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**Original Research Article**

# Active disease in juvenile idiopathic arthritis: current patterns and associations: a one-year study

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## ABSTRACT

**Background:** Juvenile idiopathic arthritis (JIA) is the most common rheumatic ailment of children. JIA is characterized by idiopathic peripheral arthritis with an immunoinflammatory pathogenesis possibly activated by contact with external antigens. To describe the success of active disease (AD) and remission in polyarticular juvenile idiopathic arthritis (JIA) and to measure the associations among patient characteristics, imaging results and these outcomes. The aim of this study is to assess the Active disease in juvenile idiopathic arthritis: current patterns and associations.
**Methods:** This is an observational study. The study used to be carried out in the admitted patient's Department of pediatrics, Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh. In Bangladesh for the duration of the period from October 2015 to March 2017.
**Results:** This study shows that the according to age of 33 patients aged 1 to 9 years. Here according to age distribution, 2 (6.1%) were 1-3 years, 10 (30.30%) were >3-6 years, 9 (27.27%) were >6-9 years and 12 (36.4%) were >9 years. And according to gender 13 (39.4%) were male and 20 (60.6%) were female.
**Conclusions:** Children with polyarticular JIA spent the majority of their follow-up with active disease. Because children with early radiographic evidence of joint damage have the most active disease, improving outcomes for these subgroups may be an important goal for prospective study.

**Keywords:** Juvenile idiopathic arthritis, Pathogenesis, Active disease, Juvenile idiopathic arthritis

## INTRODUCTION

Juvenile idiopathic arthritis (JIA) is the most frequent of the pediatric rheumatic illnesses, with an estimated annual incidence of 3.2–6.1 in 100 000 children.[1] Despite accelerated recognition of the ailment and elevated cure options, several large, prospective, observational research have reported that almost one-half of the patients with JIA had recurrent or continual disorder activity on entry into adulthood, with active arthritis, ongoing joint destruction and a diminished high-quality of life.[2]

Although the intention of treatment in JIA is inactive disorder (ID) and remission, standardized conditions did no longer exist for these diseases states till 2004 when proposed definitions for ID, medical remission on medication (CRM) and medical remission off medication (CR) have been posted by way of Wallace et al.[3] A subsequent, retrospective study of children with JIA who had been recognized and dealt with between 1980 and 1999 stated that children with polyarticular JIA tended to spend the highest proportion of follow-up with active disease as in contrast with different JIA categories.[4] Although it is predicted that children recognized and

treated with extra currently have accelerated consequences due to elevated disease recognition and before use of DMARDs, this information do no longer presently exist in the published literature

Furthermore, whilst RF reputation and younger age at disorder onset beforehand have been related with extra extreme disease, the affiliation of such elements with ID and remission in contemporary cohorts is no longer known. The associations between imaging findings and these consequences additionally have no longer been explored in polyarticular JIA.[5]

The primary objectives of this investigation had been to provide modern-day descriptive statistics involving the fulfillment of ID and remission in children with polyarticular JIA and to identify associations between specific patient characteristics, in specific RF state and the presence of joint injury on early imaging studies, with these outcomes.[6]

## METHODS

This is an observational study. The study used to be carried out in the admitted patient's Department of pediatrics, Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh. In Bangladesh for the duration of the period from October 2015 to March 2017. This study was carried out on 33 patients the find out about the population including male and female patients in the department of pediatrics, BSMMU, Bangladesh. The medical pediatricians, neonatologist and the surgeon were primarily involved in the decision-making process. The choice of treatment was made by the patient after a full discussion with the multidisciplinary team consisting of pediatricians, neonatologists and pediatric endocrinologists and surgeons. Children between 1-12 years age group with diagnosed case of JIA were included in our study. The presence of systemic arthritic disease was an exclusion criterion for our study. Parents of the study population were given a thorough explanation of the study's objectives, and each person's agreement was obtained with the commitment of confidentiality. For each participant, a code number was used both in questionnaire and in the specimen label. Data were gathered using a semi-structured questionnaire. The socio-demographic characteristics of the study participants were obtained by a face-to-face interview. The data for this study about had been accumulated from patients' medical information and radiographs. Statistical evaluation of the results used to be got via the use of a window-based computer software program devised with statistical packages for social sciences (SPSS-24).

## RESULTS

Table 1 demonstrated the age of 33 patients aged 1 to >9 years. Here according to age distribution, 2 (6.1%) were 1-3, 10(30.30%) were >3-6, 9(27.27%) were >6-9 and 12 (36.4%) were >9.

