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Original Article

Patterns of Musculoskeletal Manifestations in Post-Chikungunya Arthritis: An Observational Study at a Tertiary PMR Clinic in Chattogram, Bangladesh

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ABSTRACT

Introduction: Chikungunya virus infection is a mosquito-borne illness characterized by fever, rash, and debilitating joint pain. While acute symptoms typically resolve within days, many patients develop post-chikungunya musculoskeletal manifestations, including arthralgia, arthritis, and functional impairment. Understanding the patterns of musculoskeletal involvement and associated disability is essential for effective management and rehabilitation. This study aimed to evaluate the musculoskeletal manifestations of post-chikungunya arthritis among patients attending the Physical Medicine & Rehabilitation outpatient department at Marine City Medical College Hospital, Chattogram, Bangladesh. **Methods & Materials:** This prospective observational study evaluated 265 patients presenting with persistent musculoskeletal symptoms following chikungunya infection. Demographic data, joint involvement patterns (polyarticular vs. oligoarticular, symmetrical vs. asymmetrical), and peri-articular manifestations were recorded. Functional disability was assessed using the Health Assessment Questionnaire Disability Index (HAQ-DI). **Results:** Among the 265 participants, a female predominance was observed 165 (62.3%), with the highest prevalence in the 40–49 years age group 85 (32.1%). The most frequently involved joints were the small joints of the hands 212 (80%), followed by the ankle 207 (78.1%), knee 199 (75.1%), and foot 191 (72.1%). Clinical patterns were predominantly polyarticular 225 (84.9%) and symmetrical 186(70.2%). Significant peri-articular involvement was noted, including tenosynovitis (44.9%), bursitis (35.1%), and tendinitis (27.9%). Functional limitation was moderate to severe in 186 (70.2%) patients, showing a positive correlation with the number of involved joints. **Conclusion**: Post-chikungunya arthritis predominantly affects small peripheral joints in a symmetrical polyarticular pattern, leading to substantial functional limitation. Early recognition and targeted rehabilitation can significantly improve outcomes and quality of life.

Keywords: *Muskuloskeletal manifestation, Post Chikungunya arthritis, Chronic Arthralgia, Rheumatologic Sequelae.*

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INTRODUCTION

Chikungunya virus (CHIKV) infection is an arthropod-borne viral illness transmitted primarily by Aedes aegypti and Aedes albopictus mosquitoes [1]. It is characterized by acute onset of high-grade fever, maculopapular rash, and severe musculoskeletal manifestations, including arthralgia and myalgia [2]. The term “chikungunya” originates from the Kimakonde language of southeastern Africa, meaning “that which bends up,” referring to the stooped posture caused by debilitating joint pain during acute infection [3]. Although the acute febrile phase typically resolves within 7–10 days, a significant proportion of patients develop persistent post-viral musculoskeletal symptoms, sometimes lasting months to years [4].Post-chikungunya arthritis (PCA) has emerged as a clinically relevant sequela, mimicking chronic inflammatory arthritis in its pattern and severity [5]. Several studies have described polyarticular symmetrical involvement predominantly affecting small peripheral joints of the hands, wrists, and ankles, along with associated peri-articular inflammation such as tenosynovitis, bursitis, and tendinitis [6,7]. While large joints may be involved small-joint predilection is consistently observed resembling features of rheumatoid arthritis, which can complicate diagnosis and management [8]. Extra-articular manifestations, including entrapment neuropathies and myalgia, further contribute to functional impairment [9]. The pathophysiology of post-chikungunya musculoskeletal involvement is multifactorial. Viral persistence in joint tissues, immune-mediated synovial inflammation, and host genetic factors contribute to prolonged arthritis [10]. Female predominance in post-chikungunya arthritis has been consistently reported, suggesting potential immunological and hormonal influences on disease susceptibility and severity [11]. The degree of functional disability correlates with the number of joints involved and the extent of peri-articular inflammation [12]. In Bangladesh and neighboring South Asian countries, chikungunya outbreaks have been increasingly reported, causing substantial public health concerns [13]. Despite the high burden, limited studies

