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International Journal of Clinical Epidemiology

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Diagnosis and Management of Arthritis among Children, Adolescents and Young Adults (CHAYAs) in Primary Settings

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Received Date: July 15, 2024 | Accepted Date: August 12, 2024 | Published Date: September 05, 2024

Citation: Suresh Kishanrao, (2024), Diagnosis and Management of Arthritis among Children, Adolescents and Young Adults (CHAYAs) in Primary Settings, *International Journal of Clinical Epidemiology*, *3*(5); **DOI:**10.31579/2835-9232/073

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Abstract

Arthritis doesn't affect children, Adolescents and Young Adults (CHAYA's) as much as it does among adults, but lots of toddlers, teens and young adults do get it. Arthritis is a generic term used to indicate an inflammation of the synovial membrane, lining the joints like knees or knuckles, which produces fluid, leading to swelling and tenderness of one or more joints.

While Arthritis Among Children and Adolescents Aged <18 Years in United States, in 2017–2021 had a prevalence of 305 per 100,000 U.S. children and adolescents. We do not have any authentic data from India, but a few schools based have reported a prevalence of 48 and 65 / 100,000 children of 6-17 years in North India (2010-11) & South India respectively (2017-19).

In India Arthritis children's parents seek care from multiple providers- Registered medical Practitioners (RMPs-untrained), trained basic graduates of Allopathy, Ayurveda, Unani, Siddhi and Homeopathy, (AYUSH) systems of Medicine, Specialists (Orthopaedic & Paediatrics) and superspecialist for Robotic surgical interventions for sports injuries. The primary health care providers are the gateway for helping arthritis patients.

The main goals of arthritis treatments general are to reduce symptoms and improve quality of life. Indian Paediatricians and Family Physicians and even Internal Medicine Physicians practice administering antibiotics (especially long-acting Penicillin's) to patients with symptoms suggestive of streptococcal infection to lower the risk of rheumatic fever by as much as 70%. Long-term benzathine penicillin treatment is a secondary prevention measure to avoid recurring rheumatic fever, and to prevent Rheumatic hear diseases in later life. However, involvement of interprofessional care coordination of Paediatricians, Physicians, family physicians, Radio-diagnostics, Laboratory services, physiotherapy, and proper referral system to convalesce care-seeking pathways at primary care level are limited.

Materials and Methods: Treatments of arthritis vary depending on the type of arthritis. This article is based on authors recent involvement in 4 cases of arthritis management Allopathic medicines, Ayurveda, and Homeopathy therapies, each giving satisfaction to the patients.

Outcomes: While all four cases have recovered one of them has developed carditis and under secondary prevention measure therapy of annual long-acting Penicillin injections.

Keywords: childhood; juvenile idiopathic arthritis; musculoskeletal complaints

Abbreviation

RMSK= Rheumatic and musculoskeletal diseases; JIA= Juvenile idiopathic arthritis; RA= Rheumatoid arthritis; RF= Rheumatoid factor; Paediatric rheumatology; Referral pathway; NSAIDs and DMARDs; bDMARDs =biological disease-modifying anti-rheumatic drugs; csDMARDs= conventional synthetic disease modifying anti-rheumatic drugs PCP= Primary Care Physician

Introduction:

Arthritis affects persons of all ages; little is known about arthritis prevalence among children and adolescents aged <18 years globally. Common perception that arthritis is a problem of middle aged and elderly and not in children, Adolescents and Young Adults (CHAYA's), is not correct, as lots of toddlers, teens and young adults do get it, though it may not be seen in children as much as it does among adults [1,2,3].

Arthritis is an inflammation of the synovial membrane, which lines the joints like the knees or knuckles, when it becomes inflamed, fluid is produced, leading to the swelling and tenderness of one or more joints [1,2]. Juvenile idiopathic arthritis (JIA) is the umbrella term for a group of chronic childhood arthritis of unknown cause, in children below sixteen years of age, and persisting for at least six weeks [3,4,5]. This was the revised term proposed by the International League of Associations of Rheumatologists (ILAR) in Durban in 1997.

Burden of the Arthritis in Children: The worldwide incidence of JIA ranges from 0.8 to 22.6/100,000 children/year, while prevalence ranges from

7 to 401/100,000 [5]. During 2017–2021, an estimated 220,000 U.S. children and adolescents aged <18 years had arthritis, equating to a prevalence of 305 per 100,000 U.S. children and adolescents [1]. Country-wide representative data on its prevalence in India are not available. A few schools based studies using Paediatric Gait Arms Legs Spine (pGALS), a screening tool for identifying musculoskeletal problems, reported a prevalence of 48 /100,000 North India (2010-11) [3] and 65 /100,000 South India (2017-19) [2]. It is estimated that 10-12 % of outpatient visits in the preceding fortnight & 5% of hospital admissions in 2023 were due to RMSK symptoms [2,3]. Even though musculoskeletal problems are common in children, only a small fraction of them have an underlying serious pathology [3]. The common types of arthritis cases seen in children under 18 years by the primary health care providers of developing countries are Rheumatic Arthritis, Juvenile Idiopathic Arthritis, Traumatic Arthritis, & Septic arthritis [1,5].

Arthritis Care seeking behaviour in India: In India Arthritis CHAYA patient's/ parents seek care from multiple providers – Registered medical Practitioners (RMPs- untrained), trained basic graduates of Allopathy, Ayurveda, Unani, Siddhi and Homeopathy, (AYUSH) systems of Medicine, Specialists (Orthopaedic & Paediatrics) and superspecialist for Robotic surgical interventions for knee /hip replacement due sports injuries. However, the primary health centres or private family physicians are the first point of care for most of the patients due to ease of accessibility & affordability. The primary health care providers (PCPs) are the gateway for keeping arthritis patients. However, the availability of trained interprofessional care providers, like physician, physiotherapist radio-diagnostics, Bio-markers test (RA factor) and proper referral system, that are essential to convalesce care-seeking pathways is not readily available beyond district headquarters and half of the sub-district hospitals or community health centres. The choice of the treatment depends upon type of arthritis, affordability and possibilities of achieving the main goals of reducing symptoms and improve the quality of life by minimizing future complications of carditis.

