Correlation of Age, Sex, and Symptoms to Number of Problematic Joints in Children with Idiopathic Juvenile Arthritis

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Abstract

Background: Juvenile Idiopathic Arthritis (JIA) is a rare case in Asia, including Indonesia. **Objective:** Analyze the correlation between age, sex, and symptoms on the number of joint problems in children with JIA symptoms. **Methods:** This study used a retrospective design from January 2016 to December 2019. The data collecting in this study was included age, sex, symptoms, and the number of joint problems. The analysis used was multiple linear regression with $p < 0.05$. **Results:** The correlation between sex ($\beta = 0.015$; 95% CI -0.002 – 0.002; $p = 0.916$), age ($\beta = 0.015$; 95% CI -0.197 – 0.291; $p = 0.916$) to the number of joint problems was not significant. While, the correlation between symptoms and the number of joints with problems was significant, which included swelling ($\beta = 1.012$; 95% CI 0.243 – 1.782; $p = 0.011$), fever ($\beta = 1.000$; 95% CI 0.082 – 1.918; $p = 0.034$), and pain. ($\beta = 0.931$; 95% CI 0.082 – 1.918; $p = 0.007$). **Conclusion:** There is a significant relationship between symptoms and the number of problem joints while age and sex are not significant.

Keywords: *Juvenile Idiopathic Arthritis, Age, Sex, Symptoms*

Introduction

Juvenile Idiopathic Arthritis (JIA) is a chronic arthritis disease found in children under 16 years with autoimmune causes [(1)]. The clinical symptoms that occur in children with JIA are varied and non-specific. Affected, due to the variety of clinical symptoms that arise, sometimes JIA disease in children can go undiagnosed. This is lead to short to long term disabilities in children [(1, 2)]. In Europe and North America, the incidence of JIA is reported as 16 - 150 out of 100,000. Meanwhile, in Asia (Japan) the incidence of JIA is reported very low as much as 0.83 per 100,000 [(1, 3)]. In various countries, there are only a few surveys that assess the epidemiology of JIA. Even in developed countries such as France, where rarely does anyone know about the course of a patient's disease accurately both from diagnosis and treatment [(4)]. In Indonesia there is a low of JIA reporting, the incidence of JIA in Indonesia that has been reported is 198 from 2001-2006 [(5)].

Pediatric rheumatology is still considered a youth subspecialty in many countries, and the standards of medical education and patient care have developed rapidly over time. (6). The academic recognition for this subspecialty and the opportunity to obtain rheumatology medical education in various pediatric centers is still insufficient, although some developed countries have shifted patient care towards highly specialized multidisciplinary pediatric rheumatology teams [(7, 8)].

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But not in various other countries, as a result, until now many pediatricians and general practitioners are still lacking knowledge about rheumatic diseases and clinical examinations of pediatric musculoskeletal [9].

The lack of attention to the JIA problem causes this disease to feel strange in society, especially health workers [2] such as in Indonesia. This has an impact on delays in diagnosing JIA, thereby reducing the success of JIA management. Even now, the etiology and pathogenesis of JIA are not known with certainty, so it still uses criteria in making the diagnosis [5]. The result is frequent misdiagnosis that is detrimental to the patient [10].

Moreover, based on the importance of diagnosing JIA, we as researchers wish to know the relationship of age, sex, and symptoms to the number of problem joints in children with JIA in Dr. Soetomo General Academic Hospital, Surabaya, Indonesia as the largest specialist medical teaching hospital in Eastern Indonesia. Knowing the correlation between age, sex, and symptoms on the number of joint problems in children with JIA.

Methods

Participants

Participants in this study were children diagnosed with JIA. Participants must meet the inclusion and exclusion criteria. Participant of inclusion criteria was included patients aged >18 years, patients diagnosed with JIA based on the International League of Associations for Rheumatology (ILAR) [1, 10]. Participants' exclusion criteria included incomplete patient medical records.

Setting

The study used a retrospective design and the data used was from January 2016 to December 2019. The determination of participants number was 50 patients, obtained by using the total sampling method. This research was first carried out by ethical approval based on the Declaration of Helsinki in Ethics Committee (1528 / KEPK / IX / 2019). The data collection was included age, sex, symptoms, and the number of joint problems. This data collection by looking at hospital medical records in that period and then analyzed.

Statistical Analysis

The data obtained and analyzed by using IBM SPSS Statistics software version 23.0 (IBM Corp., Armonk, NY, USA). The data presentation technique was used table analysis of the form of frequency distribution and percentage. Meanwhile, the bivariate analysis used in this study was the multiple linear regression method with $p < 0.05$.