have systematically evaluated the musculoskeletal manifestations, joint distribution patterns and resultant functional disability among post-chikungunya patients in tertiary care settings [14]. Understanding these patterns is essential for early recognition, accurate differentiation from other chronic arthritides, and targeted rehabilitation to restore physical function and quality of life. Physical Medicine & Rehabilitation (PMR) interventions, including structured exercise, pain management, and assistive devices, have demonstrated efficacy in reducing disability and improving patient-reported outcomes in chronic post-viral arthritis [15]. Therefore, comprehensive documentation of joint involvement, peri-articular inflammation and functional status is critical to guide effective management strategies. This study aimed to evaluate the patterns of musculoskeletal manifestations and associated disability among patients with post-chikungunya arthritis attending the PMR outpatient department at Marine City Medical College Hospital, Chattogram. By identifying the distribution of joint involvement, peri- and extra-articular features, and functional limitations, this study seeks to provide evidence for optimizing rehabilitation and improving long-term outcomes in this population.

METHODS & MATERIALS

Study Design: This was a prospective observational study conducted to assess musculoskeletal involvement and functional outcomes in patients with chikungunya arthritis.

Setting and Period: The study was carried out at the outpatient department of Marine City Medical College Hospital, Chattogram, over a four-month period from June to September 2025.

Sample Size and Recruitment: A total of 265 patients presenting with clinically diagnosed chikungunya arthritis were enrolled consecutively. Consecutive sampling was employed to include all eligible patients visiting the outpatient department during the study period who met the inclusion criteria.

Inclusion and Exclusion Criteria: Adult patients aged 18 years or older presenting with persistent musculoskeletal symptoms following clinically confirmed or suspected chikungunya infection were considered eligible. All participants were required to provide informed consent. Patients with a prior history of inflammatory arthritis (including rheumatoid arthritis, spondyloarthritis, gout, or systemic lupus erythematosus), severe cognitive impairment that would preclude providing consent, or incomplete baseline data were excluded from the study.

Data Collection: Data were collected using a pretested data collection sheet that included demographic details, comorbidities, joint examination findings, and assessment of peri-articular and extra-articular involvement. Pain severity was measured using the 0–10 Visual Analogue Scale (VAS), while functional disability was assessed using the Health Assessment Questionnaire–Disability Index (HAQ-DI). Joint involvement was recorded in terms of distribution (small, large, axial), symmetry, and extent (oligoarticular or polyarticular). Peri-articular manifestations such as tenosynovitis, bursitis, tendinitis, or capsulitis were noted, along with extra-articular features including myalgia and neuropathic symptoms.

Data Management: All data were entered into a password-protected spreadsheet and cross-verified for accuracy to minimize entry errors.

Statistical Analysis: Statistical analyses were conducted using SPSS version 26. Descriptive statistics, including means, standard deviations, medians, and percentages, were used to summarize the study variables. Categorical variables were compared using Chi-square or Fisher's exact tests, while continuous variables were analyzed using t-tests or Mann–Whitney U tests based on distribution normality. The relationship between the number of affected joints and functional disability (HAQ-DI) was assessed using Spearman's rank correlation coefficient (ρ). A p-value of less than 0.05 was considered statistically significant. This study was designed to provide a comprehensive assessment of the clinical spectrum, functional impact, and distribution of joint involvement in patients with post-chikungunya arthritis in an outpatient setting, ensuring methodological rigor through systematic data collection and appropriate statistical analysis.

RESULTS

A total of 265 patients with post-chikungunya musculoskeletal symptoms were evaluated. The majority were urban residents 225 (84.9%), while 40 patients (15.1%) were from rural areas. Common occupations included homemakers 103(38.9%), service holders 52(19.6%), retirees 45(17%), businessmen 38(14.3%), and students 27(10.2%). Comorbidities were present in nearly half of the cohort, with diabetes mellitus in 58 patients (21.9%), hypertension in 48 (18.1%), ischemic heart disease in 13 (4.9%), hypothyroidism in 11 (4.2%), chronic kidney disease in 7 (2.6%), and asthma in 5 (1.9%). The gender distribution showed a female predominance, consistent with previously reported immunological susceptibility. Age distribution ranged widely, reflecting involvement of adults across multiple decades (*Table I*).