This article is based on authors involvement in 4 cases of Childhood arthritis cases management since 1969 till 2024 and relevant literature search.

Case Reports:

Acute Rheumatic fever with Arthritis (ARFA):

1. **My first ever management of a case of RA** dates to 1969 February barely 6 months after entering the service. A young girl of 6 years was brought to the OPD with fever and joint pain for 5 days. My medicine ward clinics picture and discussion came to my mind and was able to manage. I gave her Benzathine Penicillin (BP 6 Lakh IU) after an intradermal sensitivity test and making the child to wait for half an hour. In addition, I had given plain Aspirin tablets twice a day for 5 days after meals. The outcome was so dramatic that it boosted our OPD attendance. I followed the girl every year and used to give BP 6 Lakh IU every year for next 5 year and there was no Rheumatic Carditis and recurrence of ARFA. Thereafter each year I used treat a dozen cases.

2. **My latest case was in January 2024 in Bengaluru**. A 13-year-old girl presented to me with subcutaneous nodules, mild fever and a non-migratory polyarticular joint pain involving the small joints of the hands, wrist, elbows, knees, and ankles for three months with poor response to the non-steroidal anti-inflammatory drug (NSAID) Ibuprofen given by a practitioner. On physical examination identified presence of carditis, the patient fulfilled three major (carditis, polyarthritis, subcutaneous nodules) and two minor (polyarthralgia and low-grade fever 95^0F) criteria of the revised Jones criteria 2015.

Therefore, a diagnosis of acute rheumatic fever was made, and Benzathine Penicillin 12 Lakh IU was given along with Aspirin tablets. The child was asymptomatic on subsequent visits in March, May and July first week of 2024. The subcutaneous nodules have subsided, but she is advised continue to receive BP 6 L IU every quarter for five years.

3. FDG-PET/CT scan helped to diagnose a PUO Case as sJIA: A 6-year-old boy was brought to me in early December 2023 with complaints of fever spikes and mild pain in the shoulders. He was treated by a family physician with Amoxicillin 100mg and Ibuprofen 100 mg BD for last one week. A detailed history revealed that he had a sore throat and a maculo-papular rashes the first 3 days of the episode. Physical examination revealed no abnormalities. Laboratory tests revealed signs of inflammation (Leukopenia-Leukocytes-10^9/L & Ferritin ug/L results: i) Day 1 in my clinic-16.5 & 640, Day 8-13.9 (N) & 1451, day 10- 14.3 (N) & 493) and Day 14-5.0 & 400. Making a provisional diagnosis of a viral infection, I ordered for serological testing for viral pathogens. At a follow-up visit,8 days later, I learnt that the daily fever spikes had persisted, and viral serology was negative. Inflammatory parameters had increased. He was admitted for observation of pyrexia of unknown origin. Very next day the boy complained of pain in his knee during fever spikes, but no signs of arthritis were observed on examination. After consultation with a Paediatric Rheumatologist in a tertiary centre, performed an FDG-PET/CT scan. Both shoulders, knees and the right ankle joint showed mildly elevated uptake, suggesting synovitis. The images also revealed higher uptake in bilateral axillar lymph nodes and unilateral inguinal lymph nodes, and moderately diffuse uptake in the red bone marrow and slightly diffuse in the spleen. These findings, in the absence of signs for a focal active infection or malignancy, were suggestive of sJIA with polyarthritis.

4. A case of juvenile idiopathic arthritis-associated uveitis: A 5-year-old girl was brought to me in April 2023 with a history of knee and elbow joint swellings and some visual problem for which I referred her to a private tertiary care Eye hospital.

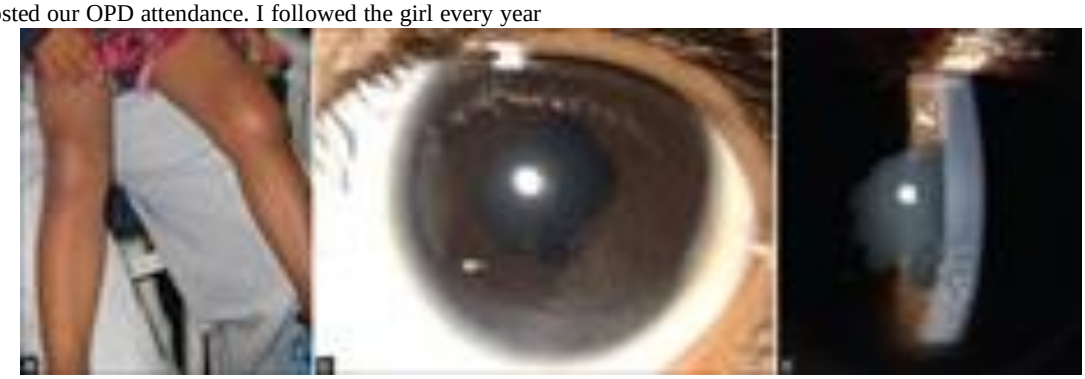

Figure 1: Composite photographs showing bilateral knee joint swelling in a child with JIA (a), slit-lamp photographs of the left eye in diffuse illumination (b), and slit illumination (c) showing band keratopathy, medium-sized keratic precipitates, and posterior synechiae

