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EDITORIAL TEAM

EDITORIAL

EARLY PHYSICAL THERAPY INTERVENTION CAN REDUCE THE CHANCE OF RESPIRATORY COMPLICATIONS IN COVID-19

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Since the start of 2020, a COVID-19 emerged as a new strain of Coronavirus. Initially, it affected the population of Wuhan, China and after that it outspread all over the world and was declared as a pandemic by World Health Organization on 30th January, 2020.[1] It has been identified that COVID-19 can cause mild illness including common cold to more severe condition known as acute respiratory distress syndrome (ARDS), if not treated promptly.[2] While people of all ages are susceptible to COVID-19, those over 60 years of age and with cardiovascular diseases along with diabetes have even more chances of becoming seriously ill Whereas children seem to be less affected.[3] Currently there is no pharmacological treatment, still some antiviral drugs have been proven to be helpful along with plasma transfusion in which plasma is extracted from the blood of patient who got recovered from COVID-19 an is transfused into the patient still suffering from the said disease.[4]

Symptoms of respiratory complications due to this disease influence the mind of a Physical Therapist (PT). Though after discussing the maneuvers of respiratory Physical Therapy with fellow professional colleagues as well as clinicians and practically applying it on respective relatives, friends and advice seekers after getting the informed consent from them; those who started to have initial symptoms of COVID-19 before being tested positive and then later got positive. It resulted in great ease for most of them to breathe and did not led to serious respiratory complications that include dyspnea and accumulation of thick and tenacious secretions inside the lungs, which ultimately is a precursor of pneumonia. Following were the PT interventions suggested to the patients showing acute symptoms;

Steam inhalation, breathing exercises and postural drainage positions were inculcated in the treatment plan and guided respectively, steam inhalation therapy is normally advised to be used as primary care in acute respiratory diseases.[5] It is most commonly used therapy at home and is inexpensive, moreover it promotes self-reliance in the patients; it is used therapeutically by inhaling steam through nose so that it reaches the respiratory system.[6-8] Steam inhalation helps in loosening the mucus, it opens the nasal airway passages decreases mucosal inflammation and heat can prevent replication of viruses.[9] It helps to relax muscles and relieves coughing by preventing excessive dryness in the mucosal membranes.[10]

Moreover, breathing exercises have been reported to have beneficial effects in improving symptoms and optimizing pulmonary function in patients. Breathing programs have been reported to have positive effects in alleviating symptoms and optimizing pulmonary function in patients.[11] Breathing exercises aim to improve the individuals breathing pattern and increase in lung expansion, they also enhance the performance of respiratory muscles thus leading towards increase in functional residual capacity, and inspiratory reserve volume.[12] Breathing exercises reduces breathlessness, increase exercise capacity and improve overall well-being of a person [13,14,15,16]

The physiological effect of breathing exercises comprises of increase in intra-bronchial pressure thus preventing the collapse of bronchi and leading towards increase in inspiratory and expiratory flow rate.[13,15] It act by stimulating the autonomic system thereby promoting relaxation and in return improves the physiological parameters.[16]

Furthermore, body positioning improves the efficiency and effectiveness of both primary and accessory muscles of breathing leading to ease in dyspnea and reduction in work of breathing.[17] These positions improve the ventilation perfusion ratio and utilize the gravity to remove secretions.[18] Positioning decrease the ventilation demand resulting in longer expiratory time thereby preventing hyperinflation and ultimately resolving dyspnea.[19]

As a healthcare professional and specially a Physical Therapist we would like to ask the imminent researchers to fill this gap by conducting different surveys and trials. Through our experience we've found that the manoeuvres we applied have been very effective and improved the overall outcome of the patients suffering from COVID -19.

REFERENCES

1. Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). Int J Surg . 2020;76:71-76. doi: 10.1016/j.ijsu.2020.02.034.
2. Wickramaratchi MM, Pieris A, Fernando AJS. Review on Identification of Major Infectious Site and Disease Progression Pathway for Early Detection of Novel Corona Virus Covid-19. 2020.
3. Ezekiel J Emanuel, Govind Persad, Ross Upshur, Beatriz Thome, Michael Parker, Aaron Glickman, et al. Fair Allocation of Scarce Medical Resources in the Time of Covid-19. N Engl J Med. 2020;382(21):2049-2055. doi:10.1056/NEJMsb2005114.
4. Anudeep T, Jeyaraman M, Shetty DU, Raj H, Ajay S, Rajeswari Somasundaram VKV, et al. Convalescent Plasma as a plausible therapeutic option in nCOVID-19–A Review. J Clin Trials. 2020;10(409): doi: 10. 35248/2167-0870. 20. 10. 409
5. Little P, Moore M, Kelly J, Williamson I, Leydon G, McDermott L, et al. Ibuprofen, paracetamol, and steam for patients with respiratory tract infections in primary care: pragmatic randomised factorial trial. BMJ. 2013;347:f6041.
6. Baartmans M, Kerkhof E, Vloemans J, Dokter J, Nijman S, Tibboel D, et al. Steam inhalation therapy: severe scalds as an adverse side effect. Br J Gen Pract. 2012;62(600):e473-7. doi: 10.3399/bjgp12X652337.
7. Umoren R, Odey F, Meremikwu MM. Steam inhalation or humidified oxygen for acute bronchiolitis in children up to three years of age. Cochrane Database Syst Rev . 2011;(1):CD006435. doi: 10.1002/14651858.CD006435.pub2.
8. Parisius LM, Stock-Schröer B, Berger S, Hermann K, Joos S. Use of home remedies: a cross-sectional survey of patients in Germany. BMC Fam Pract . 2014;15:116. doi: 10.1186/1471-2296-15-116.
9. Brewster CT, Choong J, Thomas C, Wilson D, Moiemen N. Steam inhalation and paediatric burns during the COVID-19 pandemic. Lancet . 2020;395(10238):1690. doi: 10.1016/S0140-6736(20)31144-2.
10. Rawat H, Gupta H. Effectiveness of steam inhalation with tulsileaves along with turmeric versus steam inhalation with plain water to relieve respiratory symptoms of nasal congestion among children. Baba Farid Un Nurs. J. 2015;9(2):6-10.
11. Liu F, Cai H, Tang Q, Zou Y, Wang H, Xu Z, et al. Effects of an animated diagram and video-based online breathing program for dyspnea in patients with stable COPD. Patient Prefer Adherence. 2013; 7: 905–913. doi: 10.2147/PPA.S43305
12. Grams ST, Ono LM, Noronha MA, Schivinski CI, Paulin E. Breathing exercises in upper abdominal surgery: a systematic review and meta-analysis. Rev Bras Fisioter. 2012;16(5):345-53. doi: 10.1590/s1413-35552012005000052.
13. Waqar Ahmed Awan, Noor Abid, Anees Rafiq Rao, Muhammad Naveed Babar, Misha Ansari. Effect of deep breathing exercises in healthy smokers: A pilot study. J Pak Med Assoc. 2020; 70(7): 1209-1213. doi.org/10.5455/JPMA.16551
14. Holland AE, Hill CJ, Jones AY, McDonald CF. Breathing exercises for chronic obstructive pulmonary disease. Cochrane Database Syst. Rev. 2012; 10. DOI: 10.1002/14651858.CD008250.pub2.
15. Visser FJ, Ramlal S, Dekhuijzen PR, Heijdra YF. Pursed-lips breathing improves inspiratory capacity in chronic obstructive pulmonary disease. Respiration . 2011;81(5):372-8. doi: 10.1159/000319036.
16. Garrod R, Mathieson T. Pursed lips breathing: are we closer to understanding who might benefit. Chron Respir Dis . 2013;10(1):3-4. doi: 10.1177/1479972312472689.
17. Booth S, Burkin J, Moffat C, Spathis A. Positions to Ease Breathlessness. Managing Breathlessness in Clinical Practice: Springer; 2014: 49-65.
18. Bott J. Non-pharmacological management of breathlessness. Managing Breathlessness in the Community. 2013:113.
19. Yates P, Schofield P, Zhao I, Currow D. Supportive and palliative care for lung cancer patients. J Thorac Dis . 2013;5 Suppl 5(Suppl 5):S623-8. doi: 10.3978/j.issn.2072-1439.2013.10.05.

RESEARCH ARTICLE

EFFECTIVENESS OF FRAGILITY FRACTURE INTEGRATED REHABILITATION MANAGEMENT FOR IMPROVING ACTIVITY OF DAILY LIVING AND QUALITY OF LIFE IN GERIATRIC POPULATION AFTER HIP FRACTURE

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ABSTRACT

Objective: The objective of the study was to determine the efficacy of Fragility Integrated Rehabilitation Management (FIRM) on the quality of life and activities of daily living in geriatric population with hip fracture and to reduce the recurrence of hip fracture. **Material and Method:** A single-group, pretest–posttest design was conducted at Seoul National University for a time period from August 2017 to January 2018 in Bundang Hospital, South Korea. Patients with age of 55 years and above, had diagnosed femoral neck fractures, reduction and internal fixation, intertrochanteric and sub-trochanteric fractures, total hip replacement (THR), bipolar hemi-arthroplasty were included in the study. Quality of life was assessed through the Euro-QOL (EQ-5D) questionnaire, while ADL's was measured through Modified Barthal Index (MBI). Non-parametric Wilcoxon Sign Rank test was used for pre-post analysis by using SPSS version 21. The level of significance was set at 95% CI (*p<0.05*). **Results:** Wilcoxon signed rank test showed a significant improvement in activities of daily living (p<0.05). Furthermore, significant improvement has also been determined in the quality of life (*p<0.05*), after the 10th Fragility Integrated Rehabilitation Management (FIRM) and 4 Occupational Therapy (OT) sessions. **Conclusion:** Fragility Integrated Rehabilitation Management showed a significant improvement in the Activities of Daily Living (ADLs) and Quality of Life (QOL).

Keywords: Fragility fracture, geriatric, hip fracture, physical therapy, occupational therapy, rehabilitation.

INTRODUCTION

Osteoporosis is a common factor which causes most of the fragility fractures in older population which causes severe problems including daily activity limitations and gait impairments.[1-3] Vertebra, humerus, radius, hip are the most common sites.[1,2] The incidence of fracture and disability after fracture increases with time due to the demographic changes and increase in life expectancy.[3]

In 2018, South Korea became an aged society, 14.3% population consists on adults' aged≥65 years, and by 2025, it can become a super-aged society.[3] Moreover in South Korea, from 2008 to 2012, the incidence of hip fracture increased by 14.1%. And after the hip fracture, mortality rate during the first year is 8.4-36%. Mortality rate is higher in hip fracture as compared to non-hip fracture and control population.[4]

Fragility hip fracture is a geriatric condition with comorbidities[5,6] which increase socioeconomic burden because of the increased expenses of medical care. In spite of the fact that the treatment quality of hip fracture has been improved but there are still lacking of the functional recovery of the patient after surgery, thus it is a need to provide comprehensive and multidisciplinary rehabilitation to restore the functional recovery after the surgery.[5,7] In a previous study conducted by Abraham Adunsky et al. described the effectiveness and importance of comprehensive rehabilitation care for geriatric population after fragility hip fracture.[8]

For the purpose of comprehensive rehabilitation care, a multidisciplinary hip fracture care program comprising of orthopedic doctors, physiotherapists, occupational therapists, nurses geriatricians was designed, which is known as Fracture Integrated Rehab Management (FIRM). The main goal of FIRM was to increase the level of independence, prevention of falls and detailed discharge planning. It consist on 10 days of physiotherapy and 4 days for occupational therapy sessions after surgery, increasing gradually depending on patients' functional level.[7]

In this study a new rehabilitation strategy, FIRM which was ascertained by Korean Fragility Fracture Rehabilitation Study group[7], was used. If the research hypothesis is proved, then it would be a big step in rehabilitation for the cases with Fragility fractures, which are rising day by day due to advancing age.[9,10] The aim of the study was to determine the efficacy of Fragility Integrated

Rehabilitation Management (FIRM) on the quality of life and activities of daily living in geriatric population with hip fracture and to reduce the recurrence of hip fracture. This system will contribute public health by increasing quality of life in older population with fragility fracture and improve their functional recovery.