Table I
Demographic Characteristics of Study Participants.

Characteristic	Categories	Frequency (%)
Residence	Urban	225 (84.9%)
	Rural	40 (15.1%)
Occupation	Homemaker	103 (38.9%)
	Service holder	52 (19.6%)
	Retired	45 (17.0%)
	Businessman	38 (14.3%)
	Student	27 (10.2%)
Comorbidities	Diabetes Mellitus (DM)	58 (21.9%)
	Hypertension (HTN)	48 (18.1%)
	Ischemic Heart Disease (IHD)	13 (4.9%)
	Hypothyroidism	11 (4.2%)
	Chronic Kidney Disease (CKD)	7 (2.6%)
	Asthma	5 (1.9%)

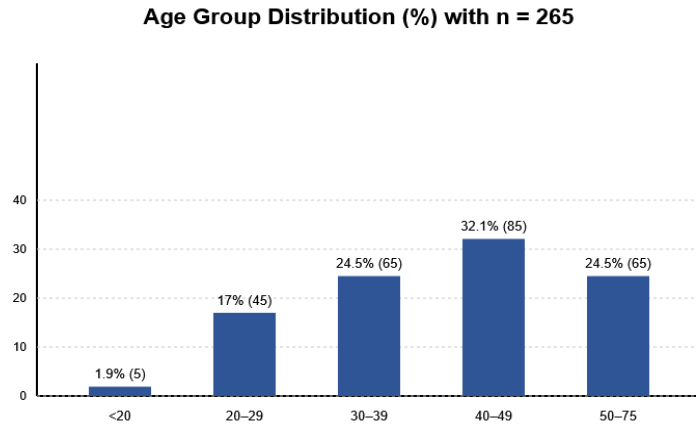

Figure 1 Age group distribution of the study participants (*n*=265).

Figure 1 illustrates the demographic distribution of the participants by age. The highest frequency of cases was observed in the 40–49 years age group, with 85 (32.1%) participants. Both the 30–39 years and 50–75 years groups followed with 65 (24.5%) participants each. The 20–29 years group comprised 45 (17%) individuals, while the youngest group (<20 years) represented the smallest portion of the cohort with 5 (1.9%) participants.

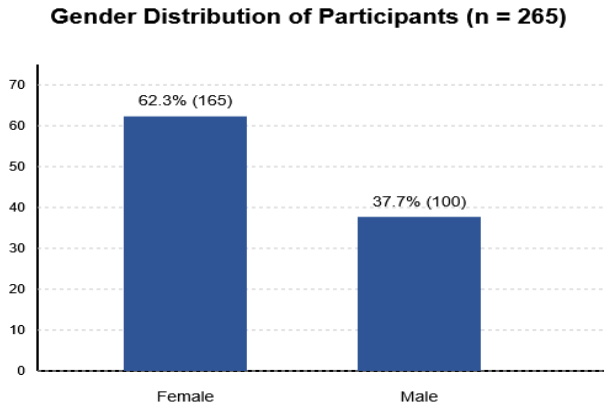

Figure 2 Gender distribution of the study participants (*n*=265).

The gender composition of the study population is presented in *Figure 2*. Among the total participants, a significant female predominance was noted, with 165 (62.3%) being female. In comparison, there were 100 (37.7%) male participants. This indicates that more than three-fifths of the patients seeking treatment for post-chikungunya musculoskeletal issues were female.