**Table 1: Distribution of patients by age (n=33).**

| Age distribution (year) | n=33 | % |
|---|---|---|
| **1-3** | 2 | 6.1 |
| **>3-6** | 10 | 30.30 |
| **>6-9** | 9 | 27.27 |
| **>9** | 12 | 36.4 |

The total study population was 33 patients, according to gender 13(39.4%) were male, 20(60.6%) were female (Table 2).

**Table 2: Distribution of the patients by sex (n=33).**

| Sex distribution | n=33 | % |
|---|---|---|
| **Male** | 13 | 39.4 |
| **Female** | 20 | 60.6 |

Table 3 demonstrated the status of laboratory investigation in active and inactive states of patients (n=33). Here according to active state of Hb (g/dl), TC ($10^9$/L), WBC DC-N (%), WBC DC-L (%), platelet ($10^9$/L) and ESR (1st hour) were 10.93±1.69, 7.00±3.22, 55.82±14.55, 36.85±14.71, 413.45±135.46 and 33.52±21.29 respectively.

**Table 3: Status of laboratory investigation in active and inactive states of patients (n=33).**

| Parameter | Mean±SD | | P value |
|---|---|---|---|
| | Active state | Inactive state | |
| **Hb (g/dl)** | 10.93±1.69 | 11.36±0.93 | $0.098^{ns}$ |
| **TC ($10^9$/l)** | 7.00±3.22 | 9.06±2.74 | $0.981^{ns}$ |
| **WBC DC-N (%)** | 55.82±14.55 | 55.58±10.41 | $0.925^{ns}$ |
| **WBC DC-L (%)** | 36.85±14.71 | 32.36±12.07 | $0.160^{ns}$ |
| **Platelet ($10^9$/l)** | 413.45±135.46 | 350.97±100.34 | $0.021^{*}$ |
| **ESR (1st hour)** | 33.52±21.29 | 15.09±7.71 | $0.0001^{**}$ |

Table 4 demonstrated the status of immunoglobulin concentrations in active and inactive state of disease in JIA patients (n=33). Here according to parameter, active state of IgG (g/l), IgM (g/l) and IgA (g/l) were 13.04±4.41, 3.25±1.80 and 3.29±1.18 respectively. And inactive state were of IgG (g/l), IgM (g/l) and IgA (g/l) were 9.88±2.31, 1.82±0.88 and 1.34±0.47 respectively.

Figure 1 shows the status of immunoglobulin concentrations of oligo-JIA patients in active and inactive state of disease (n=22). Here mean (±SD) IgG was 11.95±4.58 and 9.48±2.58 g/l in active and inactive state of disease, respectively. The difference was highly significant ($p<0.01$). Mean (±SD) IgM was 2.61±1.75 and 1.53±0.79 g/l in active and inactive state of disease, respectively. The mean difference was highly significant

(p<0.001). Mean (±SD) IgA was 3.03±1.36 and 1.31±0.54 g/l in active and inactive state of disease, respectively. The mean difference was highly significant (p<0.001).

**Table 4: Status of immunoglobulin concentrations in active and inactive state of disease in JIA patients (n=33).**

| Parameter | Mean±SD | | P value |
|---|---|---|---|
| | Active state | Inactive state | |
| **IgG (g/l)** | 13.04±4.41 | 9.88±2.31 | 0.0001*** |
| **IgM (g/l)** | 3.25±1.80 | 1.82±0.88 | 0.0001*** |
| **IgA (g/l)** | 3.29±1.18 | 1.34±0.47 | 0.0001*** |