METHODOLOGY

A single-group, pretest–posttest design was conducted at Seoul National University for a time period from August 2017 to January 2018 in Bundang Hospital, South Korea. Patients with age of 55 years and above, had diagnosed femoral neck fractures, reduction and internal fixation, intertrochanteric and sub-trochanteric fractures, total hip replacement (THR), bipolar hemi-arthroplasty were included in the study. Subjects were excluded if the patients had multiple fractures, revised hip surgeries, isolated greater and lesser tuberosity fractures, fractures due to infection and malignancy, or had a medical condition due to which rehabilitation wasn't possible, and declined to participate in the clinical trials. The study was started after approval from the research committee of Institutional Review Board of Seoul National University Bundang Hospital. Informed consent according to Declaration of Helsinki, was taken from each subject and assured them about the confidentiality of their data.

A total of n=14 patients fulfilled the eligibility criteria and received the FIRM protocol, which is a multidisciplinary team approach, and comprehensive rehabilitation program. FIRM was provided by rehabilitation physician, clinical nurse specialist, nutritionist, physical therapist, occupational therapist and a social worker. Participants had been provided by 2 weeks long intervention after surgery, which contained 10 days physiotherapy sessions and 4 days of occupational therapy. Each session lasts for 40mins/day (20 minutes twice a day) as shown in table 1.

The pre-interventional data was collected on 2nd postoperative day and post-interventional on 15th postoperative after the 10th FIRM session. The general demographic data in term of age, gender and BMI was obtained at the baseline. Quality of life or health status of the participants was assessed through the Euro-QOL (EQ-5D) questionnaire[11], while ADL's was measured through Modified Barthal Index (MBI), and low score indicated a worse outcome.[12] As both variable were ordinal, so non parametric Wilcoxon Sign Rank test was used for pre-post analysis by using SPSS version 21. The level of significance was set at 95% CI ($p<0.05$).

RESULTS

The mean age of study participant was 82.07±6.0 and BMI was 22.71±4.08. A total of n=14 participants were recruited for the study. Wilcoxon signed rank test showed a significant improvement in modified Barthal index (MBI). In MBI, self-bathing, toilet, stair climbing, dressing, ambulation, transfer is significantly improved ($p<0.05$). The personal hygiene, feeding, wheel chair, and bowel-bladder control didn't show any significant improvement ($p\geq0.05$) after 10th Fragility Integrated Rehabilitation Management (FIRM) and 4 Occupational Therapy (OT) sessions. Furthermore, significant improvement has been determined in the quality of life. In QOL-EQ-5D, mobility, self-care, usual activities, pain/discomfort is significantly improved ($p<0.05$). However, no significant improvement has been seen in the depression/anxiety ($p\geq0.05$), after the 10th Fragility Integrated Rehabilitation Management (FIRM) and 4 Occupational Therapy (OT) sessions.

DISCUSSION

The aim of the study was to determine the efficacy of Fragility Integrated Rehabilitation Management (FIRM) on the quality of life (QOL) and activities of daily living (ADL's) in geriatric population with hip fracture and to reduce the recurrence of hip fracture. The post-intervention analysis showed significant improvement in activities of daily living on Modified Barthal index. Previous studies demonstrated that due to decrease in rehabilitation,[13] hip fractures leads to decrease functional independence and worsens the quality of life.[14] While, rehabilitation has an important role in improving quality of life and functional independence of hip fracture patients.[15] The findings of current study showed that FIRM protocol significantly improved bathing, toilet, dressing, stair climbing, ambulation walking with or without aid and transfers from bed to chair or back ($p<0.05$) after the 10th FIRM session, which correlates with the previous studies and significant improvement has been seen in the mobility and activities of daily living.[7, 16] However, in frail elder population improvements in mobility and ADL's is of greater importance to cope up with the activities of daily life.[17]

Table 1: Fragility Fracture Integrated Rehabilitation Management (FIRM) Protocol

	Physical therapy protocol	Occupational Therapy Protocol
1st Session	Evaluate to check out status of the subject.	
2nd Session	Carry out hip ROM (AAROM and AROM) exercise according to status, level, function of subject	
	Carry out functional training on the mat for progressive exercise and stable function depending on the level of the subject (ex. Mat training - rolling, sit up, scooting)	
	Carry out strengthening exercise (hip abductor & extensor) & education depending on the level of the subject (on a mat). (If good motivation, re-training can be possible in the ward)	
	Carry out cardiovascular exercise for lower cardiopulmonary function due to bedding or aging depending on the level of the subject (ex. Thera Vital, UBE, daily application)	
3rd Session	Carry out tilt table standing for confirming the orthostatic hypotension of the subject's condition.	
	Carry out sit to stand exercise depending on the level of the subject	
	Carry out cardiovascular exercise for lower cardiopulmonary function due to bedding or aging depending on the level of the subject (ex. Thera Vital, UBE, daily application)	
4th Session	Carry out non-weight bearing exercise in P-bar depending on the level of the subject (if stable, do next stage)	Initial assessment (status, level, function)
	Carry out P-bar walking depending on the level of the subject(if can carry outP-bar gait 3 roll, do next stage)	
	Carry out strengthening exercise (hip abductor & extensor)& education depending on the level of the subject (on a mat). (If good motivation, re-training can be possible in the ward)	
	Carry out cardiovascular exercise for lower cardiopulmonary function due to bedding or aging depending on the level of the subject (ex. Thera Vital, UBE, daily application)	
5th Session	Go ahead with a gait endurance of 50m (25m / min = 0.4m / s). And carry out walking depending on the level of the subject. (Proceed in the order of P-bar, walker depending on the level of the subject)	
	Carry out gait with assist & supervision with rolling walker (You should check the gait pattern & posture)	
	Carry out cardiovascular exercise for lower cardiopulmonary function due to bedding or aging depending on the level of the subject (ex. Thera Vital, UBE, daily application)	
6th Session	Same as 5th session	ADL taining 1. Transfer : W/C to chair, W/C to bed, W/C to toilet, sit to standing 2. Bed mobility : sit up, roll over 3. Dressing : education of wearing pants with Reacher and purchasing 4. Home environment improvement: installing non-slip mat, safe-bar in the toilet Education of precautions after hip fracture surgery (Total Hip Replacement Arthroplasty, Complete Hip Replacement, Hemiarthroplasty, Internal Fixation).
7th Session	Same as 5th session	
8th Session	Carry out stair ambulation depending on the level of the subject.	After confirming improved ADL training and function, re-educate deficient areas
	Perform treadmill exercise (1.4km/h) depending on the level of the subject.	
	Carry out cardiovascular exercise for lower cardiopulmonary function due to bedding or aging depending on the level of the subject (ex. Thera Vital, UBE, daily application)	
9th Session	Same as 8th Session	
10th Session	Evaluate to check out status of the subject.	Final assessment (status, level, function)

Table 2: Pre & Post analysis of ADLs & QOL

	Pre				Post				Z-score	MD	p-value
	Mean	SD	Median	IQR	Mean	SD	Median	IQR			
Personal Hygiene	3.85	1.51	4.00	1.00	4.28	1.06	4.50	1.00	-1.63	-0.43	0.102
Bathing Self	1.21	1.42	1.00	1.50	2.21	1.52	3.00	2.00	-2.39	-1.00	0.017*
Feeding	8.57	3.27	10.00	0.50	9.28	2.67	10.00	0.00	-1.34	-0.71	0.180
Toilet	3.78	3.66	3.50	8.00	6.00	3.11	8.00	3.75	2.20	-2.21	0.027
Stair climbing	0.71	2.16	0.00	0.00	3.92	3.73	2.00	8.00	-2.54	-3.21	0.011**
Dressing	4.28	2.49	5.00	3.00	6.21	2.11	5.00	3.00	-3.00	-1.93	0.003**
Bowel control	7.85	3.43	10.00	5.00	9.00	2.68	10.00	0.50	-1.62	-1.14	0.104
Bladder Control	7.92	3.64	10.00	2.75	8.85	2.68	10.00	2.00	-1.28	-0.93	0.197
Ambulation Walker	6.21	4.67	8.00	9.00	10.35	3.29	12.00	4.00	-2.95	-4.14	0.003**
Wheel chair	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.000
Chair bed transfer	8.00	4.40	8.00	9.00	11.21	2.75	12.00	3.25	-2.37	-3.21	0.017*
MBI_TOTAL	**52.42**	**24.38**	**57.00**	**27.75**	**71.35**	**18.56**	**73.50**	**18.50**	**-3.18**	**-18.93**	**0.001*** **
Mobility	4.21	0.57	4.00	1.00	2.21	0.69	2.00	1.00	-3.22	2.00	0.001***
Self-care	3.85	0.77	4.00	0.25	2.71	0.82	3.00	1.00	-2.94	1.14	0.003**
Usual Activities	4.71	0.46	5.00	1.00	3.50	0.65	4.00	1.00	-3.16	1.21	0.002**
Pain/Discomfort	3.28	0.82	3.00	1.00	2.21	0.80	2.00	1.00	-2.28	1.71	0.022*
Anxiety/Depression	2.21	1.18	2.50	2.00	1.57	0.75	1.00	1.00	-1.89	0.64	0.058
EQD Total	**0.34**	**0.20**	**0.34**	**0.13**	**0.63**	**0.09**	**0.63**	**0.17**	**-2.98**	**-0.29**	**0.003****

Level of Significance, P-value<0.05, p-value<0.01**, p-value<0.001****

Moreover, in the recent study subjects were assessed after the 4 days of occupational therapy sessions along with Fragility Integrated Rehabilitation Management (FIRM), which showed a significant improvement in dressing, toilet and bathing. T. Alarcon et al. conducted a 2-years follow study, which correlates with the current findings and significant improvement has been seen in the activities of daily living such as ambulation, transfers, stair climbing, use of toilet, bathing and dressing ($p< 0.05$).[18]

Furthermore, significant improvement has been determined in mobility, self-care, usual activities and pain/discomfort after the 10th Fragility Integrated Rehabilitation Management (FIRM) and 4th Occupational Therapy (OT) session. In a study conducted by Shyu YI et al., it was determined the interdisciplinary team approach is effective for management of hip fracture in geriatric population and improve their quality of life by decreasing pain and improve physical function.[19] Moreover, previous literature determined that the Fragility Integrated Rehabilitation Management (FIRM) can significantly improve the quality, joint range of motion and decrease in pain/discomfort in elder population with hip fracture which supports the findings of current study.[20]

FIRM protocol included comprehensive management which was provided by multidisciplinary team such as physical therapist, occupational therapist, clinical nurse, nutritionist and a social worker, which could be an important part for the management of the hip fracture in elderly population.[21] In some researches, it has been concluded that comprehensive management is effective in improving functional independence and activities of daily life as compared to the conventional physiotherapy.[22]

In this study, anxiety and depression is not significantly improved ($p\geq0.05$). While, depression could be a factor to decrease the mobility and functional outcomes in elderly population with hip fracture.[23] But a study reported, 1 year-long follow-up determined a decrease in depression after discharge from the hospital.[19]

The limitation of this study is that it was single group, one centred study. Moreover, sample size was also small, so results can't be generalized.