Her eye test report read best corrected visual acuity (BCVA) as 6/6 (OD) and 6/9 (OS). Right eye (OD) examination was normal. Slit lamp examination of the left eye (OS) had shown medium-sized keratic precipitates, anterior chamber cells 1+ (SUN), and posterior synechiae. No vitreous cells were noted. Fundus examination (OS) was normal. She was started on oral steroids 20 mg/day with a slow taper along with subcutaneous injection methotrexate 12.5 mg/week along with topical prednisolone acetate eye drops 6 times/day. Over the last 1 year, the systemic disease has remained stable, multiple recurrences of anterior uveitis (OS) occurred each time the oral steroids were reduced to less than 2.5 mg/day. She requires still a maintenance dose of both topical (1 time/day of prednisolone acetate 1% eye drops) and oral steroids (2.5 mg/day). As conventional immuno-modulation, failed Adalimumab, and Tocilizumab, an IL-6 inhibitor could have been tried but not used due to financial constraints. She has eventually developed band-shaped keratopathy changes and cataractous changes in the lens (OS). In May 2024, she developed pain and swelling in the left knee joint for which I put her (in consultation with a paediatric rheumatologist) on Tofacitinib 5 mg once a day, along with continuation of tab wysolone 5 mg/day and injection methotrexate 15 mg/week. At the last follow-up (first week of July 2024), her BCVA was 6/6 (OD) and 6/12 (OS). Slit-lamp examination (OS) showed resolution of anterior uveitis. She is currently on tofacitinib 5 mg once a day along with injection methotrexate 15 mg/week. Her systemic disease and eyes are stable with no flareups and complete resolution of inflammation. No adverse effects were noted with this drug.

Discussions:

It is not uncommon in Paediatric clinical practice to encounter children with musculoskeletal symptoms. Little is known about arthritis prevalence among children and adolescents aged <18 years in India. The common conditions of childhood arthritis a general practitioner in India comes across are Acute Rheumatic Fever (ARF), Juvenile Idiopathic Arthritis (JIA), Post-traumatic Arthritis (PTA) and Septic Arthritis (SA).

A detailed clinical history, including the family history, along with a complete physical examination can provide vital clues to the underlying condition in most cases. The pattern of joint involvement gives a PCP one of the most important clues to the aetiology of arthritis. Most cases present with arthritis as one of the symptoms, of pyrexia of unknown origin (PUO), the PCP must use Revised Jone Criteria or (pGALS), a structured screening tool for the musculoskeletal system examination, get biomarkers and imaging done to diagnose &treat the child [7].

1.**Acute Rheumatic Fever:**

Acute rheumatic fever (ARF) is the consequence of an immunological reaction to pharyngitis that is caused by an infection with group A β-haemolytic Streptococcus (GAS). A significant burden of this disease worldwide affects mainly children between the ages of five and 14. ARF pathophysiology is thought to be an autoimmune cross-reactivity due to molecular mimicry following a group A streptococcal (GAS) infection [7,8]. The diagnosis is made clinically through the revised Jones criteria (2015). The diagnosis of first RF episode required a confirmation of two major criteria or one major and two minor criteria, along with evidence of antecedent group A beta haemolytic streptococcal infection.

Table-1, Revised Jone Criteria of ARF Confirmation -Gewits et al., 2015 [8]

	Major Criteria	
	Low-Risk Population	High Risk Population
	i) Carditis (clinical and/or subclinical), ii) polyarthritis, iii) chorea, iv) erythema marginatum, v) subcutaneous nodules	i. Carditis (clinical and/or subclinical), ii) mono- or polyarthritis, iii) polyarthralgia, iv) chorea, v) erythema marginatum, vi) subcutaneous nodules
	Major Criteria	
	Low-Risk Population	High Risk Population
	i) Polyarthralgia, ii) fever (≥38.5°C), iii) peak ESR ≥60 mm in the first hour and/or iv) CRP ≥3.0 mg/dL, v) prolonged PR interval	i) Mono-arthralgia, ii) fever (≥38°C), iii) Peak ESR ≥30 mm in the first hour and/or iv) CRP ≥3.0 mg/dL, v) prolonged PR interval

The incidence of acute rheumatic fever throughout the world is 8-51 per 100,000 people, and children aged 5-15 years are most affected. Worldwide, conservative estimates, indicate 470,000 new cases of ARF annually. The arthritis of ARF most commonly affects the large joints, especially the knees, ankles, elbows, and wrists and is fleeting in nature. About 300,000 children affected annually in the United States. In India, multiple studies have reported the prevalence of rheumatic heart disease in the range of 12–454 per 100,000 children aged 5–15 years [8]. Many Indian Studies have shown an association of ARF with low socioeconomic status, overpopulation, and rural areas and urban poor population with poor access to healthcare. Carditis, arthritis, Sydenham's chorea, erythema marginatum, and subcutaneous nodules are the five major clinical symptoms of rheumatic fever that were first proposed by T Ducket Jones in 1944. Subcutaneous nodules have been reported in about 5-10% of cases [8]. Rheumatic fever (RF) is one of the major causes of acquired heart disease in the paediatric population.

The clinical profile of acute rheumatic fever with arthritis in developing countries including India is frequently reported to differ from that in developed countries, due to a distinction was being not made between the manifestations of the initial attack & a recurrence. The basic criteria for considering he case to be of Rheumatic fever being i) only patients aged below 15 years ii) no history of joint pains or swelling, abnormal limb movements, or heart murmur iii) duration of symptoms not more than 3 months. In the initial attacks of rheumatic fever most of the cases have typical fleeting joint pain, mild fever, and nearly half the patients will have carditis, and, of these, 50% may exhibit congestive cardiac failure. This high incidence is because in developing countries patients continue to be active during the long pre-admission period. Lowering poverty and overcrowding in low-income areas is one of the primary preventative actions and the cornerstone of management. Indian Paediatricians and Family Physicians and even Internal Medicine Physicians firmly believe and practice administering antibiotics (especially long-acting Penicillin's) to patients with symptoms suggestive of streptococcal infection can lower the risk of rheumatic fever by as much as 70%. Long-term benzathine penicillin

treatment is a secondary prevention measure to avoid recurring rheumatic fever [7].

