Original Article

Effects of Physical Activity in Adults with Hemophilia: A Comparative Cross-sectional study

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Abstract

Background: *Haemophilia is a hereditary bleeding disorder frequently complicated by recurrent joint hemorrhages, leading to chronic arthropathy, functional limitation, and reduced quality of life. Although physical activity was traditionally discouraged due to bleeding concerns, emerging evidence supports its potential benefits when appropriately guided.*

Objective: *To evaluate the association between regular physical activity and joint health, bleeding outcomes, and quality of life among adults with haemophilia.*

Materials and Methods: *This Comparative Cross-sectional study was conducted at Dhaka CMH, Cumilla Sadar Hospital, Cumilla Medical college and Hospital and Kumudini Women's Medical college, Tangail Bangladesh, between January to June 2025. Eighty male patients twenty-five from Cumilla Sadar, ten patients from Cumilla Medical college and Hospital and seven patients from Kumudini Women's Medical college, Tangail and thirty-eight from Dhaka CMH with haemophilia A or B aged 18-45 years were enrolled, including 40 physically active participants and 40 age-, type-, and severity-matched sedentary controls. Physical activity was defined as ≥150 minutes per week of moderate-intensity activity. Outcomes included joint health scores, annual bleeding rate, and disease-specific quality-of-life scores.*

Results: *Physically active participants demonstrated significantly better joint health scores compared with sedentary controls ($p = 0.02$). Quality-of-life scores were also significantly higher among active individuals ($p = 0.01$). Annual bleeding rates did not differ significantly between groups ($p = 0.15$), indicating no increased bleeding risk associated with regular physical activity when prophylaxis was appropriately maintained. Joint health scores showed a significant inverse association with quality of life.*

Conclusion: *Regular physical activity is associated with improved joint health and quality of life in adults with hemophilia without increasing bleeding risk. These findings support individualized, rehabilitation-guided physical activity as a safe and beneficial component of comprehensive hemophilia care, particularly in resource-limited settings.*

Key words: *Hemophilia, Physical activity, Joint health, Quality of life.*

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Introduction

Haemophilia is an X-linked hereditary bleeding disorder caused by deficiency of coagulation factor VIII (haemophilia A) or factor IX (haemophilia B), resulting in impaired thrombin generation and a lifelong tendency to bleed. Spontaneous or trauma-related hemarthroses and intramuscular hemorrhages are hallmark clinical features and remain the principal drivers of morbidity among affected individuals. Recurrent joint bleeding initiates a cascade of synovial inflammation, cartilage degradation, and progressive joint destruction, culminating in haemophilic arthropathy characterized by chronic pain, restricted range of motion, muscle weakness, gait impairment, and reduced participation in daily activities. These complications substantially diminish health-related quality of life and functional independence, particularly in low- and middle-income countries where access to early prophylaxis may be limited.[1-3] Despite growing global evidence, data from South Asian countries, particularly Bangladesh remain scarce. Available studies from Bangladesh have largely focused on clinical profiles and disability burden, with limited evaluation of structured physical activity and functional outcomes.[4-6]

Historically, individuals with haemophilia were advised to avoid physical activity because of concerns regarding bleeding risk and joint damage. This conservative approach, while intended to prevent acute hemorrhage, often resulted in physical

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deconditioning, obesity, reduced bone mineral density, and poor cardiovascular fitness, which may further exacerbate musculoskeletal disability and long-term health outcomes.[7,8] In recent years, advances in prophylactic factor replacement therapy and improved understanding of exercise physiology in hemophilia have prompted a paradigm shift toward encouraging safe and structured physical activity.

Emerging evidence indicates that regular physical activity particularly low-impact, supervised, and individually tailored exercise can improve muscle strength, proprioception, balance, and joint stability in people with haemophilia, potentially reducing the risk of falls and secondary joint injury.[9-12] Additionally, physical activity has been shown to confer broader systemic benefits, including weight control, improved cardiovascular health, enhanced bone density, and positive psychosocial effects such as improved self-esteem and social participation.[13-15]

Nevertheless, clinicians continue to face challenges in balancing the musculoskeletal benefits of exercise against the perceived risk of bleeding, especially in settings with variable access to prophylaxis. Contemporary international guidelines now advocate personalized physical activity prescriptions based on disease severity, joint status, fitness level, and prophylactic coverage, while discouraging high-risk contact sports in the absence of adequate factor protection.[16,17] Despite growing global evidence, data from South Asian and resource-constrained settings remain scarce.