CONCLUSION

FIRM showed an improvement in the mobility, self-care activities, ambulation, stair climbing, and transfer. Another improvement has been also observed in the decrease in pain and discomfort due to the Hip fracture. Furthermore, activities of daily living are significantly improved, which demonstrated that FIRM is an effective protocol for hip fracture in geriatric population. It is suggested that in future studies, such conditions such as metabolic diseases and metabolic bone diseases which may hinders the improvement in hip fracture should be considered. Large sample size and multicenter studies should be incorporated in future researches.

REFERENCES

1. Lems WF, Dreinhöfer K, Bischoff-Ferrari H, Blauth M, Czerwinski E, da Silva JA, et al. EULAR/EFORT recommendations for management of patients older than 50 years with a fragility fracture and prevention of subsequent fractures. Ann. Rheum. Dis 2017;76(5):802-10.
2. Riggs BL, Melton Iii L. The worldwide problem of osteoporosis: insights afforded by epidemiology. B. 1995;17(5):S505-S11.
3. Lim S-K, Lee SY, Beom J, Lim J-Y. Comparative outcomes of inpatient fragility fracture intensive rehabilitation management (FIRM) after hip fracture in sarcopenic and non-sarcopenic patients: a prospective observational study. Eur. Geriatr. Med. 2018;9(5):641-50.
4. Abrahamsen B, Van Staa T, Ariely R, Olson M, Cooper C. Excess mortality following hip fracture: a systematic epidemiological review. Osteoporos. Int. 2009;20(10):1633-50.
5. Lim J-Y. Fragility Fracture Care: An Urgent Need to Implement the Integrated Model of Geriatric Care. Ann. Geriatr. Med. Res.. 2019;23(1):1-2.
6. Menzies IB, Mendelson DA, Kates SL, Friedman SM. The impact of comorbidity on perioperative outcomes of hip fractures in a geriatric fracture model. Geriatr. Orthop. Surg. Rehabil.. 2012;3(3):129-34.
7. Lee SY, Beom J, Kim BR, Lim S-K, Lim J-Y. Comparative effectiveness of fragility fracture integrated rehabilitation management for elderly individuals after hip fracture surgery: a study protocol for a multicenter randomized controlled trial. Med. 2018;97(20).
8. Adunsky A, Lerner-Geva L, Blumstein T, Boyko V, Mizrahi E, Arad M. Improved survival of hip fracture patients treated within a comprehensive geriatric hip fracture unit, compared with standard of care treatment. J. Am. Med. Dir. Assoc. 2011;12(6):439-44.
9. Curtis EM, Moon RJ, Harvey NC, Cooper C. Reprint of: The impact of fragility fracture and approaches to osteoporosis risk assessment worldwide. Int. J. Orthop. Trauma. Nurs. 2017;26:7-17.
10. Barnes B, Dunovan K. Functional outcomes after hip fracture. Phys. Ther. 1987;67(11):1675-9.
11. Obradovic M, Lal A, Liedgens H. Validity and responsiveness of EuroQol-5 dimension (EQ-5D) versus Short Form-6 dimension (SF-6D) questionnaire in chronic pain. Health. Qual. Life. Outcomes. 2013;11(1):110.
12. Jung HY, Park BK, Shin HS, Kang YK, Pyun SB, Paik NJ, et al. Development of the Korean Version of Modified Barthel

Index (K-MBI): Multi-center Study for Subjects with Stroke. Ann. Rehabil. Med. 2007;31(3):283-97.
13. Young Y, Xiong K, Pruzek RM. Longitudinal functional recovery after postacute rehabilitation in older hip fracture patients: the role of cognitive impairment and implications for long-term care. J. Am. Med. Dir. Assoc. 2011;12(6):431-8.
14. Randell A, Nguyen T, Bhalerao N, Silverman S, Sambrook P, Eisman J. Deterioration in quality of life following hip fracture: a prospective study. Osteoporos. Int. 2000;11(5):460-6.
15. Abdalbary SA. Partial weight bearing in hip fracture rehabilitation. Future Sci.; 2017.
16. Aftab A, Awan WA, Habibullah S, Lim JY. Effects of fragility fracture integrated rehabilitation management on mobility, activity of daily living and cognitive functioning in elderly with hip fracture. PAK. J. MED. SCI. 2020;36(5).
17. Nordström P, Thorngren K-G, Hommel A, Ziden L, Anttila S. Effects of geriatric team rehabilitation after hip fracture: meta-analysis of randomized controlled trials. J. Am. Med. Dir. Assoc. 2018;19(10):840-5.
18. Alarcón T, González-Montalvo J, Gotor P, Madero R, Otero A. Activities of daily living after hip fracture: profile and rate of recovery during 2 years of follow-up. Osteoporos. Int. 2011;22(5):1609-13.
19. Shyu Y-IL, Liang J, Wu C-C, Cheng H-S, Chen M-C. An interdisciplinary intervention for older Taiwanese patients after surgery for hip fracture improves health-related quality of life. BMC Musculoskelet. Disord. 2010;11(1):225.
20. Cifu DX, Lew HL, Oh-Park M. Geriatric rehabilitation: Elsevier Health Sciences; 2018.
21. Riemen AH, Hutchison JD. The multidisciplinary management of hip fractures in older patients. J. Orthop. Trauma. 2016;30(2):117-22.
22. Shyu YIL, Liang J, Wu CC, Su JY, Cheng HS, Chou SW, et al. Two-year effects of interdisciplinary intervention for hip fracture in older Taiwanese. J. Am. Geriatr. Soc. 2010;58(6):1081-9.
23. Feng L, Scherer SC, Tan BY, Chan G, Fong NP, Ng TP. Comorbid cognitive impairment and depression is a significant predictor of poor outcomes in hip fracture rehabilitation. Int. Psychogeriatr. 2010;22(2):246.

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RESEARCH ARTICLE

PHYSICAL ACTIVITY AS COPING STRATEGY FOR ACADEMIC STRESS AMONG UNDERGRADUATE FEMALE STUDENT

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ABSTRACT

Objective: To determine the effectiveness of physical activity as a coping strategy to reduce academic stress among undergraduate female students. **Methodology**: A Randomized control trail (NCT04221022) was conducted in Bilquis Postgraduate College for Women PAF, Nur Khan Base, Rawalpindi. A total of n=37 undergraduate inactive female (>1-month) students, age between 18-24 years, with moderate level of academic stress measured on academic stress scale were included in the study. While students with diagnosed psychological disorders, systematic diseases were excluded. The participants randomly divided into Light Physical Activity (LPA), Moderate Physical Activity (MPA) and Vigorous Physical activity (VPA) groups. The academic stress scale (ASS) was used to observe level of academic stress among participant at baseline and after six weeks of intervention. **Results**: The mean age of female study participants was 20.24±1.44 years. Pre-Post analysis showed that all group significantly improve (*p<0.001*) level of academic stress after 6 week intervention. The academic stress was significantly improved in moderate PA group as compare to vigorous PA (15.17±12.39 Ver. 44.62±36.94, *p=0.019*). **Conclusion**: All types of physical activities were effective as a coping strategy for reducing academic stress among female undergraduate students. But moderate level of physical activity like brisk walking was significantly associated with reduction in academic stress as compare to vigorous and light physical activities.

Keywords: Cognition, mental health, physical activity, stress.

INTRODUCTION

Physical activity (PA) is defined as any bodily movements, which are produced by skeletal muscles that results in energy expenditure and classified as light, moderate and vigorous physical activity. PA is effective in preventing and treating high blood pressures, diabetes, osteoporosis and depression. People who performs PA are more efficient and healthier.[1] Whereas risk of developing hypertension, coronary heart disease, diabetes and obesity increases due to physical inactivity.[2]

Now-a-days stress is a typical chunk of each individual's life.[3] Excessive work leads to the feeling of physical stress whereas improper daily life routine cause mental stress.[4] Stressors such as academic, self-imposed, economic, and health related may affect the college students.[5] The education system is quite stressful these days. A student's life and specifically a female student is subjected to diverse kinds of stressors such as the burden of academics, grades, undefined future and family problems.[6] stress also leads to the issues of concentration, tension, anxiety, focus and attention.[7]

Moreover, students are also overloaded with quizzes, assignments, presentations and exams and all these factors are working as stressors in students' life which may effects the academic achievements.[8] Academic stress is mental distress which may occurs due to the pressure of educational failure, examination, class participation, competing other class mates and extra-curricular activities.[9, 10] Due to which students face emotional, physical, and social problems which might affect their learning capability and academic performance.[6]

Regular PA is effective for health life style and it is suggested as a coping strategy for stress.[11] In some previous studies, it has been demonstrated that most of the students do not participate in physical activity, whereas engaging in it can be a potent tool to enhance the physiological wellbeing of the student and minimizing there academic stress.[12,13] However, in literature there is also limited evidence that physical activity is being properly used as an effective therapy in the management of academic stress. This study was conducted to determine the effectiveness of physical activity as a coping strategy to reduce academic stress among female participants.

METHODOLOGY

A randomized clinical trial (NCT04221022) was conducted in Bilquis Postgraduate College for Women PAF Nur Khan Base Rawalpindi after the permission from Principal. A total of n=37 undergraduate inactive female (>1-month)

students, age between 18-24 years, with moderate level of academic stress measured on academic stress scale were included in the study. While students with diagnosed psychological disorders, systematic diseases were excluded from the study.

The participants were randomly divided into three groups, through the sealed envelope method such as Light Physical Activity (LPA), Moderate Physical Activity (MPA) and Vigorous Physical activity (VPA) group. (Figure 1)