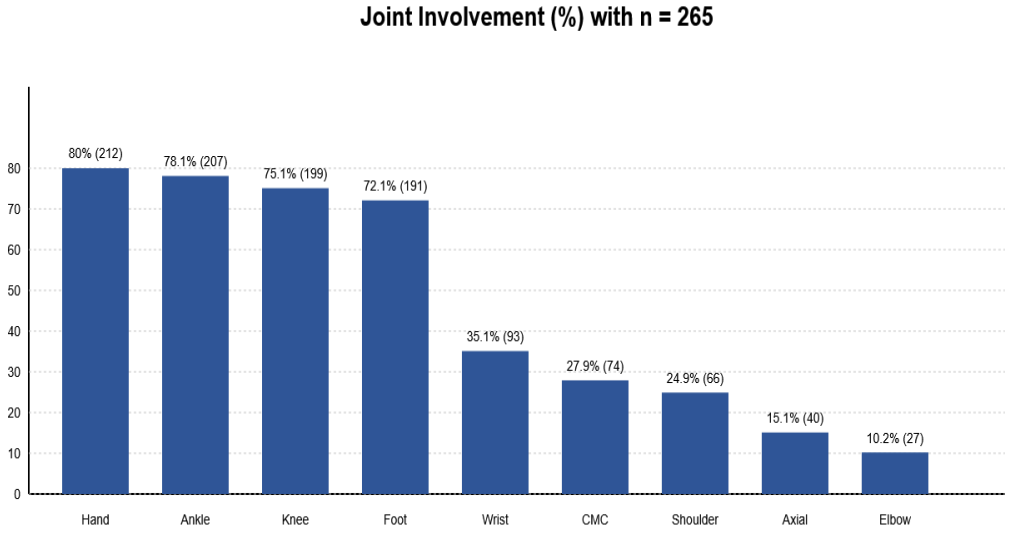

Figure 3 Pattern of joint involvement among the study participants (*n*=265).

Figure 3 illustrates the distribution of specific joint involvement in patients with post-chikungunya arthritis. According to the data, the hand was the most frequently affected site, involving 212 (80%) participants. This was followed by the ankle with 207 (78.1%), the knee with 199 (75.1%), and the foot with 191 (72.1%). Regarding other joints, involvement was noted in the wrist for 93 (35.1%) cases, the hip for 74 (27.9%), and the shoulder for 65 (24.5%). The least commonly affected areas were the axial joints with 40 (15.1%) and the elbow with 27 (10.2%). The overall pattern indicates a high prevalence of involvement in the distal small joints and major weight-bearing joints of the lower limbs.

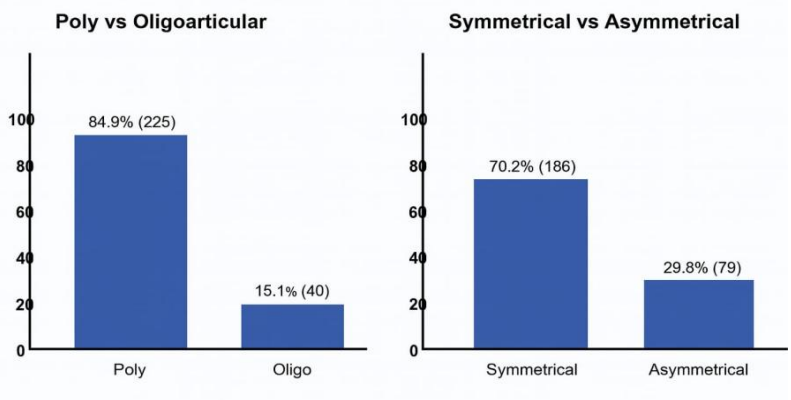

Figure 4 Pattern of joint involvement (Poly vs. Oligoarticular and Symmetrical vs. Asymmetrical).

Figure 4 illustrates the clinical patterns of joint involvement among the study participants. Regarding the number of joints affected, a vast majority presented with a polyarticular pattern, involving 225 (84.9%) patients, while an oligoarticular pattern was observed in 40 (15.1%) cases. In terms of distribution, the involvement was predominantly symmetrical, seen in 186 (70.2%) participants. On the other hand, an asymmetrical pattern was noted in 79 (29.8%) individuals. These findings suggest that post-chikungunya arthritis in this cohort most commonly presents as a symmetrical polyarthritis.

