderate n (%)	Severe n (%)	p-value
Age group	<5 years	6 (24.0)	3 (13.6)	1 (7.7)	0.03
	5–10 years	12 (48.0)	10 (45.5)	6 (46.2)	
	11–15 years	7 (28.0)	9 (40.9)	6 (46.2)	
Sex	Male	10 (40.0)	8 (36.4)	6 (46.2)	0.28
	Female	15 (60.0)	14 (63.6)	7 (53.8)	
Disease subtype	Oligoarticular	18 (72.0)	8 (36.4)	2 (15.4)	<0.001
	Polyarticular	6 (24.0)	9 (40.9)	7 (53.8)	
	Systemic	1 (4.0)	5 (22.7)	4 (30.8)	
Duration of illness	<6 months	12 (48.0)	5 (22.7)	1 (7.7)	0.02
	6–12 months	9 (36.0)	8 (36.4)	5 (38.5)	
	>12 months	4 (16.0)	9 (40.9)	7 (53.8)	
Treatment type	NSAIDs only	14 (56.0)	5 (22.7)	1 (7.7)	0.01
	DMARDs/ biologics	11 (44.0)	17 (77.3)	12 (92.3)	

DISCUSSION:

In the present study, the majority of participants were aged 5–10 years, with a female predominance and most children originating from rural areas. More than two-thirds of the participants had a disease duration exceeding six months, suggesting delayed presentation and diagnosis. Similar findings were reported in a study conducted at a tertiary care hospital in Bangladesh, where most patients with Juvenile Idiopathic Arthritis (JIA) were older than five years at presentation. However, that study observed a higher prevalence among males, which contrasts with the female predominance identified in the current study. Delayed presentation of JIA cases was also highlighted in that study [14].

The current study demonstrated that oligoarticular JIA was the most common subtype, while joint pain and swelling were the predominant presenting symptoms. Combined involvement of both large and small joints was observed in a considerable proportion of patients, and extra-articular manifestations were present in 30.0% of cases. Similar observations have been documented in previous studies, where oligoarticular JIA was identified as the predominant subtype and joint pain, swelling, and morning stiffness were the major clinical manifestations. Extra-articular involvement was also reported in a proportion of affected children [15]. Regarding disease severity, mild disease was the most frequent presentation,

followed by moderate and severe disease activity. Comparable findings have been reported previously, where the majority of pediatric rheumatic disease patients presented with mild to moderate disease severity at tertiary care hospitals in Dhaka [16]. In the present study, low disease activity was the most common category, followed by inactive disease, whereas high disease activity was less frequent. Similar findings have been observed in previous studies, where most children with JIA exhibited low to moderate disease activity and only a smaller proportion demonstrated high disease activity [17].

Functional assessment revealed that most children belonged to Functional Class II, followed by Functional Class I, indicating predominantly mild to moderate functional limitation. Classes III and IV accounted for a smaller proportion of cases, suggesting comparatively fewer children with severe disability. Similar findings have been documented previously, demonstrating that children with JIA generally experience mild to moderate physical functional limitations, while severe disability is less common [18]. With regard to treatment patterns, NSAIDs and methotrexate were the principal therapeutic agents used in this study, whereas biologic therapy was not utilized in the majority of cases. Physiotherapy was provided to more than half of the participants. Comparable findings have been reported in earlier studies, where NSAIDs and methotrexate constituted the cornerstone of JIA management, while the use of biologic agents remained limited because of restricted availability and financial constraints [19].

The present study further demonstrated significant associations between disease severity and age group, disease subtype, duration of illness, and treatment type, while no significant association was observed with sex. Severe disease was more frequently identified among children with polyarticular and systemic JIA as well as among those with longer disease duration. Similar findings have been reported previously, indicating that systemic and polyarticular subtypes are associated with greater disease severity because of increased inflammatory burden and prolonged disease duration, without clear sex-based differences [20]. In summary, JIA typically manifests as oligoarticular type and with mild to moderate severity, where disease severity is greatly affected by subtype and illness duration, highlighting the significance of early diagnosis and treatment.

CONCLUSION

Juvenile Idiopathic Arthritis is a significant chronic rheumatologic disorder among children, with oligoarticular JIA being the most common subtype. Most participants had mild-to-moderate disease activity, although a notable proportion experienced severe disease and functional limitation. Methotrexate was the most commonly used DMARD, while biologic therapy use remained limited. Disease severity was significantly associated with disease subtype, duration of illness, age group, and treatment type. Early diagnosis, regular monitoring, and improved access to advanced therapies are essential to improve clinical outcomes and reduce disability among children with JIA.

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