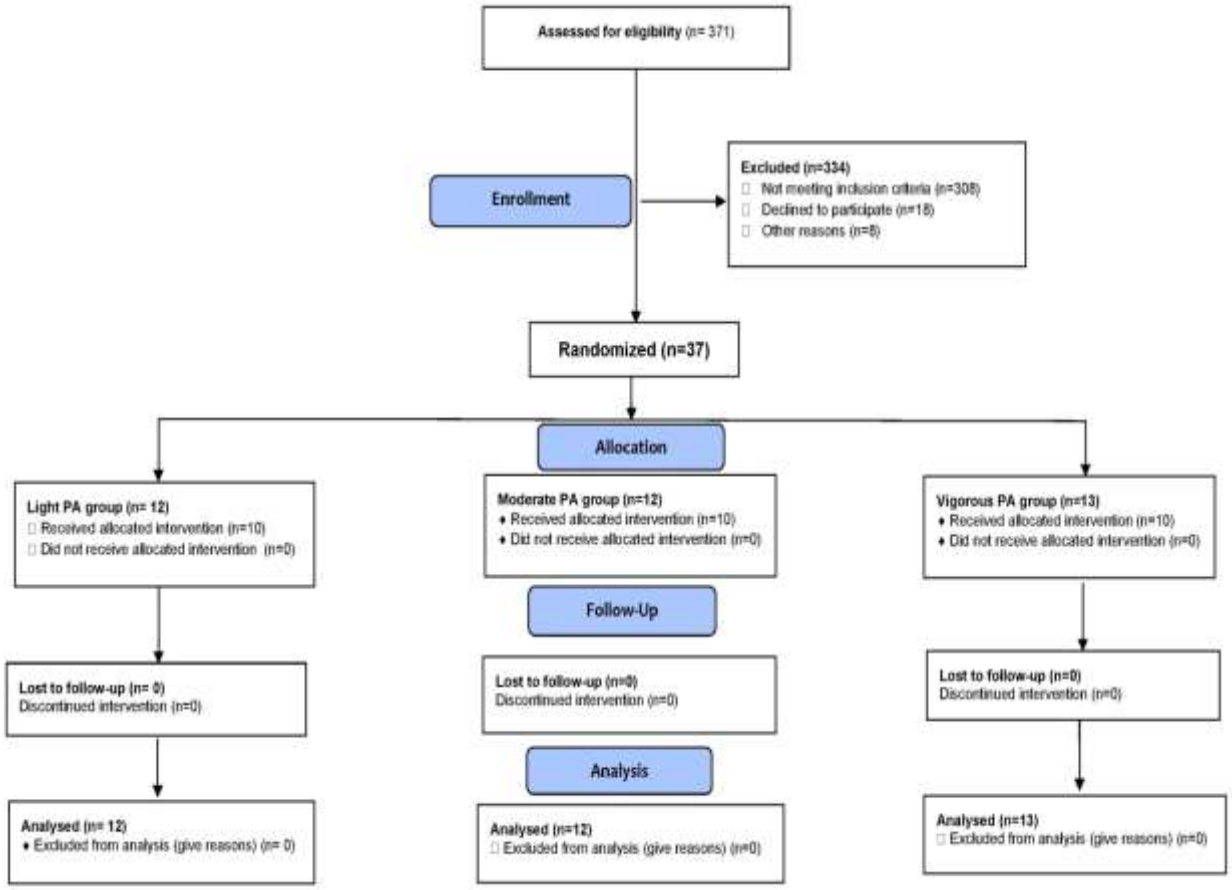

Figure 1: CONSORT Diagram

The guidelines regarding physical activity for intervention were obtained from Rapid Assessment of Physical Activity (RAPA) questionnaire which has constructed validity and reliability.[15] The duration of study were 6 weeks and each group receiving intervention for 5 days/week. The participants were ask to perform Leisure Walk for 35 minutes in LPA group, Brisk Walk for 30 minutes in MPA group and jogging for 15 minutes in VPA group

The information regarding age, BMI and semester was obtained at baseline. The academic stress scale (ASS) was used to observe level of academic stress among participant at baseline and after six weeks, which is also a valid and reliable tool.[16] The assumptions of parametric tests were met, so for within group changes, paired sample t-test and for comparison One Way ANOVA with Tukey HSD post hoc was used. The level of significance was set as $p<0.05$, and SPSS ver. 21 was used to analyse the data.

RESULTS

The mean age of female study participants was 20.24±1.44 years and mean BMI 20.23±0.26 kg/m^2, which showed that majority of participant, had normal BMI score. Majority of students were in 2nd (n=10) and 4th (n=14) semester respectively (Figure 2).

Pre-Post analysis showed that all group showed improvement in level of academic stress after 6 week intervention, while comparison between groups showed significant difference ($p=0.024$) among the groups as shown in figure 3.

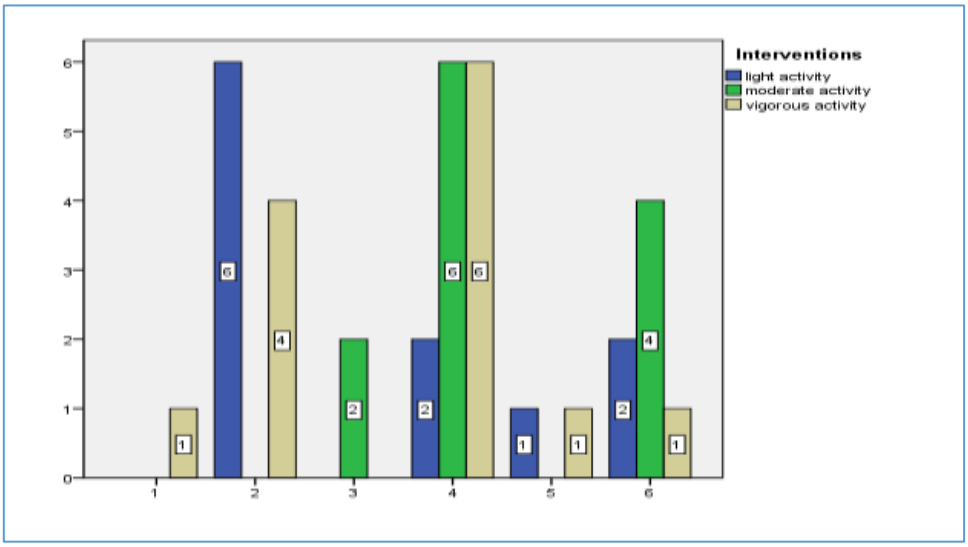

Figure 2: Semester wise distribution of participants

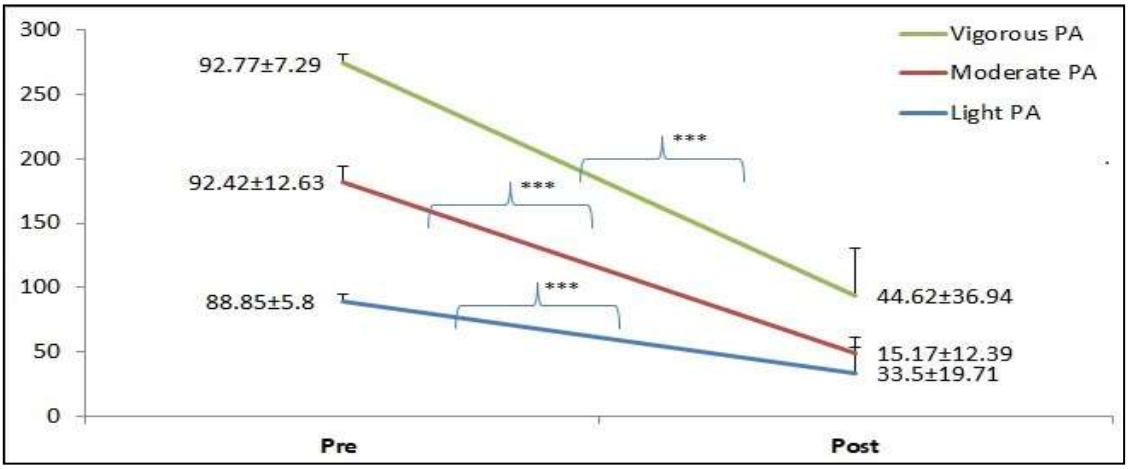

Figure 3: With-in group changes in ASS

Post Hoc analysis with Tukey HSD showed that the academic stress was significantly improved in moderate PA group as compare to vigorous PA (15.17±12.39 Ver. 44.62±36.94, *p=0.019*). But no significant difference was observed between moderate and light PA group (15.17±12.39 Ver. 33.5±19.71, *p=0.196*) as well as light and vigorous PA group (33.5±19.71 Ver. 44.62±36.94, *p=0.543*) as shown in Figure 4.

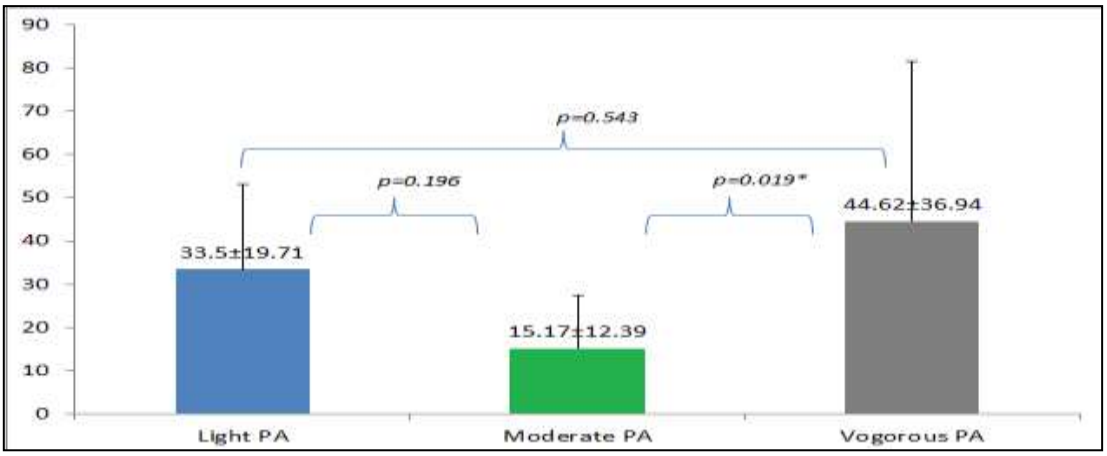

Figure 4: Comparison of ASS among LPA, MPA & VPA groups

DISCUSSION

According to the results, each level of physical activity reduced the academic stress level at the end of 6 weeks but moderate level of physical activity e.g. brisk walk significantly improve academic stress symptoms as compare to light and vigorous physical activity.

In this study, it was concluded that moderate level of PA was significantly associated with the academic stress, which correlates with the previous study conducted by Urich A. In which it has been demonstrated that moderate level of PA i.e. 150 minutes/week is effective for reducing stress and improve health in undergraduate students.[17]

Moreover, it has also been determined that regular moderate and vigorous intensity PA improves mental and cognitive health.[18] A study conducted by James A. Blumenthal et al. discussed that 12 weeks of aerobics and strength training is effective for reduction in mental stress.[19] However, according to the results of this study, brisk walking for a time period of 6 weeks can significantly use as a coping strategy for mental stress. This occurs due to the cortisol level, which is considered as stress hormone. Cortisol is released during physical activity such as brisk walking which reduces the stress level while secretion of cortisol is decreased or inhibited due to low PA.[20]

Additionally, another possible mechanism is the increased concentration of serotonin and other neurotransmitters due to PA, which are associated with the endorphin effects and decrease the negative effects of stress.[21] This supports the current findings of the study that moderate intensity of physical activity for 6 weeks reduces the stress level and improves mental health of college students. And stress is the leading cause of poor academic performance in college students.[14]

Moreover, in the current study no significant difference has been observed in the light and vigorous PA after 6 weeks of intervention. However, in a previous literature, it has been discussed that vigorous PA is inversely associated with the stress level among college students.[22] On the other hand, walking in nature is also effective for the mental health.[23] However, there's less evidence available for the leisure walk and the academic stress in college students.

CONCLUSION

All type of physical activities were effective for coping up with the academic stress among female undergraduate students. But moderate level of physical activity like brisk walking was significantly associated with the academic stress, as compare to vigorous and light physical activities. The current study was single centre study as well as no confounding variables like age socioeconomic status were included in the analysis. So multi-centre study, while focusing confounding variables, is recommended for future research.