2. Juvenile Idiopathic Arthritis (JIA): JIA is the most common cause of chronic rheumatic disease affecting children younger than 16 years of age and lasting six weeks or longer. It causes both short-term and long-term disability. The diagnosis of JIA remains a clinical one and is essentially one of exclusion in addition to pattern recognition. There are no clinical, laboratory or radio-logic tests that are pathognomonic for the disease. The Aetiology and pathogenesis are still poorly understood with some evidence that there is genetics. The genetic contribution, that Th 1 type T cells are involved in some but not all subgroups, pro- inflammatory cytokines are key players in both systemic and articular inflammation [8].

Causes of chronic arthropathy that need to be excluded before branding the condition as JIA are: Firstly, systemic infections like acute rheumatic fever tuberculosis and reactive arthritides in India importantly,, neo-plastic disorders (especially acute leukaemia, lymphomas, osteoid osteoma and neuro-blastoma), haematological disorders - bleeding diathesis, immunological disorders, cystic fibrosis and. Secondly autoimmune disorders like juvenile dermato-myositis, systemic lupus erythematosus (SLE), systemic sclerosis and a variety of primary & reactive vasculitides presenting as arthritis. Thirdly, noninflammatory disorders like chondromalacia patellae, anterior knee pain, reflex sympathetic dystrophy, benign joint hyper-mobility with chronic pain syndromes must be considered in differential diagnosis and ruled out as they may be confused with JIA [5].

The International League of Associations for Rheumatology (ILAR) 1997 classification of juvenile idiopathic arthritis (JIA) recognizes 8 categories: systemic arthritis, oligoarthritic, extended/persistent oligoarthritic, polyarthritis [rheumatoid factor (RF) positive], polyarthritis (RF negative), enthesitis related arthritis, Psoriatic arthritis and Other Arthritis.

The latest (2001) international league of associations for rheumatology (ILAR) criteria classifies JIA into 6 subtypes- i) systemic-onset JIA (SOJIA), ii) oligoarticular JIA (persistent and extended), iii) polyarticular JIA (rheumatoid factor (RF) positive and RF negative), based on Positive test for Rheumatoid factor -at least two positive results 3 months apart during the first six months of observation iv) psoriatic, v) enthesitis-related arthritis (ERA) and vi) undifferentiated arthritis.

Systemic juvenile idiopathic arthritis (sJIA) modified Definition Yamaguchi criteria (2018) Quotidian fever (rising to ≥39°C once a day and returns to ≤37°C between fever peaks) for at least 3 consecutive days and reoccurring over a duration of at least 2 weeks, accompanied by two major criteria OR 1 major criterion and 2 minor criteria [13]:

Sl. No	Major Criteria	Minor Criteria
1	Nonfixed erythematous rash.	Generalized lymph node enlargement and/or hepatomegaly and/or splenomegaly;
2	Arthritis.	Serositis;
		Arthralgia lasting 2 weeks or longer (in the absence of arthritis)
		leucocytosis (≥15,000/mm3) with neutrophilia.

Burden of JIA: The worldwide incidence of JIA ranges from 0.8 to 22.6/100,000 children/year, while prevalence ranges from 7 to 401/100,000.[2] Studies on its countrywide prevalence in the Indian population are rare. A few hospital & community studies in North & South India:

1) Chopra et al, in a community-oriented program for control of rheumatic diseases study conducted in Pune district, reported a prevalence of 0.26 for JIA.[10]
2) A retrospective study over a period of 30 months, in BJ Wadia Hospital for children in Mumbai, analysed 61 cases (31 male & 30 female) Maximum cases were of SoJIA and ERA (n=18 in each, 29.5%), followed by polyarticular JIA (n=16, 26.2%) and oligoarticular JIA (n=8, 13.1%). Knee (75.4%) was the commonest joint involved. Two patients had uveitis (one with chronic and other with acute anterior uveitis). The mean ESR was 72mm and CRP 45.87mg/dL. ANA was positive in 7 patients, whereas RF in 3 patients. There was a mean 6-month delay in their diagnosis, maximum being in polyarticular JIA of 11 months delay. All these patients treated with NSAIDs (naproxen / indomethacin). 12 patients were given biologicals DMARDs either methotrexate or sulfasalazine [11].
3) In another prospective observational study, the clinical, serological, radiological, and treatment profile of 56 consecutive JIA patients attending a tertiary care hospital in North India between January 2013 to December 2016 indicated that JIA-ERA (35.7%) was the commonest subtype of JIA observed. Out of 56 children, 38 (67.8%) were boys and 18 (32.2%) were girls. Five (8.9%), 15 (26.8%), 16 (28.5%), and 20 (35.7%) children had oligoarticular, systemic-onset JIA (SOJIA), polyarticular JIA, and enthesitis-related arthritis (ERA), respectively, with male: female ratios being 0.67:1. 6.5:1, 0.45:1 and 9:1, respectively. Mean age at disease onset was 6.7 ± 4.3, 6.6 ± 4.5, 6.0 ± 2.6, and 10.4 ± 3.2 years in SOJIA, polyarticular, oligoarticular and ERA, respectively. Arthritis was present in all patients. Fever, lymphadenopathy, hepatosplenomegaly, and rash were exclusive to patients with SOJIA. Knee was the most common joint involved in all subtypes except SOJIA, where the wrist was most involved. All children with SOJIA and polyarticular JIA required conventional synthetic disease-modifying anti-rheumatic drugs. Seven children with SOJIA, six children with polyarticular JIA and six children with ERA received biological disease-modifying anti-rheumatic drugs, in view of refractory disease. JIA-ERA (35.7%) was the commonest subtype of JIA observed in this study, the prevalence of which was like a large community-oriented study done from India (35.7%) as well as international studies from Taiwan, (37.4%) and Singapore (32.8%) [12].
4) In a tertiary hospital-based prospective observational study of the Department of Paediatric Rheumatology at Indira Gandhi Institute of Child Health, Bengaluru, Karnataka, India between December 2017 to May 2019. All children who fulfilled International League of Associations for Rheumatology (ILAR) criteria for the diagnosis of JIA were enrolled in the study, and their clinical and laboratory parameters were evaluated. The mean age of the study participants was 9.67±3.96 years. A total of 51 children were included in the study with Male: Female (M: F) of 1:1.12. Mean age at onset was 8.71±4.02 years and median duration of disease was 13 months (2-96 months). The most common subgroup was polyarticular JIA 18 (35.3%) followed by Systemic Onset Juvenile Idiopathic Arthritis (SOJIA) 14 (27.5%), enthesitis-related arthritis 13 (25.5%) and oligoarticular JIA 4 (7.8%). Knee (94%) was the most common joint involved followed by the ankle (70.5%). Fever was the most common extra-articular feature present in 73% of cases. Hepatomegaly, splenomegaly and lymphadenopathy was present in 33.3%, 9.8% and 21.6% children, respectively. Anaemia, leucocytosis, thrombocytosis & elevated ESR were more common in SOJIA with no mortality [13].