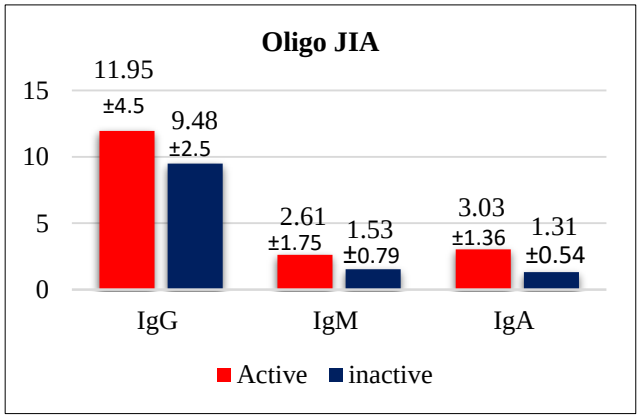


**Figure 1: Status of immunoglobulin concentrations of oligo JIA in active and inactive state of disease (n=22).**

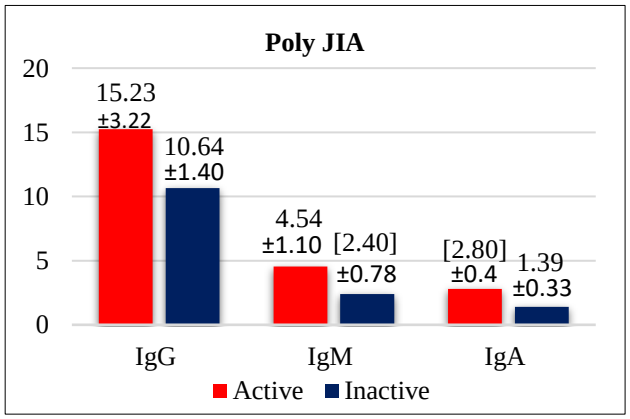


**Figure 2: Status of immunoglobulin concentrations of poly JIA patients in active and inactive state of disease (n=11).**

Figure 2 shows the status of immunoglobulin concentrations of poly-JIA patients in active and inactive state of disease. Here mean (±SD) IgG was 15.23±3.22 and 10.68±1.40 g/l in active and inactive state of disease, respectively. The difference was highly significant (p<0.001). The Mean (±SD) IgM was 4.54±1.10 and 2.40±0.78 g/l in active and inactive state of disease, respectively. The mean difference was highly significant (p<0.001). And the mean (±SD) IgA was 2.80±0.41 and 1.39±0.33 g/l in active and inactive state of disease, respectively. The difference was highly significant (p<0.001).

## DISCUSSION

Children with polyarticular JIA spent an average of 66.3% of their ailment direction with energetic disease, regardless of anticipated upgrades in ailment endeavor due to before prescription of DMARDs and increased disorder recognition.[7] Children with early radiographic evidence of joint injury and children who had one or extra advantageous RF titres tended to be much less possibly to gain medication of their first 6 months of care, even although they additionally tended to acquire greater medicines at some stage in their first 6 months of SCH care.[8] Patients with early radiographic evidence of joint harm spent an extensively large share of their ailment direction with energetic disease, and have been much less possibly to gain ID and CRM at some point of their time in the cohort. RF+ patients have been much less in all likelihood to obtain ID inside their first 6 months of care and tended to spend a larger percentage of their disorder direction with energetic disorder than the RF− patients.[9]

In our study, according to age of 33 patients aged 1 to 9 years. Here according to age distribution, 2(6.1%) were 1-3 years, 10 (30.30%) were >3-6 years, 9 (27.27%) were >6-9 years and 12 (36.4%) were >9 years. And according to gender 13(39.4%) were male and 20 (60.6%) were female.

The retrospective cohort find out about by using Wallace and colleagues described in the introduction used to be the first learn about to make use of the proposed definitions of ID and remission, and is the greatest to describe the non-stop ailment direction of every patient.[10] The find out about protected 437 patients from SCH and Italy, who had a minimal of four years of follow-up between the years 1980–99. Although the majority of children with oligoarticular JIA spent almost 60% of their disorder route with ID, 64% of the patients with RF− polyarticular JIA and 84% of the children with RF+ polyarticular JIA spent ≥60% of their disorder route with active disease.[11] RF+ patients spent a median of 16% of their follow-up with ID. Median length of disorder till first medical institution go to with ID was once 29 months for children with RF+ polyarticular JIA and 23 months for children with RF− polyarticular JIA.[12] These findings have been validated in a small, retrospective, single-Centre file from Brazil, in which children with polyarticular JIA had been much less possibly to acquire and preserve ID when in contrast with the different JIA categories; however, the cohort protected only 13 children with polyarticular JIA.[13]

It is additionally necessary that the median time to first go to with ID in our cohort was once 7.6 months, about half of the length stated through Wallace et al.[14] We hypothesize that this enchantment may also be due to previously disease consciousness and beforehand

DMARD prescription. Children aged 5–10 years had been extra probable to obtain ID inside 6 months in this cohort.[15] The importance of this discovering is doubtful and, comparable to the findings suggested by means of Wallace, we did no longer study any extra age effects.[16] Although our pattern dimension was once too small to determine medicinal drug effects, there was once a small however statistically considerable affiliation between the use of oral corticosteroids and/or MTX inside the first 6 months and the success of ID at 1 year.[17]

In our study, according to active state of Hb (g/dl), TC ($10^9$/l), WBC DC-N (%), WBC DC-L (%), platelet ($10^9$/L) and ESR (1st hour) were 10.93±1.69, 7.00±3.22, 55.82±14.55, 36.85±14.71, 413.45±135.46 and 33.52±21.29 respectively. And according to parameter, active state of IgG (g/l), IgM (g/l) and IgA (g/l) were 13.04±4.41, 3.25±1.80 and 3.29±1.18 respectively. And Inactive state were of IgG (g/l), IgM (g/l) and IgA (g/l) were 9.88±2.31, 1.82±0.88 and 1.34±0.47 respectively.