REFERENCES

1. Abou Elmagd M. Benefits, need and importance of daily exercise. Int. J. Phys. Educ. Sports Health. 2016;3(5). 22-27.
2. Powell KE, Blair SN. The public health burdens of sedentary living habits: theoretical but realistic estimates. Med. Sci. Sports Exerc. 1994;26(7):851-6.
3. Ruscio AM, Gentes EL, Jones JD, Hallion LS, Coleman ES, Swendsen J. Rumination predicts heightened responding to stressful life events in major depressive disorder and generalized anxiety disorder. J. Abnorm. Psychol. 2015;124(1):17.
4. Kofoworola OH, Alayode AM. Strategies for managing stress for optimal job performance. Int. J. Psychol. Stud. 2012;4(2):162.
5. SAJID MB, HAMID S, SABIH F, SAJID A. Stress and coping mechanisms among college students. J. Pak. Psychiatr. Soc. 2017;14(3):31-4.
6. Shaikh B, Kahloon A, Kazmi M, Khalid H, Nawaz K, Khan N, et al. Students, stress and coping strategies: a case of Pakistani medical school. Educ. Health. 2004;17(3):346-53.
7. Cruz SY, Fabian C, Pagán I, Ríos JL, González AM, Betancourt J, et al. Physical activity and its associations with sociodemographic characteristics, dietary patterns, and perceived academic stress in students attending college in Puerto Rico. P. R. Health. Sci. J.2013;32(1).
8. Chi T. Physical activity is defined as "any bodily movement produced by skele-tal muscles that results in caloric expenditure"(Pender, 1996, p. 185). Definitions of exercise are complex and vary according to scientific. Complementary Alternative Therapies in Nursing.2009:349.
9. Morrison V, Bennett P. An introduction to health psychology: Pearson Education; 2009.
10. Ströhle A. Physical activity, exercise, depression and anxiety disorders. J. Neural. Transm. 2009;116(6):777.
11. Wijndaele K, Matton L, Duvigneaud N, Lefevre J, De Bourdeaudhuij I, Duquet W, et al. Association between leisure time physical activity and stress, social support and coping: A cluster-analytical approach. **Psychol. Sport Exerc**.2007;8(4):425-40.
12. Nguyen-Michel ST, Unger JB, Hamilton J, Spruijt-Metz D. Associations between physical activity and perceived stress/hassles in college students. Stress Health: Stress Health.2006;22(3):179-88.
13. Stephens T. Physical activity and mental health in the United States and Canada: evidence from four population surveys. Prev. Med. 1988;17(1):35-47.
14. Lawrence NS, Aduka SZ, Desa ZM. Factors of Stress Affecting the Academic Performance among the University Students.

15. Aktan R, Ozalevli S, Yalcinkaya G, Alpaydin AO, Sevinc C. Validation of the rapid assessment of physical activity questionnaire (RAPA) in COPD patients. Eur Respiratory Soc; 2018.
16. Bedewy D, Gabriel A. Examining perceptions of academic stress and its sources among university students: The Perception of Academic Stress Scale. Health Psychol. Open. 2015;2(2):2055102915596714.
17. Urich A. The Impact of Physical Activity on Stress. Methods for Stress Management. 2017.
18. Nakagawa T, Koan I, Chen C, Matsubara T, Hagiwara K, Lei H, et al. Regular Moderate-to Vigorous-Intensity Physical Activity Rather Than Walking Is Associated with Enhanced Cognitive Functions and Mental Health in Young Adults. Int. J. Environ. Res. Public Health.2020;17(2):614.
19. Blumenthal JA, Fredrikson M, Kuhn CM, Ulmer RL, Walsh-Riddle M, Appelbaum M. Aerobic exercise reduces levels of cardiovascular and sympathoadrenal responses to mental stress in subjects without prior evidence of myocardial ischemia. Am. J. Cardiol. 1990;65(1):93-8.
20. Jin P. Efficacy of Tai Chi, brisk walking, meditation, and reading in reducing mental and emotional stress. J. Psychosom. Res. 1992;36(4):361-70.
21. Wu X, Tao S, Zhang Y, Zhang S, Tao F. Low physical activity and high screen time can increase the risks of mental health problems and poor sleep quality among Chinese college students. PLoS ONE.2015;10(3):e0119607.
22. VanKim NA, Nelson TF. Vigorous physical activity, mental health, perceived stress, and socializing among college students. Am. J. Health Promot. 2013;28(1):7-15.
23. Marselle MR, Warber SL, Irvine KN. Growing resilience through interaction with nature: Can group walks in nature buffer the effects of stressful life events on mental health? Int. J. Environ. Res. Public Health. 2019;16(6):986.

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RESEARCH ARTICLE

EFFECTS OF NON MECHANICAL HORSE BACK RIDING ON BALANCE IN SPASTIC CEREBRAL PALSY CHILDREN: A RANDOMIZED CLINICAL TRAIL

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Nabeela Kanwal[1]: Analysis & interpretation of data, writing; Revised and accountable for all aspects
Raheela Kanwal[2]: Conception & Designing, Revised and accountable for all aspects
Rab Nawaz Khan[3]: Interpretation of data, writing; Revised and accountable for all aspects

ABSTRACT

Objective: To compare the effectiveness of non-mechanical horseback riding with conventional Physical therapy on dynamic balance within spastic CP children. **Material and Method:** A single blinded randomized clinical trial conducted at THQ hospital Gujar Khan Pakistan. The n=30 spastic hemiplegic CP children with Gross Motor Function Classification scale (GMFCS) level-IV, a score of II on Modified Ashworth Scale (MAS) were included through non-probability convenience sampling technique. The participants were randomly allocated into conventional physical therapy (CPT) group and non-mechanical horseback back riding (NMHBR) group through lottery method. The data was collected at baseline and post 06 months through the General demographic questionnaire, MAS, GMFCS and Pediatric Balance Scale (PBS). For between-group comparison independent samples t-test was used while for within-group analysis paired sample t-test was used. **Results:** The mean age and BMI was 8.36±2.15, 14.5±0.75 respectively. When Comparing both groups, no significant difference was observed in Spasticity *(p=0.130)* and functional independence (*p=0.216*). But NMHBR group showed significant improvement in overall pediatric balance score as compare to CPT group (17±10.24 vs. 26.33±1429, *p=0.049*), after 6 months of intervention. The PBS's task including standing unsupported (*p=0.027*), Standing with eyes closed (*p=0.039*), standing with feet together (*p*=0.021), Standing with one foot in front (*p=0.016*), Standing on one foot (*p=0.039*) and Reaching forward with outstretched arm (*p=0.012*) significantly improved in NMHBR groups as compare to CPT. **Conclusion:** It was concluded that conventional physical therapy and non-mechanical horseback riding both can improve spasticity, functional independence and balance of spastic CP children but NMHBR is more effective than CPT.

Keywords: balance, hippo-therapy, physical therapy.

INTRODUCTION

Cerebral palsy is non-progressive disorder manifested by impairment in movement and posture due to damage of the motor cortex.[1] It is most common neurodevelopmental motor disability as it is prevalent in every 2 to 3 out of 1000 children.[2] The incidence of CP is 2.5/1000 live births.[1] In US, every 1 out of 278 child is diagnosed with CP each year. However, a study in Faisalabad reported 160 cases with the abnormalities in movement, tone, and posture and out of which 75% cases were diagnosed with CP.[2]

It was considered as CP occurs due the result of perinatal asphyxia, but in some recent studies it has been concluded that there are number of factors which cause CP. Injury to the brain could be prenatal, natal, and postnatal.[3] The CP can be classified as spastic, dyskinesia, ataxic, and mixed.[2]

Spastic CP is characterized by jerky movements, muscle tightness and joint stiffness.[4] Growth and effects of gravity increase the movement difficulties in children, which leads to the secondary effects of compensating bones and muscular abnormalities.[5] The most important problem in children with CP is defective control on posture. However, postural maintenance is necessary for daily living activities.[5, 6]

Management of CP includes medications, surgery and rehabilitation. The medications relieve spasticity while surgery may include tenotomy, selective dorsal rhizotomy etc. on the other hand, physical therapy includes different types of exercises like stretching, strengthening, postural stability, balance training, Bobath, PNF techniques.[7] Organization of posture is controlled at two functional levels: direction-specific adjustment & fine-tuning of direction-specific activities. There exist many approaches to improve control of posture and balance.[5, 8, 9] In previous studies it has been concluded that treatments such as Swiss ball training, and hippotherapy is more effective as compared to conventional physical therapy. However, rehabilitation is an important aspect for the management of CP children.[10]

Furthermore, hippotherapy therapy approach, in which movement of horse, is used for patients' benefit.[11] It improves neuromotor and sensory processes and affects many systems of body. The constant rhythmical 3-dimensional (3-D) movement of the horse not only facilitates automatic postural responses and stimulate trunk muscles, joint stability, weight shift but also increases sensory input to the Vestibular, Proprioceptive, Tactile, Cognitive and Motor systems.[12] Therapeutic horseback riding leads to improved coordination, increased head and trunk control and improved gait.[13, 14]

Moreover, hippotherapy helps to improve balance and coordination, muscle tone and strength and range of motion.[15-17] In present study the non-mechanical horseback riding is cost effective, friendly user, cannot be affected by weather and

occupies less space and children enjoy with toy horse. Present study was done to compare the effectiveness of non-mechanical horseback riding versus conventional therapy (NMHBR) on dynamic balance and conventional physical therapy in spastic hemiplegic CP children.

METHODOLOGY

A single-blinded, randomized clinical trial was conducted at Makkah Medical Center Saudi Arabia, from June 2018—May 2019, after taking an approval from competent authority of Tehsil Headquarter Hospital (THQ), Gujar Khan Pakistan. The study was initiated after taking an informed consent from parents, and considering the ethical considerations according to declaration of Helsinki.

The children with spastic hemiplegic CP, age range of 5-12 years, who had GMFCS - level IV, a score of 2 on Modified Ashworth Scale and move the affected parts easily, and who had an active hand grip of affected hand were included in the study. However, the children with any acute infection, fever and cognitive impairments were excluded.

The sample was recruited through non-probability convenience sampling technique. The n=30 participants who fulfilled the eligibility criteria were randomly divided into non-mechanical horseback back riding (NMHBR) and conventional physical therapy groups through lottery method and participants were kept blind to the allocated treatment. (Figure 1)

