



Original Article

Effects of Functional Therapy Program on Elbow Arthropathy of Hemophilia Patient

Hafiz Muneeb-ur-Rehman¹, Azfar Khurshid¹, Shazia Rafiq², Hunza Zulfiqar¹, Ayesha Razzaq^{3*}¹Department of Physiotherapy, Bakhtawar Amin Hospital, Multan, Pakistan²Department of Physiotherapy, Jinnah Hospital, Lahore, Pakistan³Department of Physiotherapy, Mayo Hospital, Lahore, Pakistan

ARTICLE INFO

Key Words:

Hemophilia, Elbow Arthropathy, Functional Therapy, Program, Patients

How to Cite:

Hafiz Muneeb Ur Rehman, Khurshid, A. ., Rafiq, S., Zulfiqar, H., & Razzaq, A. (2022). Effects Of Functional Therapy Program on Elbow Arthropathy of Hemophilia Patient: Functional Therapy Program on Elbow Arthropathy. Pakistan BioMedical Journal, 5(5). <https://doi.org/10.54393/pbmj.v5i5.391>

*Corresponding Author:

Ayesha Razzaq
Department of Physiotherapy, Mayo Hospital,
Lahore, Pakistan
drayesharazzak@gmail.com

Received Date: 19th April, 2022

Acceptance Date: 18th May, 2022

Published Date: 31st May, 2022

ABSTRACT

Hemophilia is an X-linked genetic progressive hemorrhage condition that is characterized by a clotting factor VIII (classic hemophilia, or hemophilia A) or IX (hemophilia B) deficiencies.

Objective: To determine the comparative effects of functional therapy program and manual therapy program on elbow arthropathy of haemophilia patients. **Methods:** It was a single blinded randomized controlled trial in which assessor was kept blind. In this study non-probability purposive technique was applied. The study was conducted in the Sundas foundation Lahore taking into account consort guidelines. Thirty participants suffering from hemophilia were enrolled in study in 2 groups while considering inclusion and exclusion criteria. Randomization was done through lottery method and concealment was done. Group A (n=15) was treated with manual therapy Grade 1, 2 or 3 mobilization techniques according to patient condition program and Group B (n=15) were treated with functional therapy. Hot pack was used as a baseline treatment for 10 min. For data collection Goniometer was used to measured elbow flexion and extension and Stanford HAQ 20 item Disability for assessing disability. **Results:** P-value was <0.01 which shows that both groups were effective for managing the patient of hemophilia, but manual therapy show more significant result as compared to functional therapy program.

Conclusion: In manual therapy treatment group, there was significant improvement in range of movement of elbow joint which enhanced functional activity of arm in haemophilic patients with chronic elbow arthropathy.

INTRODUCTION

Hemophilia is an X-linked genetic progressive hemorrhage condition that is characterized by a clotting factor VIII (classic hemophilia, or hemophilia A) or IX (hemophilia B) deficiencies [1,2]. In severe hemophilia patients have < 1 percent involvement in the coagulation factor, 1-5% in moderate patients and 6-40% in mild patient [3]. Initially hemophilia was treated with intravenous administration of the missing clotting factor, only when bleeding occurred [4]. Across developed countries early prophylactic diagnosis has become the preferred procedure for patients with severe hemophilia [5]. Radial head hypertrophy is a characteristic feature of Elbow arthropathy of patients

with haemophilia (PWH). So, correcting the radius head can improve the pronation and supination activities of the forearm [6]. The elbow is not a weight-bearing joint, so restrictions to initial movement (flexion and extension) less affect with usability as the related cycle is progressing worsening. The humerus-ulnar joint is impaired, thus restricting flexion and expansion movements [7]. This impacts normal daily routine activities growth. In certain cases, bone deformity may contribute to ulnar neuropathy [8]. Searching for signs of hemophilic arthropathy is an essential part of assessing hemophilic patients, even in the case of young patients benefiting from primary or