Importantly, this is the first study about to report the non-stop ailment direction of children who had early radiographic evidence of joint damage. Prior research has suggested radiographic proof of joint injury on research got at analysis or inside the first year of disorder in ~30% of the children with JIA.[18] Our statistics point out a comparable occurrence of early radiographic proof of joint damage. In addition, in this cohort, patients with joint area narrowing and/or erosions on imaging research acquired prior to or inside the first 6 months of care have been drastically much less probably to attain ID and CRM at some stage in their time in the cohort and had a greater incidence of lively disorder all through their first three years of follow-up.[19] While this discovering requires extra exploration in potential cohorts, these statistics point out that this subgroup might also have specifically aggressive disease, even after adjustment for RF fame and age at ailment onset.[20]

Because imaging used to be no longer constantly got in this cohort, we do now not have information concerning development of these imaging findings. Furthermore, due to the fact the imaging records had been got from reviews only, we had been unable to report these findings the usage of standardized measures or to investigate the severity of the damage.[21]

This record is constrained by means of its observational, single-Centre design, short follow-up period and reliance on retrospective chart review. We can't account for lacking and improper facts or for adjustments in disease popularity between clinic visits.[22] Importantly, we are unable to measure medication outcomes due to the small pattern measurement and are unable to modify for confounding with the aid of indication, as this information do no longer consist of common measures of baseline ailment severity.[23] Patients obtained a giant range of special medicine mixtures and we do no longer have medication dosages, route of administration or a measure of medicine compliance, which in addition constrained our capacity to check for treatment effects. This study shows the status of immunoglobulin concentrations of oligo-JIA patients in active and inactive state of disease (n=22). Here mean (±SD) IgG was 11.95±4.58 and 9.48±2.58 g/l in active and inactive state of disease, respectively. The difference was highly significant ($p<0.01$). Mean (±SD) IgM was 2.61±1.75 and 1.53±0.79 g/l in active and inactive state of disease, respectively. The mean difference was highly significant ($p<0.001$). Mean (±SD) IgA was 3.03±1.36 and 1.31±0.54 g/l in active and inactive state of disease, respectively. The mean difference was highly significant ($p<0.001$).

Although these patients spent the majority of their ailment direction with active disease, and the incidence of active ailment plateaued at ~50%, we can't decide whether or not the absolute levels of disorder activity in this cohort have been clearly decrease than these in before published cohorts, as disorder endeavor in this cohort used to be dichotomized into active vs inactive.[24] Also, the reliance on observational records in all likelihood over-represents patients with the most extreme ailment as children with much less extreme disorder would be greater in all likelihood to be misplaced from the cohort.[25] It is probably that we did no longer become aware of any episodes of CR for this equal reason, alongside with the exceedingly short duration of follow-up and limitations of our information regarding medication use.[26]

Despite these limitations, it is vital commentary that these patients with polyarticular JIA spent an aversage of two-thirds of their follow-up with active disease. It will be essential to decide the most fulfilling timing and aggregate of treatment options to gain and preserve ID, and to acquire CRM and CR. Patients with early radiographic evidence of joint injury and patients who are RF+ may additionally be specially possibly to gain from these interventions.[27]

### *Limitations*

The present study was conducted in a very short period due to time constraints and funding limitations. The small sample size was also a limitation of the present study.

## CONCLUSION

In this paper, children with polyarticular JIA spent the majority of their follow-up with active disease. Because children with early radiographic evidence of joint injury have the most active disease. JIA is a chronic, debilitating childhood disorder with many long-term consequences. Diagnosis is based mainly on clinical indications, and accurate classification of JIA disease subtype is extremely significant.

### *Recommendations*

This study can serve as a pilot to much larger research involving multiple centers that can provide a nationwide

picture, validate regression models proposed in this study for future use and emphasize points to ensure better management and adherence.

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