Results

Characteristic of Participant

The mean age of the participants was 105.12 ± 45.33 months with a median value of 108.00 (24.00 - 192) months. Most of the participants were 108 months old (12%), followed by 120 months and 132 months, which were 10% respectively. Most of the participants were male was 60%. Most of the participants who experienced pain symptoms were 88.0% and the number of participant joint disorders was at most 2 joints (46.0%; Table 1).

Correlation between sex, age, and symptoms on the number of joint problems in children with Juvenile Idiopathic Arthritis

The correlation between sex and the number of problem joints in children with Juvenile Idiopathic Arthritis was not significant ($\beta = 0.015$; 95% CI -0.002 – 0.002; $p = 0.916$). In addition, it was found that there was no significant correlation between age and the number of problem joints ($\beta = 0.015$; 95% CI -0.197 – 0.291; $p = 0.916$). A significant correlation was found between symptoms and number of joint problems, which symptoms included swelling ($\beta = 1.012$; 95% CI 0.243 – 1.782; p = 0.011), fever (β = 1.000; 95% CI 0.082 – 1.918; p = 0.034), and pain ($\beta = 0.931$; 95% CI 0.082 – 1.918; $p = 0.007$; table 2).

Table 1. Characteristic of participant

Variables	n (%)
Sex	
Male	30 (60.0)
Female	20 (40.0)
Patient Complaints	
Swollen	20 (40.0)
Fever	13 (26.0)
Pain	44 (88.0)
Number of Problematic Joints	
One joint	17 (34.0)
Two joint	23 (46.0)
Three joint	3 (6.0)
Four joint	0 (0.0)
Five joint	7 (14.0)

Table 2. Correlation between sex, age, and symptoms on the number of joint problems

	t	β	CI 95%	p
Sex	0.106	0.015	-0.002 – 0.002	0.916
Age	0.106	0.015	-0.197 – 0.291	0.916
Swollen	2.663	1.012	0.243 – 1.782	0.011*
Fever	2.205	1.000	0.082 – 1.918	0.034*
Pain	2.827	0.931	0.264 – 1.597	0.007*

Note: *significant $p < 0.05$

Discussion

In our study, it was found that JIA cases have more males than females. Based on previous research, it was stated that JIA cases were more common in females. 2004 In Spain was found 432 cases of JIA, of which 288 were female [11]. A study in France in 2010 also had the same cases of JIA in female than male [12]. In the case of JIA, it is often found in female than male [11-13].

Several literatures states that JIA cases often occur in children under 16 years, which is consistent with our study [1, 2]. This condition is supported by previous research where JIA cases occurred in the age range of 1.6-18 years and the mean age of the participants was 8.1 years [14]. Other studies also found that the age of children who experienced JIA was 7.4 years (median) with an interquartile range of 3.6 - 11.2 years [15].

Arthritis is clinically characterized by swelling, warmth, stiffness of joint effusion, joint pain and, limited range of motion, and limited movement due to pain [16]. Inflammation of the joints causes pain, loss of function, and morning stiffness. The distribution

of complaints varies between JIA subtypes. Systemic symptoms usually occur in systemic and polyarticular subtypes and can include fatigue, weight loss, anemia, anorexia, or fever. Growth abnormalities can complicate JIA and cause short stature or local growth disorders such as bone overgrowth, prematurely fused epiphyses, and leg length discrepancies. This may be of value in determining patient management [1, 17].

Characterizing the number of joints affected by each joint and analyzing the correlation of the chief complaint is essential for analyzing the basic mechanisms of AIJ and for efficiently predicting future joint damage. However, there is no detailed analysis to address the correlation between these joint symptoms. The most common symptom of AIJ is joint pain. Joints may swell and become tender, red, and feel warm to the touch. Joints can become stiff and lose mobility. This causes a loss of subtle dexterity, especially in the hands [16]. Children experience anxiety due to joint pain in the hip, knee, or ankle. As a result, the child becomes less physically active because of pain and limited movement. If it lasts for a long time, it can cause damage to the affected joint, causing disability. Joint pain from arthritis can interfere with sleep that causes tiredness. Inflammation can also cause fatigue. Physical examination shows a limp, hesitates to use an arm or leg, or, in younger children, has problems with fine motor skills [1, 18].

Conclusion

There is a significant correlation between symptoms and the number of problem joints in children with JIA. Meanwhile, age and sex did not have a significant relationship with the number of problem joints in children with JIA.

Ethical Approval: This research has gone through the ethical approve stages based on the Declaration of Helsinki at Ethics Committee Dr. Soetomo General Academic Hospital, Surabaya, Indonesia.

Conflict of Interest: None.

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