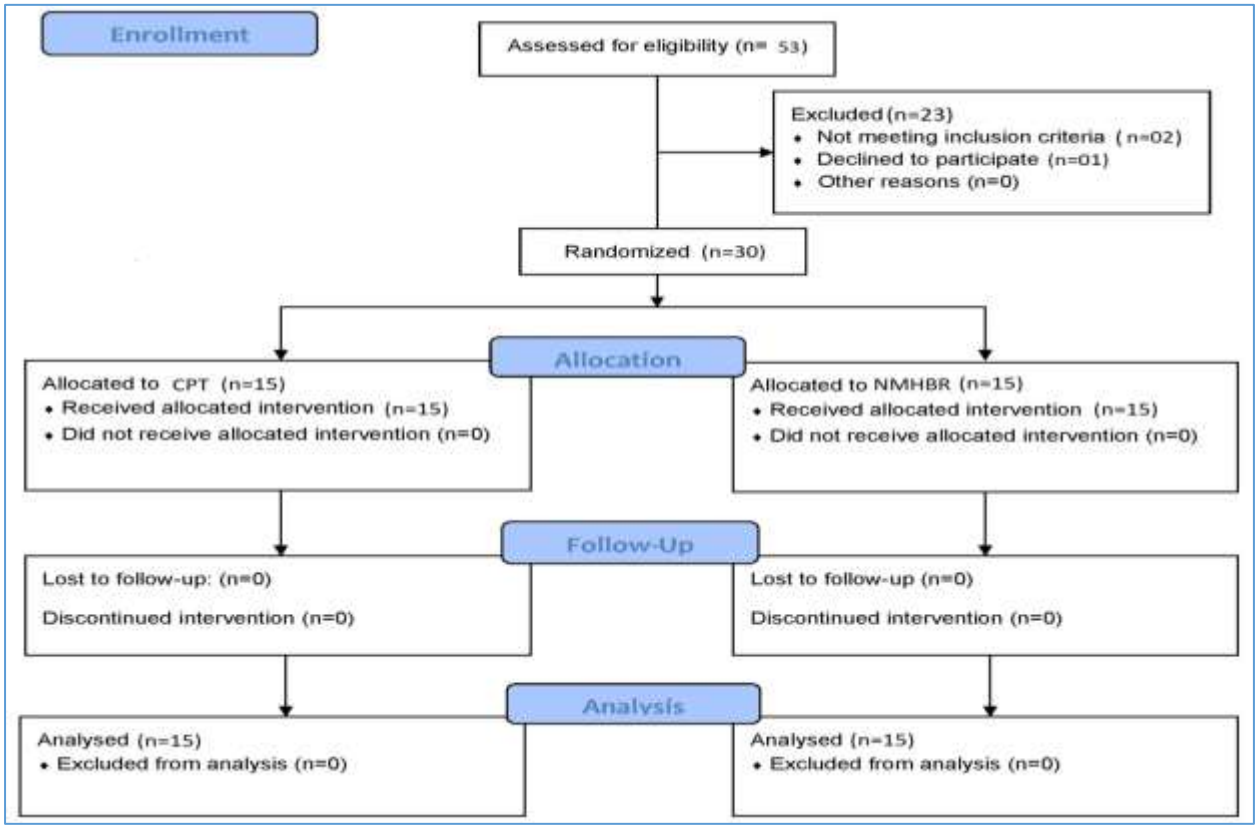

Figure 1: CONSORT Diagram

Figure 2: Custom made wooden horse

In conventional physical therapy group, all participants were treated with the stretching of the tight muscle, positioning, abdominal co activation, rolling and balance training exercises. While in NMHBR group, exercises performed in CPT group, and with the addition of a custom made wooden horse for balance training. The horse was fixed on the floor with spring as shown in Figure 2.

Table 1: Treatment protocol for CPT and NMHBR groups

	CPT (n=15)	NMHR (n=15)
Type of exercises	Stretching of the tight muscle, positioning, abdominal co activation, rolling and balance training etc.	Stretching of the tight muscle, positioning, abdominal co activation; rolling, balance training and non-mechanical horseback riding.
Frequency of sessions	3 times a week up to 6 months	3 times a week up to 6 months and 3 times a week up to 6 months for non-mechanical horseback riding
Duration of session	30 to 40 mint session for CPT	30 to 40 mint session for CPT and 30 mints for NMHR
No. of repetitions	10 to 20 rep within 30 sec	10 to20 rep within 30 sec and one sitting for 30 mint

The data was collected at baseline and post 06 months after intervention. General demographic data was collected including age, gender, height, weight, BMI (Appendix 1). Pediatric Balance Scale (PBS), which has constructed validity and reliability, was used for the assessment of dynamic balance which consists of 14 items scoring from 0 point (lowest level of function) to 4 points (highest level function) with a maximum score of 56 points.[18] The independent sample t-test was used for between-group comparison while for within-group analysis paired sample t-test was used by using SPSS version 21. The level of significance was set at a $p<0.05$.

RESULTS

The mean age of study participants was 8.35±2.27 years and BMI was 14.8±0.84 kg/m^2. A total of n=14 males and n=16 females participated in the study. Of which n=5 males and n=10 females were in CPT group while n=9 males and n=6 females were in NMHBR group.

Within group analysis showed that spasticity was significantly improved in both groups (CPT=1.86±0.22 vs. 1.40±0.20, *p<0.001* & NMHBR=1.80±0.25 vs. 1.26±0.25, *p<0.001*). But functional independence (GMFCS) was significantly improved only in NMHBR group (3.53±0.51 vs. 3.26±0.88, *p=0.041).* The overall balance score was significantly improved in both groups (CPT=11.60±8.54 vs. 17.±10.24, *p<0.001* & NMHBR=16.53±8.5 vs. 26.33±14.29, *p<0.001*) after six months of interventions. In CPT group most of the tasks of PBS were not significant improved (*p>0.05*) including sitting unsupported, standing with eyes closed, standing with feet together, standing with one foot in front, standing on one foot, turning 360 degrees, turning to look behind, retrieving object from floor and placing alternate foot on stool. While in NMHBR group all tasks were improved significantly (*p<0.05*) except turning 360 degrees (*p=0.055*) and placing alternate foot on stool (*p=0.164*). (Table 2)

While comparing the both group, no significant difference was observed in Spasticity *(p=0.130)* and functional independence (*p=0.216*). But NMHBR group showed significant improvement in overall pediatric balance score as compare to CPT group (17±10.24 vs. 26.33±1429, *p=0.049*), after 6 month intervention. The PBS's task including standing unsupported (*p*=0.027), Standing with eyes closed (*p=0.039*), standing with feet together (*p=0.021*), Standing with one foot in front (*p=0.016*), Standing on one foot (*p=0.039*) and Reaching forward with outstretched arm (*p=0.012*) were significantly improved in NMHBR groups as compare to CPT. (Table 3)

Table 2: Pre-post analysis in CPT & NMHBR (Spasticity, GMFCS & PBS)

		CPT (n=15)				NMHBR (n=15)			
		Mean	SD	MD	p-value	Mean	SD	MD	p-value
Spasticity	Pre	1.86	0.22	0.46	0.000***	1.80	.25	0.53	0.00***
	Post	1.40	0.20			1.26	.25		
Functional Independence (GMFCS)	Pre	3.73	0.45	0.13	0.164	3.53	.51	0.26	0.041**
	Post	3.60	0.50			3.26	.88		
sitting to standing	Pre	2.66	0.89	-1.0	0.000***	3.46	.74	-0.40	0.028**
	Post	3.66	0.48			3.86	.51		
of standing to sitting	Pre	2.60	0.91	-1.00	0.000***	3.33	.72	-0.46	0.014**
	Post	3.60	0.63			3.80	.56		
Transfers	Pre	1.80	1.26	-0.93	0.000**	2.73	.96	-0.66	0.001***
	Post	2.73	1.09			3.40	.82		
standing unsupported	Pre	0.80	1.14	-0.40	0.009**	1.40	1.12	-1.06	0.000***
	Post	1.20	1.56			2.46	1.4		
sitting unsupported	Pre	0.93	1.62	-0.06	0.334	1.06	1.62	-0.80	0.047**
	Post	1.00	1.73			1.86	2.06		
standing with eyes closed	Pre	.00	0.00	-	-	0.13	.51	-0.33	0.019**
	Post	0.000	0.00			0.46	.83		
standing with feet together	Pre	0.066	0.25	-	-	0.20	.56	-1.00	0.026**
	Post	0.06	0.25			1.20	1.78		
standing with one foot in front	Pre	0.00	0.00	-	-	0.00	.00	-1.00	0.023**
	Post	0.00	0.00			1.00	1.51		
standing on one foot	Pre	0.00	0.00	-	-	0.00	.00	-0.46	0.048**
	Post	0.00	0.00			0.46	.83		
turning 360 degrees	Pre	0.26	0.45	-0.40	0.164	0.60	.98	-0.66	0.055
	Post	0.66	1.39			1.26	1.53		
turning to look behind	Pre	0.26	0.45	-0.40	0.164	0.60	.91	-0.73	0.036**
	Post	0.66	1.39			1.33	1.54		
retrieving object from floor	Pre	0.60	1.12	-0.20	0.082	0.80	1.26	-1.00	0.013**
	Post	0.80	1.52			1.80	1.89		
placing alternate foot on stool	Pre	0.00	0.00	-	-	0.00	.00	-0.13	0.164
	Post	0.00	0.00			0.13	.35		
reaching forward with outstretched arm	Pre	1.60	1.24	-0.60	0.007**	2.20	1.01	-1.06	0.000***
	Post	2.20	1.26			3.26	.88		
Total PBS	Pre	11.60±8.54		-5.40	0.000***	16.53±8.5		-9.80	0.001***
	Post	17.±10.24				26.33±14.29			

*Level of significance= p<0.05** & p<0.001****

Table 3: Comparison of CPT & NMHBR (Spasticity, GMFCS & PBS)

	CPT		NMHBR		MD	p-value
	Mean	SD	Mean	SD		
Spasticity	1.40	0.20	1.26	0.25	.013	0.130
Functional independence (GMFCS)	3.60	0.50	3.26	0.88	0.33	0.216
Sitting to standing	3.66	0.48	3.86	0.51	-0.20	0.285
Standing to sitting	3.60	0.63	3.80	0.56	-0.20	0.367
Transfers	2.73	1.09	3.40	0.82	-0.66	0.071
Standing unsupported	1.20	1.56	2.46	1.4	-1.26	0.027**
Sitting unsupported	1.00	1.73	1.86	2.06	-0.86	0.223
Standing with eyes closed	0.000	0.00	0.46	0.83	-0.46	0.039**
Standing with feet together	0.06	0.25	1.20	1.78	-1.13	0.021**
Standing with one foot in front	0.00	0.00	1.00	1.51	-1.0	0.016**
Standing on one foot	0.00	0.00	0.46	0.83	-0.46	0.039**
Turning 360 degrees	0.66	1.39	1.26	1.53	-0.60	0.272
Turning to look behind	0.66	1.39	1.33	1.54	-0.66	0.225
Retrieving object from floor	0.80	1.52	1.80	1.89	-1.00	0.122
Placing alternate foot on stool	0.00	0.00	0.13	0.35	-0.13	0.153
Reaching forward with outstretched arm	2.20	1.26	3.26	0.88	-1.06	0.012**
Total PBS	17.00	10.24	26.33	14.29	-9.33	0.049**

*Level of significance= p<0.05** & p<0.001****

DISCUSSION

The primary objective of the study was to compare the effectiveness of non-mechanical horseback riding with conventional physical therapy on spasticity, functional independence, and dynamic balance within spastic CP children.

In this study, it has been seen that the spasticity is significantly improved on MAS in both groups which is in the support of previous finding that hippotherapy can significantly reduce the muscle tone in spastic hemiplegic CP children.[19] And physical therapy such as continuous stretching exercises helps in reducing spasticity by addressing the muscle shortening.[20]

Furthermore, functional independence on GMFCS was also significantly improved which is in the coherence of the previous study that, hippotherapy is an effective approach for the improvement in functional independence in spastic hemiplegic CP children. The shape of the horse, and the 3-D and rhythmic movement also influence the mobility, gross motor function, and functional activities of the CP children.[21]

Between groups comparison showed significant improvement in the total score of PBS after 6 months of intervention in both NMHBR and CPT group, while within group comparison showed significant improvement in the NMHBR group. Benda et al. did a pre posttest study and concluded that hippotherapy improved symmetry of muscle activity rather than passive stretching supporting the results of present study. [22] It has also considered that 3-D and rhythmic movement of horse also improve balance and posture in CP children.[21]

Additionally, between groups comparison showed significant improvement in sitting to standing, standing to sitting, transfers, standing unsupported and reaching forward with outstretched arms in CPT group. While all items including sit to stand, stand to sit, transfers, standing unsupported, sitting unsupported, standing with eyes closed, standing with feet together, standing with one foot in front, one foot standing, turning to look at back, picking any object from floor, and forward reaching with outstretched arm showed significant improvement in NMHBR group. In some previous literature it has been discussed that the maintenance of balance depends on muscle activity and posture control. Horse movement provides a precise, smooth, rhythmic, and repetitive pattern of movement.[16, 22] Hence, such repeated adjustments improves the strength of pelvic, abdominal and lumbar area and maintain balance and upright posture. Different studies have been done to assess effectiveness of horseback riding.