secondary prophylaxis [9]. Recurrent joint hemorrhages cause damage to various joint elements with subsequent arthropathy growth [10]. This study focused to assess the development of hemophilic arthropathy in children by using clinical, X-ray and MRI scores to compare their relative contribution to the disease assessment [11]. Many fitness treatments resulted in change in one or more of the measures assessed, including discomfort, range of motion, energy, and resistance to walking [12]. Hydrotherapy may be more effective in relieving pain in adults than land exercises. Functional exercises such as partial weight-bearing exercises and walking the treadmill appear to be more effective than static or short arc exercises for muscle improvement [13]. Such results fit with the many unchecked accounts of interference in the hemophilia literature. Several researchers, though, used prophylactic conditions until exercise and other studies even examined people with mild hemophilia [14]. Sufficient weight-bearing physical activity in teenage years, particularly in the area of puberty, is related with the gaining and maintenance of high bone mineral density which helps to prevent osteoporosis in later life. Adult PWH on long-term prophylaxis has also been documented not to suffer a reduction of bone mass independent of their degree of physical activity [15]. Arthropathy is a common complication which leads to pain and disability in people with hemophilia. A new approach is measuring individual physical performance at PWH [16]. The goal of this analysis was to equate the subjective physical performance of PWH to healthy controls and to associate the findings with objective data. The HEP-Test-Q proved to be a workable test, that reinforced objective measurements and is therefore appropriate for the initial indicator of physical performance in PWH clinical practice [17]. It is evident that manual therapy program for elbow arthropathies is well established. There is need to establish standardized home-based functional therapy program for elbow arthropathies in patients with hemophilia. Functional therapy program is totally self/home based management to improve and maintain the joint mobility. This study helps the researchers and clinician to manage the arthropathies of different joints. The aim of this research was to investigate improvements in musculoskeletal processes over a six-week of physical therapy treatment sessions along with replacement therapy in a young hemophilic group of patients and to evaluate the effect of a formal recovery program in hemophilic arthropathy patients. If therapy was given at an early age the effectiveness of therapy would be greater, in this study participants were limited and includes only male patients aged 18 years or younger.

METHODS

It was a single blinded randomized controlled trial in which assessor was kept blind. Non-probability purposive technique was applied. The study was conducted in the Sundas foundation Lahore taking into account CONSORT guidelines. Duration of the study was 6 months. Total sample size was 30 with 20% dropout rate. Thirty participants suffering from hemophilia were enrolled into study (15 participant in each group) in 2 groups while considering inclusion and exclusion criteria. Inclusion criteria comprise Age group 5 -20 years, Children with enough motivation and cognition to follow directions to task, appeared alert and oriented to their surroundings, Parental consent, no part take in further therapeutic plan decide physical therapy. Exclusion Criteria comprise of children with active history of fracture and open wound, Joint laxity, sensory motor impairment, hemarthrosis, mental retardation psychological issues, other systematic diseases. Before enrolling the participant in the study informed consent were taken from them in written, and also all the information were given to them regarding their involvement into our study, treatment session and taken them into confidence that their personal data were kept confidential. Group A (n=15) was treated with manual therapy Grade 1, 2 or 3 mobilization techniques according to patient condition program and Group B (n=15) were treated with functional therapy. Hot pack was used as a baseline treatment for 10 min. For data collection Goniometer was used to measured elbow flexion and extension and Stanford HAQ 20 item Disability for assessing disability. Data was collected pre and post treatment. Treatment sessions consisted of 6 weeks. In Group A treatment procedure given to patients was Elbow joint mobilization (Grade 1 & Grade 2) of for 5 min with base line treatment of hot pack for 10 min. Proprioceptive neuromuscular facilitation (PNF) including upper limb abduction, flexion, and external rotation of shoulder. Muscle stretching (within the limits of joint mobility) for 15 min. Local cryotherapy with cold pack for 15 min. Patients were reassessed at the end of 6 weeks through Stanford HAQ 20 item Disability scale [18]. In Group B (n=2) treatment procedure was base line treatment of hot pack for 10 min, dragging trolley bag (15 Rep), throwing, and catching football (15 Rep), hold 4liter water bottle for 3-5 mints & Rep 5 times, Supinate & Pronate elbow while holding 1 kg weight, ball Squeezing hold for 10 sec 5 rep. drawing the sword 10 rep 3 sets, patients were re assessed at the end of 6 weeks through Stanford HAQ 20 item Disability scale.