Against this background, the present study aims to evaluate the effects of regular physical activity on musculoskeletal health, bleeding outcomes, and quality of life among adults with haemophilia compared with sedentary controls at a tertiary medical college in Bangladesh. By generating context-specific evidence, this study seeks to inform culturally appropriate and clinically feasible exercise recommendations for haemophilia care in similar settings.[18]

Materials and Methods

This Comparative Cross-sectional study was conducted at Dhaka CMH, Cumilla Sadar Hospital, Cumilla Medical College, Kumudini women's Medical college and Hospital in Bangladesh between January to June 2025. Adult male patients aged 18-45 years with a confirmed diagnosis of haemophilia A or B were enrolled. Participants were categorized into physically active group and sedentary groups based on physical activity levels during the preceding six months. Physical activity was defined as ≥150 minutes per week of moderate-intensity exercise, consistent with international recommendations.[19] Controls engaged in <60 minutes per week. Groups were matched for age, type, and severity of haemophilia. Patients with inhibitors, recent major surgery, or comorbid conditions limiting physical activity were excluded. Demographic and clinical data were collected using a structured data sheet. Joint health was assessed using a validated Haemophilia Joint Health Score (HJHS, version 2.1),[20] and quality of life was evaluated using a disease-specific questionnaire (Haem-A-QoL). Data were analyzed using appropriate statistical tests, with a p value <0.05 considered statistically significant.

Results

A total of 80 male patients with haemophilia A or B were included in the analysis from four different center. Following bar diagram shows participants from four different center:

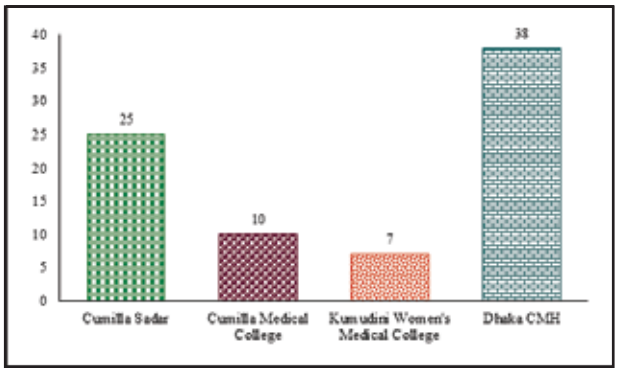

Figure 1: Distribution of study participants by recruitment center (n=80)

A total of 80 male patients (Figure 1) with haemophilia A or B aged 18–45 years were enrolled, including 40 physically active participants and 40 age-, haemophilia type-, and severity-matched sedentary controls. Participants were recruited from Cumilla Sadar (n=25), Cumilla Medical College Hospital (n=10), Kumudini Women's Medical College, Tangail (n=7), and Dhaka CMH (n=38).

Table I: Baseline characteristics of study participants (n = 80)

Variable	Active (n=40)	Sedentary (n=40)	p value
Age (years), mean ± SD	29.1 ± 6.5	29.9 ± 7.1	0.64
Haemophilia A, n (%)	32 (80)	31 (77.5)	0.78
Severe hemophilia, n (%)	22 (55)	24 (60)	0.65
On regular prophylaxis, n (%)	26 (65)	25 (62.5)	0.82

Among 80 haemophilic patients comprising 40 physically active participants and 40 sedentary controls. The mean age of the study population was 29.5 ± 6.8 years. The two groups were comparable with respect to age, type of hemophilia, disease severity, and prophylaxis status (Table I).

Joint health outcomes differed significantly between groups. Physically active participants demonstrated better joint health scores compared with sedentary controls (mean ± SD: 13.2 ± 4.1 vs 17.6 ± 5.0; p = 0.02), indicating less joint impairment among individuals engaging in regular physical activity (Table II).

Table II: Clinical and functional outcomes in active vs sedentary groups.

Outcome measure	Active (mean ± SD)	Sedentary (mean ± SD)	p value
Joint health score	13.2 ± 4.1	17.6 ± 5.0	0.02
Annual bleeding rate	2.1 ± 1.4	2.5 ± 1.6	0.15
Quality of life score	72.4 ± 8.6	64.1 ± 9.2	0.01

Bleeding outcomes did not differ significantly between groups. The annual bleeding rate was slightly lower in the physically active group; however, this difference was not statistically significant (2.1 ± 1.4 vs 2.5 ± 1.6; p = 0.15), suggesting no increased bleeding risk associated with regular physical activity under appropriate prophylactic coverage (Table II).

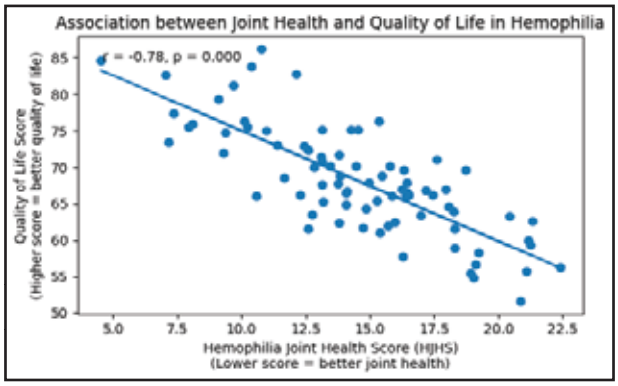

Figure 2: Association between haemophilia joint health and quality of life.