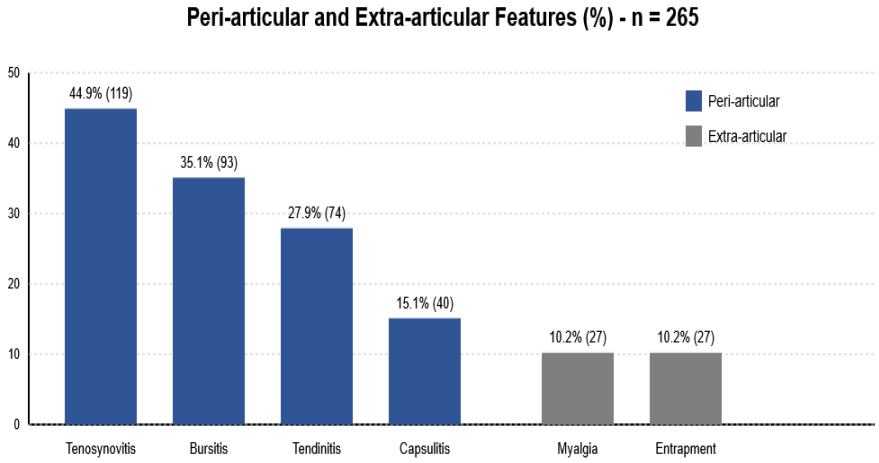

Figure 5 Pattern of extra & periarticular involvement among the study participants (*n*=265).

Figure 5 highlights the frequency of peri-articular and extra-articular manifestations observed in the study cohort. Among the peri-articular features, tenosynovitis was the most prevalent, affecting 119 (44.9%) participants. This was followed by bursitis in 93 (35.1%) cases, tendinitis in 74 (27.9%), and capsulitis in 40 (15.1%) individuals. In terms of extra-articular features, both myalgia and entrapment neuropathy (such as carpal tunnel syndrome) were less common, each being recorded in 27 (10.2%) participants. These results indicate that peri-articular inflammation, particularly tenosynovitis, is a significant clinical feature in patients suffering from post-chikungunya musculoskeletal complications.

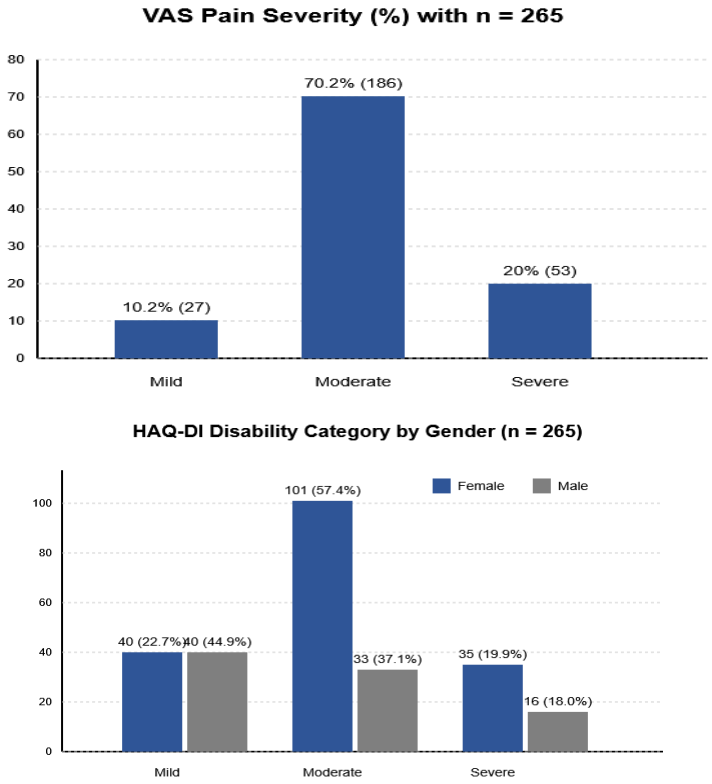

Figure 6 Pain & Disability assessment among the study participants (*n*=265).