In present study when both groups were compared, significant improvement was observed for standing unsupported, standing with eyes closed, standing with feet together, standing with foot in front, standing on one foot, and placing alternate foot on stool in NMHBR group. In a previous study the effectiveness of hippotherapy on balance was observed in CP children and PBS showed major improvements in balance.[23] Furthermore, in another study, children having mild to moderate balance problem were treated with hippotherapy for 45-minute two times in a week till 6 weeks. The results supported that hippotherapy can improve balance and performance of daily activities for children with mild to moderate balance problems.[24]

Moreover, Shurtleff et al. determined that hippotherapy improves stability of head/trunk and reaching activities of upper extremity (UE) in spastic diplegia cerebral palsy (SDCP) children. A human performance laboratory with six camera video motion capture systems was used and showed significant improvements in stability of head/trunk, improved reaching/targeting and reach/path ratio with hippotherapy.[14] However, the result of current study showed the hippotherapy improved reaching activities of UE in hemiplegic CP children. Furthermore, study done by Bertoti, showed significant improvement in posture and functional skills due to improved muscle tone and balance in CP children who were treated with therapeutic horseback riding program.[16]

CONCLUSION

It was concluded that conventional physical therapy and non-mechanical horseback riding both can improve balance, spasticity and functional independence of spastic hemiplegic CP children but NMHBR is more effective than CPT. It is recommended to conduct multi centered study

with larger sample size as well as with different types of topographical and physiological CP.

REFERENCES

1. Odding E, Roebroeck ME, Stam HJ. The epidemiology of cerebral palsy: incidence, impairments and risk factors. Disabil Rehabil.2006;28(4):183-91.
2. Bangash AS, Hanafi MZ, Idrees R, Zehra N. Risk factors and types of cerebral palsy. J Pak Med Assoc. 2014;64(1):103-7.
3. Reddihough DS, Collins K. The epidemiology and causes of cerebral palsy. Aust J Physiother. 2003;49(1):7-12.
4. Albright AL. Spastic cerebral palsy. CNS Drugs. 1995;4(1):17-27.
5. Shumway-Cook A, Woollacott M. Motor Control: Theory and practical applications. Lippincott Williams & Wilkins; 1995.
6. Forssberg H, Hirschfeld H. Postural adjustments in sitting humans following external perturbations: muscle activity and kinematics. Exp Brain Res. 1994;97(3):515-27.
7. Minciu I. CEREBRAL PALSY MANAGEMENT. Therapeutics, Pharmacology Clinical Toxicology. 2011;15(2).
8. van der Heide JC, Hadders-Algra M. Postural muscle dyscoordination in children with cerebral palsy. Neural Plast. 2005;12.
9. Siebes RC, Wijnroks L, Vermeer A. Qualitative analysis of therapeutic motor intervention programmes for children with cerebral palsy: an update. Dev Med Child Neurol. 2002;44(9):593-603.
10. Elanchezhian C, SwarnaKumari P. Swiss ball training to improve trunk control and balance in spastic hemiplegic cerebral palsy. Sri Lanka J. Child Health. 2019;48(4):300-4.
11. McGibbon NH, Benda W, Duncan BR, Silkwood-Sherer D. Immediate and long-term effects of hippotherapy on symmetry of adductor muscle activity and functional ability in children with spastic cerebral palsy. Arch Phys Med Rehabil. 2009;90(6):966-74.
12. Meregillano G. Hippotherapy. Phys Med Rehabil Clin N Am. 2004;15(4):843-54, vii.
13. Potter J. Therapeutic horseback riding. J Am Vet Med Assoc. 1994;204:131-3.
14. Shurtleff TL, Standeven JW, Engsberg JR. Changes in dynamic trunk/head stability and functional reach after hippotherapy. Arch Phys Med Rehabil. 2009;90(7):1185-95.
15. McGibbon NH, Andrade CK, Widener G, Cintas HL. Effect of an equine-movement therapy program on gait, energy expenditure, and motor function in children with spastic cerebral palsy: A pilot study. Dev Med Child Neurol. 998;40(11):754-62.
16. Bertoti DB. Effect of therapeutic horseback riding on posture in children with cerebral palsy. Phys Ther. 1988;68(10):1505-12.
17. Murphy D, Kahn-D'Angelo L, Gleason J. The effect of hippotherapy on functional outcomes for children with disabilities: a pilot study. Pediatr Phys Ther. 2008;20(3):264-70.
18. Franjoine MR, Gunther JS, Taylor MJ. Pediatric balance scale: a modified version of the berg balance scale for the school-age child with mild to moderate motor impairment. Pediatr Phys Ther. 2003;15(2):114-28.
19. Yokoyama M, Kaname T, Tabata M, Hotta K, Shimizu R, Kamiya K, Masuda T. Hippotherapy to improve hypertonia caused by an autonomic imbalance in children with spastic cerebral palsy. Kitasato Med J. 2013 Nov;43(1):67-73.
20. Tilton AH. Management of spasticity in children with cerebral palsy. InSeminars in Pediatric neurology 2004 Mar 1 (Vol. 11, No. 1, pp. 58-65). WB Saunders.
21. Park ES, Rha DW, Shin JS, Kim S, Jung S. Effects of hippotherapy on gross motor function and functional performance of children with cerebral palsy. Yonsei Med J. 2014 Nov 1;55(6):1736-42.
22. McGee MC, Reese NB. Immediate effects of a hippotherapy session on gait parameters in children with spastic cerebral palsy. Pediatr Phys Ther. 2009;21(2):212-8.
23. Hamill D, Washington K, White OR. The effect of hippotherapy on postural control in sitting for children with cerebral palsy. Phys Occup Ther Pediatr. 2007;27(4):23-42.
24. Silkwood-Sherer DJ, Killian CB, Long TM, Martin KS. Hippotherapy—an intervention to habilitate balance deficits in children with movement disorders: a clinical trial. Phys Ther. 2012;92(5):707-17..

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RESEARCH ARTICLE

LEVEL OF PHYSICAL ACTIVITY AND ITS ASSOCIATION WITH HB LEVEL AMONG DPT STUDENTS

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ABSTRACT

Objective: The objective of this study was to evaluate the level of physical activity and its association with hemoglobin level among undergraduate students. **Method and materials**: A cross-sectional study was conducted on undergraduate students of Isra Institute Rehabilitation Sciences, Isra University Islamabad. The undergraduate students between 18-25 years were included in the study. The hemoglobin level was evaluated through the hemoglobin-meter and physical activity through the International Physical Activity Questionnaires IPAQ-SF-7. The Pearson product-moment correlation was used to find association between physical activity and hemoglobin level. **Results:** The mean age of study participants was 21.10±1.76. Of the 400 participants, 22% participants had low level of physical activity, 46.25% participants had moderate level of physical activity and 31.75% participants had vigorous physical activity. The time spent in vigorous and moderate physical activity was significantly associated with the hemoglobin level ($p<0.05$) and sitting was negatively correlated with Hb ($p<0.05$). **Conclusion:** It was concluded that that levels of physical activity was significantly associated with the hemoglobin level.

Keywords: *Physical activity, hemoglobin, anemia.*

INTRODUCTION

Physical activity is the skeletal muscles movements in the form of contraction and relaxation due to which energy is utilized.[1] It is categorized as low, moderate and high physical activity. The mild physical activity occurs when metabolic equivalent (METS) is 1.5 to 2.9 like slow pace walking ,the moderate physical activity occurs about 3 to 5.9 METs as the brisk walking and the Vigorous physical activity is defined as METs more than 6.[2]

Globally, the 4th common leading cause of death is due to physical inactivity.[3] According to WHO, 3.2 million deaths per year occurs due to physical inactivity throughout the world.[4] Overweight and obesity mainly occurs due to the physical inactivity.[5] National health survey of Pakistan reported that 25% of population is overweight while 10% is obese. A total of 60% world's population is physically inactive or doing very little physical activity which is similar to the statistics of Pakistan and reported that majority of adults are physically inactive.[6]

Physical activity lowers the risk of establishing major cardiovascular diseases (CVD) and metabolic syndrome, obesity, osteoporosis, and muscular weakness.[7] Regular physical activity remains important in prevention of disorders of muscles and skeleton which includes mechanical low back pain, cervical and shoulder pain.[8]

The barriers to physical inactivity are lack of time due to hectic routine related to studies, parents prefer academic success compared to the exercise.[3] Physical inactivity is a crucial risk factor for cardio-vascular disease, type 2 diabetes, and numerous forms of cancers.[9] It also leads to pre-mature deaths.[10]

The average hemoglobin value required for males is 14 to 18 g/dl whereas that for females is 12 to 16 g/dl. The appropriate hemoglobin level (Hb) is essential for the proper tissues oxygenation.[11] According to Haas et al, the reduced work outcome is due to low Hb and reduction in oxygen transport. Iron deficiency anemia effect the capacity of activity performance and by improving iron status, human capital or work outcome can also be enhanced.[12] The causes of low Hb includes, malnourishment as a result of poor diet habits, worm infections, menarche, socio-demographic factors like age, gender, community status.[13,14]

Limited studies were available in Pakistan related to the association of HB with different levels of physical activities. The significance of healthy diet and sufficient degree of physical performance is well understood by medical students yet they do not pay attention to this fact. So it is difficult for them to make people aware about the benefits of physical activity. This study was conducted to explore the levels of physical activity and its association with HB levels among undergraduate students.

METHODOLOGY

A cross-sectional study was conducted on n=400 undergraduate students of Isra Institute Rehabilitation Sciences, Isra University Islamabad, after the approval from the Advanced Study & Research Committee (ASRC) from December 2018 to February 2019. Written informed consent was

obtained from the participants prior to data collection, after explaining the detail of study.

Participants fulfilling the eligibility criteria were recruited through purposive sampling technique, which were the undergraduate students (both male and female) of Isra University, Islamabad, among the age of 18 to 25 years while the students with fever, hemophilia, history of fracture<1-year, physical impairments and hepatitis (B,C,D) were excluded from the study.

Furthermore, the demographic details were obtained from the study participants including age, gender, height and BMI. Hb was evaluated through hemoglobin-meter while IPAQ-SF-7 was used for the levels of physical activity (PA). The IPAQ-SF-7 is valid and a reliable tool.[15] Hemoglobin was measured through hemoglobin meter (Inst-answer, LBM-01).

The numerical data was expressed as mean and standard deviation (SD), while percentages and frequencies were calculated for the categorical variables. As the data was normally distributed, so, Pearson Product-Moment Correlation was used to find the association between PA and Hb level. A p-value<0.05 was considered statistically significant. The data was analysed through SPSS 21.