5) A cross-sectional study of musculoskeletal complaints using a questionnaire filled either by parents (always in children < 14 years) or children themselves. Subsequently, all children were individually met, responses verified, followed by an abbreviated musculoskeletal examination (GALS) of every child between March 2010 to April 2011 among school children aged 6-17 years in northern India. In cases of suspected inflammatory arthritis, further investigations were performed. The results indicated that of the 2059 children (851 girls, 1208 boys), mean (± SD) age was 11.5 ± 2.9 years. Joint pain (more than 1 week) was present in 158 (7.6%), back pain in 63 (3.1%) and heel pain in 62 (3%) of them. Limb 'growing pains' were present in 45 (2.1%) children. There were six suspected cases of inflammatory musculoskeletal pain of which, only one child was confirmed as having JIA (enthesitis-related arthritis). The estimated prevalence of JIA was 48/100,000 in Indian children. The study inferred that Estimated prevalence of JIA was 48/100,000 (95%CI 10-280) [2].
6) A retrospective chart review was performed of patients evaluated by Paediatric rheumatology consultation at the Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand, from July 2011 to June 2015. Of 531 patients, 285 (53.6%) had at least one MSK complaint. The mean age of the patients was 9.1 ± 4.1 years. Joint pain was the most common MSK complaint (86.3%), followed by limping (33%) and refusal to walk (19.6%). Joint swelling and limited range of motion were found in 146 (51.2%) and 115 (40.4%) patients, respectively. Seventy-three (25.6%) patients were diagnosed as JIA. The other common diagnoses included Henoch-Schönlein purpura (16.1%), reactive arthritis (14.2%), and systemic lupus erythematosus (13.7%). Morning stiffness ≥ 15 minutes [odds ratio (OR) 8.217 (3.404-19.833)]; joint swelling on MSK examination [OR 3.505 (1.754-7.004)]; a duration of MSK complaints of more than 6 weeks [OR 2.071 (1.120-3.829)]; and limping [OR 1.973 (1.048-3.712)] were significantly associated with the ultimate diagnosis of JIA [14]. The study inferred that Morning stiffness ≥ 15 minutes is a strong predictor of JIA. Comprehensive history taking and an MSK examination will provide clues for making the ultimate diagnosis [15].

JIA remains a diagnosis of exclusion, with clinical and laboratory findings helping to exclude secondary causes of arthritis. Treatment in JIA is aimed at preventing complications such as growth retardation and improving the quality of life. The introduction of the biological disease-modifying anti-rheumatic drugs (bDMARDs) for patients who are inadequate responders to conventional synthetic disease modifying anti-rheumatic drugs (csDMARDs) have dramatically improved the disease outcome.

3. **Infectious Rheumatic arthritis (IRA):** Infectious arthritis, also called septic arthritis, is a painful infection in the joint. It can occur when an infection from another part of our body spreads to a joint or the fluid surrounding the joint. Infection-causing germs may also enter the body during surgery, or through open wounds or an injection. Most cases of infectious arthritis are caused by bacteria, most common being Staphylococcus aureus (staph). IRA can also be caused by a virus or a fungus. Symptoms of septic arthritis usually come on rapidly and include intense swelling, pain, fever and chills. Infectious arthritis typically strikes the knee, but hips, ankles and wrists may also be affected. Rarely, infectious arthritis affects more than one joint [16].

Diagnosis of infectious arthritis will include a complete medical history, physical exam and laboratory tests. Culture and sensitivity of a sample of joint fluid can determine what organism is causing the infection and help to plan treatment. X-rays and other imaging tests may be ordered to assess any damage to the affected joint.

The management of infectious arthritis done by antibiotics and/or joint drainage.

Antibiotics: While all Bacterial infections are always treated with antibiotics initially empirically and if response is not good after culture sensitivity test. Infectious arthritis caused by a virus usually goes away on its own with no specific treatment and fungal infections are treated with antifungal medication.