Figure 6 illustrates the severity of pain and functional disability as assessed by the Visual Analog Scale (VAS) and Health Assessment Questionnaire-Disability Index (HAQ-DI). VAS Pain Severity: The assessment of pain severity revealed that the majority of the participants experienced moderate pain. Specifically, 186 (70.2%) patients reported moderate pain levels, while 53 (20%) participants suffered from severe pain. Mild pain was noted in 27 (10.2%) individuals. HAQ-DI Disability Category by Gender: The disability assessment shows a clear distribution across genders. In the moderate disability category, female patients predominated with 101 (57.4%) cases compared to 33 (37.1%) males. For mild disability, the distribution was 40 (22.7%) for females and 40 (44.9%) for males. Lastly, severe disability was recorded in 35 (19.9%) females and 16 (18.0%) males. These findings indicate a significant functional impact on the daily lives of patients, particularly among the female cohort.

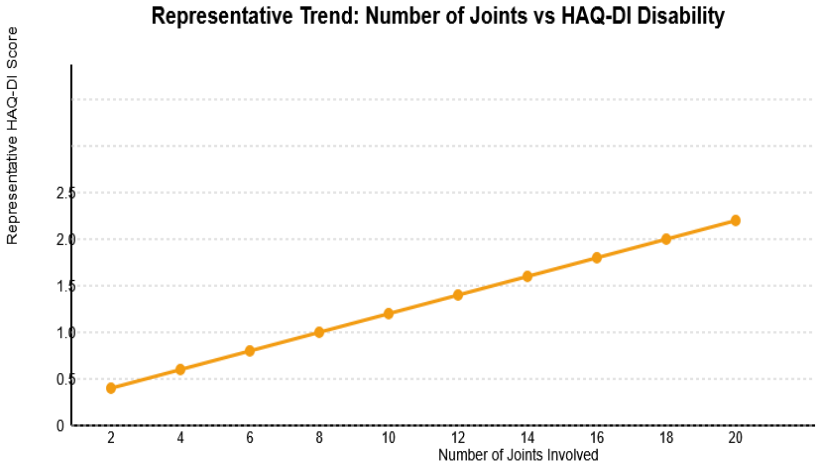

Figure 7 HAQ-DI Disability Pattern by Joint Count.

Figure 7 demonstrates the representative trend between the number of joints involved and the functional disability score measured by the Health Assessment Questionnaire-Disability Index (HAQ-DI). The line graph reveals a clear linear progression, showing that as the number of involved joints increases, the severity of functional disability also rises significantly. Patients with a low joint count (e.g., 2 joints) exhibited relatively low HAQ-DI scores (approximately 0.5), whereas those with extensive joint involvement (up to 20 joints) showed substantially higher disability scores, reaching nearly 2.0. This

positive correlation suggests that the extent of joint involvement is a primary determinant of functional impairment in patients suffering from post-chikungunya arthritis.

The relationship between the extent of joint involvement and functional disability was categorized into three distinct groups based on the representative joint count and expected HAQ-DI trends (*Table II*). According to the study data, participants with a Low joint burden (1–4 joints) showed relatively lower functional impairment, with HAQ-DI scores ranging between 0.4–0.8, interpreted as Mild disability. Those in the Moderate burden category (5–10 joints) exhibited HAQ-DI scores of 0.9–1.5, indicating Moderate disability. The highest level of functional impairment was observed in the High burden group (11–20 joints), where HAQ-DI scores reached 1.6–2.3, signifying Severe disability. This trend underscores a direct correlation between the number of affected joints and the severity of physical limitation.

Table II Correlation between Joint Burden and Functional Disability (HAQ-DI).