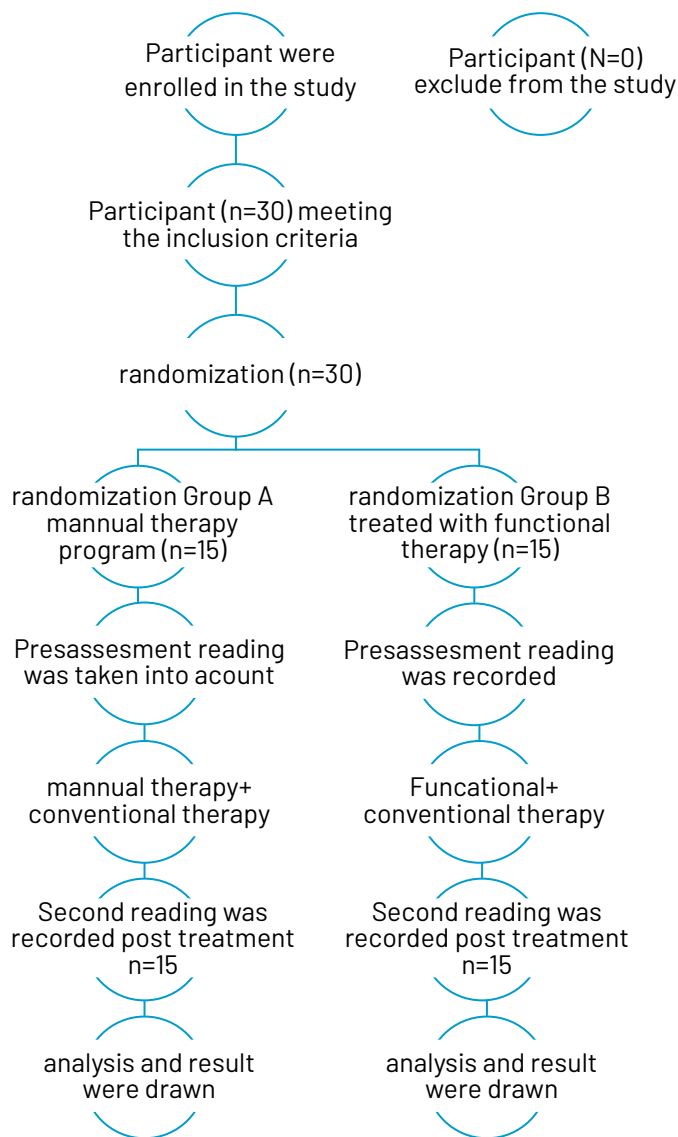


Figure 1: CONSORT diagram

RESULTS

Hemophilia patients with elbow arthropathies were included. Total 30 patients were allocated in two groups. Group A was illustrated to receive manual therapy program and group B was illustrated to receive Functional therapy program. Patients of group A had mean age 12.2± 4.09 years and patient of group B had mean age 11.6± 3.89 years. Table 1 revealed the comparison of flexion and extension range of motion between two groups before and after treatment session with applying Independent t-test.

Range of motion for elbow movement (flexion & extension)			
Variable	Outcome measurement	Manual Therapy Program n (15) Mean ± SD	Functional Therapy Program n (15) Mean ± SD
Flexion	Pre	87.86±10.73	97.14±13.54
	Post	116.00±11.98	101.78±12.80
	P	0.01	0.01
Extension	Pre	57.87±7.01	68.33±14.47
	Post	26.67±6.45	58.57±14.34
	P	<0.01	<0.01

ROM (Range of motion) P (Coefficient of alpha, P≤0.05), SD (Standard Deviation) Pre (Pretreatment), Post (Post treatment)

Table 1: Comparison of flexion and extension range of motion between two groups before and after treatment session

With p≤0.01 which shows that both groups were effective for managing the patient of hemophilia, but manual therapy show more significant result as compared to functional therapy program (Table 2).