Joint Drainage. Some people with infectious arthritis need to have their joint fluid drained, to remove infected synovial fluid, relieve pain, reduce inflammation and prevent further damage to the joint. Joint aspiration is the least invasive procedure in which a needle is inserts into the joint and fluid withdrawn. Sometimes arthroscopy may have to resorted to drain fluid or, in more challenging cases, open joint surgery.

4. **Traumatic Arthritis:** Post-traumatic arthritis is inflammation in our joints that forms after experiencing a trauma. It develops quickly after an injury instead of over years of wear and tear like other forms of arthritis. It's usually a temporary issue, and many people recover in a few days/weeks or months. Sometimes, post-traumatic arthritis last longer and becomes a chronic condition. It's rare, but you might need surgery if your symptoms are severe and limit your quality of life. Most people can manage their post-traumatic arthritis with lifestyle changes and exercise, often as part of their recovery plan from their original injury.

Anyone can be affected by post-traumatic arthritis because it's caused by traumas & injuries. Unlike most forms of arthritis, it is more common in younger people including kids and teens than older adults, as trauma occurs while children and adolescents playing outdoors (sports injuries), learning to ride bicycles/motor bikes and Road Traffic Accidents and Falls. Post-traumatic arthritis contributes to around 10% of all arthritis cases. It causes stiffness and pain in the affected joints. Depending on which of your joints are impacted, it'll be hard to walk, run, play sports or move like one used to do before the injury. The most common joints affected by post-traumatic arthritis are Ankles, Knees, Hips, Elbows, toes and fingers. Most common Symptoms of post-traumatic arthritis are- Swelling, Pain, Stiffness & sensitivity to touch medically called as tenderness.

A primary care Physician must after a physical exam, consider the need of at least one of imaging tests: i) X-rays: An X-ray will confirm show how damaged the bones in the joint are ii) Magnetic Resonance Imaging (MRI) and iii) CT scans give a complete picture of damage to the joint, bones and the tissue around better than an X-ray and help deciding a surgery.

Post-traumatic arthritis management includes: i) Weight loss to minimize the extra stress on the joints ii) Low-impact exercise like swimming or biking can help us to move our joint & reduce pain while not putting our full weight on our joints iii) Customized exercises and movements to increase the strength and flexibility around the affected joint iv) Wearing a brace around the affected joint helps reduce tension on it and hold it in place.

It may not be possible to prevent the development of OA after an injury, However, everyone must take following steps to lower your risk: i) Build strength above and below the joint ii) follow instructions on what to work on first iii) Keep doing your exercises iv) Know and perform in your limits vi) Focus on what one can control.

Common Arthritis seen in general Practice: Knee pain is the most frequently reported type of lower extremity pain among children and adolescents. A retrospective chart review among children with knee pain evaluated through paediatric rheumatology consultations at a single centre between 2012 and 2019 showed that out of 262 children, 32 patients (12.2%) were diagnosed with JIA, 46 patients (17.6%) presented with inflammatory knee pain (IP) of an origin different than JIA, and 57 patients (21.7%) with non-inflammatory knee pain (NIP). In 127 cases (48.5%), no musculoskeletal disorder was diagnosed. The presence of limping, joint swelling, decreased passive range of motion and decreased active range of motion of the knee joint were registered more frequently in the JIA group compared to the other three

groups. A family history of autoimmune diseases and pain in other joints were associated with inflammatory pain.

Increased pain after physical activity, pain only in the knee joint and absence of limping were predictors of NIP. The risk factors of JIA were limping and an erythrocyte sedimentation range of ≥10 mm after an hour. In the NDD group, the risk factors included no increase in pain after physical activity, serum C-reactive protein level < 5 mg/L & normal musculoskeletal ultrasound image. Most of the children with knee pain referred to a paediatric rheumatologist do not prove to be arthritis and hence referral be guarded [20].

Medical pathways of children with juvenile idiopathic arthritis before referral to paediatric **rheumatology centres:**

From the Paediatric Public Health point of view, it is important to describe and analyse time from onset of symptoms to first paediatric rheumatology (PR) visit and the referral pathway of children. A study with incident JIA and referral pathways in two French competence centres, gives an indication of the role of PCPs in referrals:

The study From October 2009 to October 2017, new JIA patients were registered in the "Auvergne-Loire cohort on JIA". Research collected referral pathway, symptom onset, biological and clinical data at first assessment in PR department. The results indicated that in 111 children, median time to first PR visit was 3.3 months [interquartile range 1.3- 10.7] with a significant difference between JIA subtypes. After exclusion of systemic JIA, older age at onset of symptoms, and presence of enthesitis or joint pain were significantly associated with a longer time to first PR visit, while joint swelling or limping, abnormal ESR or CRP were associated with a shorter time. The median number of health care practitioners met was 3 [IQR 3, 4]. General practitioners referred 25% of cases, Orthopaedists referred children to a PR centre in 64% of cases, paediatricians in 50%, emergency care practitioners in 27%.

In India the time to first PR visit is rather long compared to other countries for want of specialists, limited in some tertiary care institutes.

Clinical Assessment by the Primary Care Physicians:

A primary care physician needs to take a detailed history including asking patients if they are taking any supplements, look at them as in many cases they work well for pain relief as they contain glucocorticoids lead to iatrogenic adrenal dysfunction, therefore shouldn't be taking. Then use a simple tool called Oxford Knee Score (OKS- annexure 1) a questionnaire of about a dozen questions or KL grading (Annexure-2) if there is an access to radiological test. This helps assessing the initial condition, guide the therapy course and to monitor the progress.