Quality-of-life scores were significantly higher among physically active participants compared with sedentary controls (72.4 ± 8.6 vs 64.1 ± 9.2; p = 0.01). Joint health scores demonstrated a significant inverse association with quality-of-life scores, indicating that better joint status was associated with improved perceived well-being (Figure 2).

Scatter plot showing the relationship between Haemophilia Joint Health Score (HJHS) and quality-of-life scores with a fitted linear regression line. Lower HJHS values indicate better joint status, while higher quality-of-life scores reflect better perceived well-being.

Discussion

This comparative cross-sectional study demonstrates that adults with haemophilia who engage in regular, structured physical activity have significantly better joint health and quality of life compared with sedentary counterparts, without a corresponding increase in annual bleeding rates when prophylaxis is adequately maintained. These findings add to the growing body of evidence challenging the traditional paradigm of physical activity restriction in hemophilia care. In our study, the absence of a significant increase in bleeding episodes among physically active participants is consistent with international data indicating that bleeding risk is more strongly influenced by baseline disease severity and clotting factor levels than by physical activity itself. Large observational and cohort studies from Europe and North America have shown that moderate physical activity does not increase bleeding frequency when patients are appropriately treated and monitored.[21,22] Pediatric and adult cohorts alike have demonstrated similar safety profiles, supporting a shift toward individualized activity counseling rather than blanket avoidance.[23] Although some cited studies include pediatric populations, they provide foundational safety and mechanistic evidence that informs adult hemophilia care. Improved joint health among active participants in the present study aligns with international evidence showing that regular exercise enhances periarticular muscle strength, proprioception, and joint stability, thereby potentially reducing microtrauma and abnormal joint loading.[24,25] Studies using objective joint health tools have confirmed that physically active individuals with hemophilia often exhibit slower progression of arthropathy compared with inactive peers.[26] These findings are particularly relevant for Bangladesh, where delayed access to rehabilitation and limited physiotherapy services contribute to early functional decline. Quality of life outcomes in this study mirror results from multiple international investigations demonstrating that physical activity positively affects physical, emotional, and social domains of health-related quality of life (HRQoL) in haemophilia.[27–29] Disease-specific HRQoL instruments consistently show that restrictions on physical activity and fear of bleeding are major determinants of reduced well-being. Encouraging safe activity may therefore address both physical impairment and psychosocial burden, including anxiety, social isolation, and reduced self-confidence.[30] Evidence from Asian and middle-income settings further supports these findings. Studies from Korea and Brazil have shown that joint status and functional independence are key predictors of HRQoL, independent of hemophilia subtype.[27, 31]

These parallels suggest that the benefits observed in high-income countries are transferable to resource-constrained contexts when adapted to local realities. Importantly, recent expert guidance and literature emphasize that regular, low-impact physical activity tailored to the individual can be safely incorporated into hemophilia care and has benefits for joint health, muscle strength, and quality of life, even when access to prophylaxis is limited.[32] Sports participation and structured exercise have also been associated with improved functional independence and reduced long-term disability when integrated into comprehensive haemophilia care models.[33] International recommendations increasingly advocate for tailored exercise prescriptions based on joint status, fitness level, and treatment coverage, rather than prohibitive restrictions. This approach is particularly relevant in Bangladesh, where misconceptions surrounding exercise may contribute to unnecessary inactivity and secondary morbidity.

Strengths and Limitations

The type of physical activity was not categorized into aerobic, resistance, or sport-specific domains. As activity was self-directed and heterogeneous, the present analysis focused on

overall activity exposure rather than modality-specific effects. Future studies with larger samples should examine differential impacts of activity type and intensity on joint health and bleeding outcomes. Objective activity monitoring and longitudinal follow-up would strengthen future research. Nonetheless, the consistency of these findings with robust international literature reinforces their validity.

Conclusion

Regular physical activity in adults with haemophilia is associated with better joint health and improved quality of life without a significant increase in bleeding risk when appropriate prophylaxis is maintained. These findings support a move away from restrictive activity avoidance toward individualized, rehabilitation-guided physical activity as part of standard haemophilia care. In resource-limited settings such as Bangladesh, encouraging safe and structured physical activity may reduce progressive joint damage, enhance functional independence, and improve psychosocial well-being. Further multicenter and longitudinal studies are needed to evaluate long-term outcomes, activity-specific effects, and practical strategies for integrating physical activity counseling into comprehensive haemophilia management programs.

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