Joint Count Category	Representative Range	Expected HAQ-DI Trend	Interpretation
Low joint burden	1-4 joints	0.4-0.8	Mild disability
Moderate burden	5-10 joints	0.9-1.5	Moderate disability
High burden	11-20 joints	1.6-2.3	Severe disability

DISCUSSION

This observational study evaluated musculoskeletal manifestations in patients with post-chikungunya arthritis attending a Marine City Medical College Hospital, Chattogram. Our findings demonstrate a predominance of symmetrical polyarticular involvement, especially affecting small peripheral joints of the hands, wrists and ankles with frequent peri-articular inflammation and significant functional disability. These results are consistent with previous reports which describe small-joint predilection and polyarticular patterns as hallmarks of post-chikungunya arthritis [7,8]. Polyarticular involvement was observed in 225(84.9%) of patients with symmetrical distribution in 186(70.2%), supporting the notion that post-chikungunya arthritis often mimics rheumatoid arthritis in clinical presentation [7,8]. Small joints of the hands were most commonly involved 212 (80%), followed by the ankle 207 (78.1%) and knee199 (75.1%). This distribution aligns with prior studies from India and Reunion Island, where small-joint dominance was consistently reported in post-chikungunya populations [8,9]. Large joints were less frequently involved and oligoarticular patterns occurred in only 40(15.1%) of cases. These findings reinforce the concept that post-chikungunya arthritis is primarily a peripheral polyarthritis with functional implications. Peri-articular manifestations, including tenosynovitis (44.9%), bursitis (35.1%), tendinitis (27.9%) and capsulitis (15.1%) were common. These extra-synovial features have been described in prior studies as contributors to persistent pain and stiffness and they may exacerbate functional disability [7,10]. Entrapment neuropathy, observed in 27(10.2%) of patients, further highlights the spectrum of extra-articular involvement and underscores the importance of comprehensive musculoskeletal assessment. Functional impairment, measured by HAQ-DI was moderate to severe in 186(70.2%) of patients. A positive correlation was observed between the number of joints involved and HAQ-DI scores (Spearman's $p = 0.52$, $p < 0.001$) as illustrated in *Figure 7*. This indicates that patients with extensive joint involvement experience higher disability a finding corroborated by other post-chikungunya cohort studies [11,12]. Notably, females who constituted the majority of the cohort (165 [62.3%]), exhibited higher HAQ-DI scores than males, reflecting potential immunological, hormonal and social determinants that influence disease severity [13]. The clinical spectrum observed in our study highlights the need for early recognition of post-chikungunya musculoskeletal manifestations. While acute symptoms often resolve spontaneously, persistent polyarticular involvement can lead to chronic pain, joint stiffness and activity limitation [8,9]. Timely intervention, including targeted physiotherapy, analgesic management and structured rehabilitation programs can mitigate long-term disability and improve quality of life [14,15]. Limitations of the study include single-center design, lack of laboratory confirmation in some cases, absence of imaging for peri-articular assessment and lack of longitudinal follow-up. Additionally, acute subacute and chronic phases were not analyzed separately limiting phase-specific interpretations. Despite these limitations, the study provides valuable insights into the patterns of joint and peri-articular involvement and the functional impact of post-chikungunya arthritis in a Bangladeshi tertiary care setting, complementing findings from other endemic regions [7–15]. In summary, the study confirms that post-chikungunya arthritis predominantly affects small joints in a symmetrical polyarticular pattern, with frequent peri-articular involvement and significant functional impairment. The positive correlation between joint burden and disability emphasizes the importance of early identification and comprehensive rehabilitation strategies to prevent long-term morbidity.

CONCLUSION

Post-chikungunya arthritis in this cohort was characterized by symmetrical polyarticular involvement, predominantly affecting small peripheral joints, with frequent peri-articular manifestations such as tenosynovitis, bursitis and tendinitis. Functional impairment, measured by HAQ-DI was moderate to severe in the majority of patients and correlated positively with the number of joints involved. Female patients demonstrated higher disability scores, suggesting gender-specific influences on disease expression and outcomes. These findings underscore the clinical importance of early recognition of post-chikungunya musculoskeletal involvement. Structured rehabilitation, pain management and patient education are essential to reduce functional limitation and improve quality of life. The study highlights the need for multidisciplinary care approaches especially in endemic regions where recurrent outbreaks place a significant burden on patients and healthcare systems. Future longitudinal studies with imaging and laboratory confirmation are warranted to explore disease progression, long-term outcomes, and optimal management strategies for post-chikungunya arthritis.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this study.

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