The Oxford Knee Score (OKS) was developed in 1998 and validated to measure pain and function after total knee replacement. It is a self-completed patient-based outcome score to assess the patient's perspective of the outcome following total knee arthroplasty and other nonsurgical therapies applied to those suffering from issues with the knee. The OKS consists of twelve questions measuring the function and pain associated with the knee (Annexure-1). The questionnaire is short, practical, reliable, valid, and sensitive to clinically important changes over time with 0 being the worst score and 48 being the best score. The patient or an attendant gives a score of 4,3,2,1,0 from the ANSWERS FROM LEFT TORIGHT. Scores of 0–19 are perceived as "poor," 20–29 are perceived as "moderate," 30–40 are perceived as "good," and 40–48 are perceived as "excellent". The Numerical Rating Scale (NRS) score is the measurement of pain intensity in whole number (0–10 integers).

A recently created a clinical meaningful classification of the change scores suggest that four categories can be distinguished when comparing the ΔOKS: i) much better (≥16) ii) a little better (7-15), iii) about the same (1-6), iv) much worse (≤0) [7]

Early detection plays a pivotal role in dictating the course of the disease, ultimately the patient's quality of life. Once diagnosed four key actions involve: i) CONSIDER if a reference is required, using the criteria of a need for treatment beyond medical management including i) Knee support, ii) Home remedies like Local gel application or Cabbage packing and iii) DMRDS and or BRMs and or Triple therapy were tried for 3-6 months and pain not relieved.

The Crucial Role of Early Detection in Arthritis Management:

i) Early Medication: Prompt diagnosis allows for immediate initiation of treatment. Medications like Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) and Disease-Modifying Anti-Rheumatic Drugs (DMARDs) are more effective if administered early.

ii) Lifestyle changes: When arthritis is detected early, implementing lifestyle changes like exercise regimes and dietary modifications extremely effective. These strategies often reduce the need for aggressive medical treatments down the line.

iii) Optimal Management: Early detection sets the stage for active disease monitoring. Regular check-ups and diagnostic tests help in adapting treatment plans as required, ensuring optimal management of the condition.

iv) Psychological Impact: Early diagnosis can also have a positive psychological impact. Knowing what you're up against allows for mental preparation, better stress management, and a more proactive approach to disease management.

Treatment at Primary Care:

Allopathic treatment recommends 1) Disease-modifying anti-rheumatic drugs (DMARDs). 2) Biologic response modifiers (a type of DMARD) 3) Glucocorticoids 4) Nonsteroidal anti-inflammatory drugs (NSAIDs) and Analgesics (painkillers)

In the past, doctors took a conservative, stepwise approach toward treating rheumatoid arthritis. They started first with NSAIDs such as ibuprofen. Then, they progressed to more potent RA drugs for people who showed signs of joint damage.

DMARDs: Most used drugs are hydroxychloroquine sulphate, leflunomide, methotrexate, tofacitinib, baricitinib and Upadacitinib. Biologic response modifiers are a type of DMARD, target the part of the immune system response that leads to inflammation & joint damage.

Biologic response modifiers (BRMs): BRMs slow the progression of the disease or help put it into remission. These are prescribed along with methotrexate. Biologic response modifiers are given by injection and/or by IV along with methotrexate under a doctor's supervision. They are expensive.

Corticosteroids: In few cases, synthetic steroids called corticosteroids either as pills or injections help relieve RA symptoms and may stop or slow joint damage. They are strong anti-inflammatory drugs and may block other immune responses. Several man-made corticosteroids either as pills or injections are available, that need to be sued as last resort.

Triple therapy (TT): TT has emerged as a potential meaningful change in the management of rheumatoid arthritis. This treatment approach combines three medications – methotrexate, sulfasalazine, and hydroxychloroquine- to target arthritis symptoms effectively. The main types of RA medications in Allopathy, are bisphosphonates, which They slow down or prevent bone loss, strengthening bones by inhibiting osteoclasts which are responsible for breaking down and reabsorbing minerals such as calcium from bone and allow osteoblasts to work more effectively, resulting in improved bone mass.

The most benefits happen within the first five years of treatment and long-term use have been associated with atypical femur fractures, osteonecrosis of the jaw and oesophageal cancer. Therefore, experts recommend bisphosphonate treatment for three to five years.

Traditional & ISM Management: Alternative nonoperative treatments for OA include physical therapy, medication, bandages, and applying compresses [6].

Efficacy of Cabbage Leaf in Patients with Knee Osteoarthritis:

Patients with moderate to severe (grades 3-4) OA by the Kellgren and Lawrence grading system with a poor to good Oxford Knee Score were enrolled and the participants were divided into three intervention groups: i) the cooling gel pad group for 20 minutes duration once a day (n = 20), ii) the diclofenac gel group for 4 times a day (n = 20) as the control group (total n = 40), and iii) the cabbage leaf group for 1-hour duration once a day (n = 20) as the experimental group (total n = 20). All trial participants were trained by the physicians to record their Numerical Rating Scale (NRS) pain score and Oxford Knee Score and were advised to undergo weekly follow-ups and assessment of the outcome at 4 weeks. Data analysed by the paired t-test & analysis of variance (ANOVA).

Results showed that the cabbage leaf group and cooling gel pad group showed a significant difference in both the Oxford Knee Score ($p < 0.001$ in both groups) and NRS score ($p < 0.001$ in both groups) after the intervention, by using the paired t-test. The study concluded that cabbage leaf application and cooling gel pad application showed similar improvements in reducing OA symptoms in terms of the overall scores by both methods and their therapeutic effectiveness was better than that of diclofenac gel [6].