Independent T-test HAQ			
Variables	Outcome measurement	Manual Therapy Program n (15) Mean ± SD	Functional Therapy Program n (15) Mean ± SD
HAQ	Pre	23.07±5.26	25.60±1.19
	Post	14.13±3.93	21.47±4.34
	P	<0.01	<0.01

HAQ (Health assessment questionnaire disability index), P (Coefficient of alpha, P≤0.05), SD (Standard Deviation), Pre (Pretreatment), Post (Post treatment)

Table 2: Independent T-test HAQ

DISCUSSION

Schafer GS conducted a systematic research to assess the impact of physical exercise on pain and musculoskeletal function in patients with hemophilia; randomized, non-randomized and quasi-randomized controlled trials including patients with hemophilia over 18 years of age who have undergone physical activity alone or with other therapies; Included in the care of elbow, knee and/or ankle injuries, such as thermo phototherapy, which was associated with those without medication, no involvement or other forms of operation. This systematic review proposes that physical workout and physiotherapy techniques can promote a decrease in pain perception and improve range of motion and muscle strength of hemophilia patients [19]. Our study result was supported by above mention study. For flexion in group A (manual therapy program) mean & standard deviation before treatment was (87.86± 10.73) and after treatment it was (116.00± 11.98). While in group B (functional therapy program) mean & standard deviation formerly treatment was (97.14± 13.54) and after treatment it was (101.78± 12.82). For extension in group A (manual therapy program) mean & standard deviation before treatment was (57.87± 7.01) and after treatment it was (26.67± 6.45). While in group B (functional therapy program) mean & standard deviation formerly treatment was (68.33± 14.47) and after treatment it was (58.57± 14.34). For HAQ in group A (manual therapy program) mean & standard deviation before treatment was (23.07± 5.26) and after treatment it was (14.13± 3.93). While

in group B (functional therapy program) mean & standard deviation formerly treatment was (25.60± 1.19) and after treatment it was (21.47± 4.34). With $p < 0.01$ which shows that both groups were effective for managing the patient of hemophilia, but manual therapy show more significant result as compared to functional therapy program. Another study supports our study results GOTO M et al., (2014) conducted a randomize control trial. This study is proposed to clarify the efficacy of home exercise self-monitoring for hemophiliacs with intervention in four hospitals in Japan over 8 weeks. Home exercise improved their physical function without raising the frequency of bleeding and pain. A self-monitoring home exercise routine has the capacity for tolerance to, frequency of knee extension and self-efficacy in hemophilia. Using the Internet and mobile phones, self-monitoring reached a high rate [20].

CONCLUSION

In manual therapy treatment group, there was a significant improvement in range of movement of elbow joint which enhanced functional activity of arm in haemophilic patients with chronic elbow arthropathy. Physiotherapy treatment program by mobilization, muscle relaxation, and proprioceptive neuromuscular facilitation can enhance perception of flexion and pain in elbow haemophilic arthropathy patients.