Over-the-Counter Arthritis Supplements Pose Adrenal Danger:

Some patients have been taking over-the-counter arthritis drugs and supplements for prolonged periods. These drugs/ supplements containing undisclosed glucocorticoids can lead to iatrogenic adrenal dysfunction, Cushing syndrome, and/or adrenal insufficiency (AI), with undetectable hormone levels. Sometimes this can cause them to go into signs or symptoms of adrenal insufficiency and become life-threatening occasionally if it's not addressed in an inpatient setting. They must be tapered off slowly because abruptly stopping the supplement can precipitate and replaced with corticosteroids.

Cost of Therapy in India: Medications, including NSAIDs, corticosteroids, DMARDs, and biologics, play pivotal roles. Monthly costs for these medications range from INR 10,000 to 30,000. The average cost medical treatment of RA patients in 2013 was estimated to be INR 2230 ($34)/month in a study of 200 patients in Amrita institute of medical sciences, Kerala.

Conclusion:

Arthritis is a common ailment with rare chance of getting cured completely. Its management calls for actions at Individual, Primary Crae Physicians, Specialists and the State at large.

Individual Actions: i) Self-care: Lose weight, 10-15% in 3 months, ii) Switch from high-impact activities, like running, to low-impact ones, like walking or swimming; iii) Avoid movements, like lunges and squats, that could make the condition worse iv) Painful arthritis discourages exercising, However, being active helps reduce & prevent pain, as regular exercise improves muscular power, movement and joint mobility. v) Apply ice or heat for pain or take NSAIDs in consultation with PCP.

Primary Care Physicians: i) Take a detailed history, do a thorough physical examination, use Scanning or MRI & Diagnose AEAP ii) Use a simple tool called Oxford Knee Score, to assess the initial condition, guide the therapy course and to monitor the progress iii) Refer the case urgently if beyond your resources to manage iv) Encourage your patients to stretch often, to help decrease the stiffness in the joints v) Remind the patient to use their strongest joints first and encourage them to sit in chairs with arms so they can push up when rising. Ensure the patient maintains a good balance between rest and activities

State/Governments: i) Train more Doctors, Physiotherapists, Nurses, CHOs and other Para-medicals to diagnose & manage rheumatic diseases at the primary, secondary and tertiary levels of care ii) Launch Community-based national health care programs to manage RMSK diseases at the community level (H&W Centres, PHCs, CHCs & Taluka Hospitals) iii) State must organize Paediatric rheumatologists to train primary care providers and Orthopaedics in district hospitals, a basic training on JIA and fast referral access to PR departments if JIA is suspected.

References:

1. (2023). Arthritis Among Children and Adolescents Aged <18 Years- United States, 2017–2021, Tyler D et.al, 72(29);788-792
2. (2022). Identification of musculoskeletal problems using pGALS examination in school going boys in Chennai, India, Nithya Bhaskar et.al, J Family Med Prim Care, Jun; 11(6):
3. (2014). Prevalence of musculoskeletal complaints and juvenile idiopathic arthritis in children from a developing country: a school-based study, Bonnie Abujam, et.al, Int J Rheum Dis;17(3):256-60.
4. Growing Pains: (1998). The ILAR Classification of Juvenile Idiopathic Arthritis, Ross E. Petty, Revision of the proposed classification for juvenile idiopathic arthritis: Durban 1997, J Rheumatol;25:1991-1994
5. (2019). Tyler D. Lites, MPH Care-seeking pathways, challenges, and coping experiences of rural women living with rheumatoid arthritis in Odisha, India, Sanghamitra Pati, et.al, Prim Health Care Res Dev.; 20: 83.
6. Approach to Joint Pain in Children, Suma Balan et.al, (2016). Indian J Pediatr,83(2):135-139.
7. Rheumatic fever: clinical profile of the initial attack in India, B. L. AGARWAL' et.al, (1986). Bulletin of the World Health Organization, 64 (4): 573-578
8. A Case Report-Acute Rheumatic Fever or Something More, Alexander Muacevic et, al (2023). Cureus.; 15(3): 36967,
9. Cytokine gene polymorphisms and susceptibility to juvenile idiopathic arthritis. (2001). Donn RP, et al. British Paediatric Rheumatology Study Group. Arthritis Rheum, 44: 802-810.
10. (2001). Prevalence of rheumatic diseases in a rural population in western India: A Chopra et.al, J Assoc Physicians India.
11. Clinical & Demographic Profile of Patients with JIA in a Tertiary Care Centre in Mumbai, Agarwal et.al, Indian Journal of Rheumatology
12. Clinical Profile of Juvenile Idiopathic Arthritis from a Tertiary Care Hospital in Northern India, Hegde, et.al, Indian Journal of Rheumatology 15(4): |
13. Clinical and Laboratory Profile of Patients with Newly Diagnosed Juvenile Idiopathic Arthritis, D Gururaju, et.al.
14. Prevalence of musculoskeletal complaints & juvenile idiopathic arthritis in children,a school-based study, Abujam, et.al.
15. Features distinguishing juvenile idiopathic arthritis among children, Satita Jeamsripong et.al, PMID: 30498888
16. Infectious arthritis, Arthritis foundation.
17. Systemic Juvenile Idiopathic Arthritis in two children; case report on clinical course, challenges in diagnosis and the role of FDG-PET/CT-scan, S. Sahba, et.al.
18. Juvenile idiopathic arthritis-associated uveitis, Babu, et.al, (2022). Indian Journal of Ophthalmology. Oxford_Knee_Score, Dawson et al 1998
19. Knee pain as a reason for referral to a paediatric rheumatologist: A retrospective study
20. Daiva Gorczyca et.al, J Paediatr Child Health.

21. (2019). Medical pathways of children with juvenile idiopathic arthritis before referral to paediatric rheumatology centres, Caroline Freychet, et al, Multicentre Study Joint Bone Spine, 86(6):739-745.

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