REFERENCES

- [1] Mannucci PM. Hemophilia therapy: the future has begun. *Haematologica*. 2020 Mar;105(3):545-553. doi: 10.3324/haematol.2019.232132.
- [2] Perrin GQ, Herzog RW, Markusic DM. Update on clinical gene therapy for hemophilia. *Blood*. 2019 Jan 31;133(5):407-414. doi: 10.1182/blood-2018-07-820720.
- [3] Weyand AC, Pipe SW. New therapies for hemophilia. *Blood*. 2019 Jan 31;133(5):389-398. doi: 10.1182/blood-2018-08-872291.
- [4] Forsyth A, Blamey G, Lobet S, McLaughlin P. Practical guidance for non-specialist physical therapists managing people with hemophilia and musculoskeletal complications. *Health*. 2020 Jan 21;12(2):158-79. DOI: 10.4236/health.2020.122014.
- [5] Kikuchi K, Komachi T, Honma Y, Fujitani J. Benefits of physical therapy for people living with hemophilia. *Glob Health Med*. 2021 Dec 31;3(6):409-412. doi: 10.35772/ghm.2021.01026.
- [6] Vochteloo AJ, Roche SJ, Dachs RP, Vrettos BC. Total elbow arthroplasty in bleeding disorders: an additional series of 8 cases. *J Shoulder Elbow Surg*. 2015 May;24(5):773-8. doi: 10.1016/j.jse.2015.01.004.
- [7] Rodriguez-Merchan EC, De la Corte-Rodriguez H. Complications of hemophilia in the elbow: current management. *Expert Rev Hematol*. 2020 Sep;13(9):991-1001. doi: 10.1080/17474086.2020.1803061.
- [8] Cuesta-Barriuso R, Gómez-Conesa A, López-Pina JA. Manual and educational therapy in the treatment of hemophilic arthropathy of the elbow: a randomized pilot study. *Orphanet J Rare Dis*. 2018 Sep 3;13(1):151. doi: 10.1186/s13023-018-0884-5.
- [9] Alblaihed L, Dubbs SB, Koyfman A, Long B. High risk and low prevalence diseases: Hemophilia emergencies. *Am J Emerg Med*. 2022 Jun;56:21-27. doi: 10.1016/j.ajem.2022.02.045.
- [10] Hirayama AB, Silva AKCD, Rocha JS, Roberti MDRF. Prevalence of symptoms in hemophilia carriers in comparison with the general population: a systematic review. *Hematol Transfus Cell Ther*. 2019 Oct-Dec;41(4):349-355. doi: 10.1016/j.htct.2019.02.006.
- [11] Konkle BA, Huston H. Hemophilia a. 2017.
- [12] Cuesta-Barriuso R, Trelles-Martínez RO. Manual therapy in the treatment of patients with hemophilia B and inhibitor. *BMC Musculoskelet Disord*. 2018 Jan 22;19(1):26. doi: 10.1186/s12891-018-1934-9.
- [13] Donoso-Úbeda E, Meroño-Gallut J, López-Pina JA, Cuesta-Barriuso R. Effect of manual therapy in patients with hemophilia and ankle arthropathy: a randomized clinical trial. *Clin Rehabil*. 2020 Jan;34(1):111-119. doi: 10.1177/0269215519879212.
- [14] Strike K, Mulder K, Michael R. Exercise for haemophilia. *Cochrane Database Syst Rev*. 2016 Dec 19;12(12):CD011180. doi: 10.1002/14651858.CD011180.pub2.
- [15] Negrier C, Seuser A, Forsyth A, Lobet S, Llinas A, Rosas M et al. The benefits of exercise for patients with haemophilia and recommendations for safe and effective physical activity. *Haemophilia*. 2013 Jul;19(4):487-98. doi: 10.1111/hae.12118.
- [16] Stephensen D, Bladen M, McLaughlin P. Recent advances in musculoskeletal physiotherapy for haemophilia. *Ther Adv Hematol*. 2018 Jul 2;9(8):227-237. doi: 10.1177/2040620718784834.
- [17] Prasetyo M, Moniqa R, Tulaar A, Prihartono J, Setiawan SI. Correlation between Hemophilia Early Arthropathy Detection with Ultrasound (HEAD-US) score and Hemophilia Joint Health Score (HJHS) in patients with hemophilic arthropathy. *PLoS One*. 2021 Apr 7;16(4):e0248952. doi: 10.1371/journal.pone.0248952.
- [18] Douglas-Withers J, McCulloch K, Waters D, Parker K,

- Hogg N, Mitsuhashi T *et al.* Associations between Health Assessment Questionnaire Disability Index and physical performance in rheumatoid arthritis and osteoarthritis. *Int J Rheum Dis.* 2019 Mar;22(3):417-424. doi: 10.1111/1756-185X.13460.
- [19] Schäfer GS, Valderramas S, Gomes AR, Budib MB, Wolff ÁL, Ramos AA. Physical exercise, pain and musculoskeletal function in patients with haemophilia: a systematic review. *Haemophilia.* 2016 May;22(3):e119-29. doi: 10.1111/hae.12909.
- [20] Goto M, Takedani H, Haga N, Kubota M, Ishiyama M, Ito S *et al.* Self-monitoring has potential for home exercise programmes in patients with haemophilia. *Haemophilia.* 2014 Mar;20(2):e121-7. doi: 10.1111/hae.12355