RESULTS

The mean age of study participants was 21.10±1.76. The general demographics of participants of the study included age, height, weight and Hb levels was measured as shown in table 1. Furthermore, in this study 88 (22%) participants had low level of physical activity while 185 (46.25%) participants had moderate level of physical activity and 127 (31.75%) participants had vigorous physical activity

Table 1: Descriptive Demographics

	Minimum	Maximum	Mean±Sd.Div
Age in years	18	24	21.10±1.76
Height in feet	5.0	6.3	5.47±0.28
Weight in kg	35	95	59.15±10.76
HB in g/dL	6.53	17.33	10.92±2.03

The vigorous physical activities and time spent in vigorous activities was positively correlated with HB (r= 0.216, *p=0.000* and r= 0.192, *p=0.000* respectively). Furthermore, the moderate physical activities was also positively correlated with HB (r=0.099, *p=0.049*) while time spent in moderate activities was not significantly associated with HB (r=0.093, *p=0.063*). Moreover, walking and time spent in walking was also not significantly associated with HB. (r=0.046, p=0.358 and r=0.042, *p=0.401* respectively). While sitting was negatively correlated with HB (r=-.107, *p=.032*). Additionally, IPAQ 7 total score was positively correlated with HB (r=0.155, *p=0.002*). (Table 2)

Table 2: Correlation between PA & Hb level

	Mean	SD	HB Level in g\dl (10.92±2.03)	
			r	*p-value*
During the last 7 days, on how many days did you do vigorous physical activities? (days)	.75	1.60	0.216**	*0.000****
How much time did you usually spend doing vigorous physical activities on one of those days? (min.)	16.73	43.55	0.192**	*0.000****
During the last 7 days, on how many days did you do moderate physical activities? (days)	2.02	2.37	0.099*	*0.049***
How much time did you usually spend doing moderate physical activities on one of those days? (min.)	30.30	61.74	0.093	*0.063*
During the last 7 days, on how many days did you walk for at least 10 minutes at a time? (days)	5.43	2.09	0.046	*0.358*
How much time did you usually spend walking on one of those days? (min.)	80.86	82.60	0.042	*0.401*
During the last 7 days, how much time did you spend sitting on a week day? (days)	7.61	3.75	-0.107*	*0.032***
IPAQ7 Total Score	113.73	88.95	0.155**	*0.002***

*Level of significance= p<0.05** & p<0.001****

DISCUSSION

The objective of the study was to explore levels of physical activity and its relationship with hemoglobin (Hb) level among students. In a current study low physical activity was observed in 88 (22%) students while 185 (46.25%) participants had moderate level of physical activity and 127 (31.75%) participants had vigorous physical

activity. According to a study conducted in Bangalore, India, on physical activity among medical undergraduates of 18 to 22 years of age, using International Physical Activity Questionnaire (IPAQ). High physical activity was present in 41.3% of the students while 43.2% have moderate physical activity and 15.4% of the students were having low levels of activities.[16] Another study was conducted in Poland, to evaluate the physical activity in students of the medical university of Silesia, which demonstrated that 46% of the physical therapist had the vigorous level of physical activity, 54% had a moderate level of physical activity.[17]

Moreover, in this study it has been determined that the vigorous and high level of physical activity is significantly associated with hemoglobin level. This correlates with the previous study, in which it has been reported that if a person performs physical activity, it causes the muscles to manage with severe oxygen deficiency which leads the muscles to balance the need of O2 by having accessibility of oxygen. The muscles have the capability to cope with this oxygen deficiency so it combines very rapidly to develop oxy-hemoglobin. It leads to the increase in HB concentration and have better health outcomes as well.[18, 19] Also, many physiological responses can lead to the condition of hypoxia for example exercise.[18] And hypoxia is deliberated to a greater extent by stimulation of the transcription factor which is sensitive to hypoxia. Endurance exercises trigger the hypoxia sensitive transcription factor. This element leads to the excess transportation of oxygen through blood via procedure like erythropoietin-mediated erythropoiesis.[20]

Moreover, increase in endurance exercises are connected with hemoglobin levels. It is also linked to the increase of the oxygen carrying capability of blood.[21] Furthermore, regular participation in moderate physical activity was also significantly associated with HB an level which also correlates with the previous study which stated that continuous and regular exercises of moderate intensity, aerobics and endurance exercises can improve the Hb levels. The endurance exercises helps to improves the growth hormone production through the hematopoiesis as well as enhance cytokines concentration which mature, proliferate and renew the blood stem cells.[22] Moreover, according to some previous literature, it has been concluded that aerobic training can significantly improve the Hb level.[23, 24]

Additionally, in a recent study it was observed that sitting is also negatively significant correlated with Hb level which supports the previous literature that prolonged sitting may reduce the plasma fibrinogen, hemoglobin and red blood cells.[25] Sedentary life style and excessive sitting is associated with the decline in the flow of blood to muscles, reduction of erythrocytes and their volume. It also leads to the muscles weakness which increases the chance of trauma to the joints and bones.[26] Furthermore, in the current study no association has been found between walking and hemoglobin level. But, in a study conducted by Terink R et al. walking for a long time period may improve the Hb level.[27]

CONCLUSION

It was concluded that students who had perform vigorous and moderate physical activity have high hemoglobin concentration in blood. Students with longer duration of sitting had low hemoglobin concentration.

It is recommended to conduct further study to find cause and effect relationship of different level of physical activity on hemoglobin concentration (RCT).

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REFERENCES

1. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Rep. 1985;100(2):126-31.
2. Makizako H, Liu-Ambrose T, Shimada H, Doi T, Park H, Tsutsumimoto K, et al. Moderate-intensity physical activity, hippocampal volume, and memory in older adults with mild cognitive impairment. J. Gerontol. A Biol. Sci. Med. Sci. 2015;70(4):480-6.
3. Kohl 3rd HW, Craig CL, Lambert EV, Inoue S, Alkandari JR, Leetongin G, et al. The pandemic of physical inactivity: global action for public health. Lancet Glob. Health. 2012;380(9838):294-305.
4. Kruk J. Health and economic costs of physical inactivity. Asian Pac. J. Cancer Prev. 2014;15(18):7499-503.
5. Croezen S, Visscher T, Ter Bogt N, Veling M, Haveman-Nies A. Skipping breakfast, alcohol consumption and physical inactivity as risk factors for overweight and obesity in adolescents: results of the E-MOVO project. Eur. J. Clin. Nutr. 2009;63(3):405-12.
6. Samir N, Mahmud S, Khuwaja AK. Prevalence of physical inactivity and barriers to physical activity among obese attendants at a community health-care center in Karachi, Pakistan. BMC Res. Notes. 2011;4(1):174.

7. Arzu D, Tuzun EH, Eker L. Perceived barriers to physical activity in university students. J. Sci. Med. Sport. 2006;5(4):615.
8. McPhee JS, French DP, Jackson D, Nazroo J, Pendleton N, Degens H. Physical activity in older age: perspectives for healthy ageing and frailty. Biogerontology. 2016;17(3):567-80.
9. Waxman A. WHO global strategy on diet, physical activity and health. FOOD NUTR. BULL. 2004;25(3):292-302.
10. Yu S, Yarnell J, Sweetnam P, Murray L. What level of physical activity protects against premature cardiovascular death? The Caerphilly study. Br. Heart J.. 2003;89(5):502-6.
11. Billett HH. Hemoglobin and hematocrit. Clinical Methods: The History, Physical, and Laboratory Examinations 3rd edition: Butterworths; 1990.
12. Haas JD, Brownlie IV T. Iron deficiency and reduced work capacity: a critical review of the research to determine a causal relationship. J. Nutr. 2001;131(2):676S-90S.
13. Mehta K. Prevalence of nutritional anaemia among college students and its correlation with their body mass index. Int J. Sci. Res. 2015;4(3):1882-6.
14. Dayi A, Acikgoz A, Guvendi G, Bayrak L, Ersoy B, Gur C, et al. Determination of factors affecting physical activity status of university students on a health sciences campus. Med. Sci. Monit. 2017;23:325.
15. Dinger MK, Behrens TK, Han JL. Validity and reliability of the International Physical Activity Questionnaire in college students. Am. J. Health. Promot. 2006;37(6):337-43.
16. Padmapriya K, Krishna P, Rasu T. Prevalence and patterns of physical activity among medical students in Bangalore, India. Electron. Physician. 2013;5(1):606.
17. Dabrowska-Galas M, Plinta R, Dabrowska J, Skrzypulec-Plinta V. Physical activity in students of the Medical University of Silesia in Poland. Phys. Ther. 2013;93(3):384-92.
18. Kumar H, Choi D-K. Hypoxia inducible factor pathway and physiological adaptation: a cell survival pathway? Mediators. Inflamm.. 2015;2015.
19. Mason SD. Hypoxia inducible factor-1alpha in the skeletal muscle during exercise and endurance training: UC San Diego; 2006.
20. Lindholm ME, Rundqvist H. Skeletal muscle hypoxia-inducible factor-1 and exercise. Exp. Physiol. 2016;101(1):28-32.
21. Calbet JA, Lundby C, Koskolou M, Boushel R. Importance of hemoglobin concentration to exercise: acute manipulations. Respir. Physiol. Neurobiol. 2006;151(2-3):132-40.
22. Mohamady HM, Elsisi HF, Aneis YM. Impact of moderate intensity aerobic exercise on chemotherapy-induced anemia in elderly women with breast cancer: a randomized controlled clinical trial. J. Adv. Res. 2017;8(1):7-12.
23. Pourghardash F, Nikseresht A. Investigating the effect of regular aerobic activity on young females hematology. IIOABJ J. 2017;8(1):39-45.
24. Sazvar A, Mohammadi M, Nazem F, Farahpour N. The effect of morning aerobic exercise on some hematological parameters in young, active males. Iran. J. Public Health 2013;4(1).
25. Howard BJ, Fraser SF, Sethi P, Cerin E, Hamilton MT, Owen N, et al. Impact on hemostatic parameters of interrupting sitting with intermittent activity. Med. Sci. Sports Exerc. 2013;45(7):1285-91.
26. Convertino VA, Bloomfield SA, Greenleaf JE. An overview of the issues: physiological effects of bed rest and restricted physical activity. Med. Sci. Sports Exerc. 1997;29(2):187-90.
27. Terink R, Ten Haaf D, Bongers C, Balvers M, Witkamp R, Mensink M, et al. Changes in iron metabolism during prolonged repeated walking exercise in middle-aged men and women. Eur. J. Appl. Physiol. 2018;118(11):2349-57.

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RESEARCH ARTICLE

COMPARISON OF VISUAL ACTION THERAPY AND AUDITORY COMPREHENSION THERAPY FOR LANGUAGE FUNCTIONS IN PATIENTS WITH WERNECK'S APHASIA

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ABSTRACT

Objective: to compare the effectiveness of visual action therapy (VAT) and auditory compression training (ACT) for language functions in patients with Wernicke Aphasia. **Methodology:** A Pilot Randomized Clinical trial was conducted. Patients with age range of 30-60 years with neurological impairments and aphasia were included in the study. The participants n=12 were recruited through purposive sampling technique and randomly divided in to two groups through lottery method. One group received visual action therapy while other group received auditory comprehensive training. Each participant in both groups received three sessions per week in their homes for a time period of 10 weeks. The data were collected through Western Aphasic Battery (WAB). **Results:** The Mean of age of study participant in VAT and ACT as 51.83±7.83 and 60.3±2.05 respectively. In this study significant improvement has been observed after 10 weeks of intervention in visual action therapy group ($p<0.05$). **Conclusion:** It is concluded from the results that VAT significantly improved the western aphasic battery scoring and comprehension skills in patient with Wernicke's aphasia.

Key words: Auditory comprehension therapy, visual action therapy, Wernicke aphasia

INTRODUCTION

Aphasia is a language impairment that affects the production or understanding of a speech and the ability to read or write. It occurs due to the brain damage, usually in stroke, especially in older adults. Additionally, the brain damage that leads to aphasia can also be caused by head trauma, brain tumors or infections.[1] According to the American Speech-Language-Hearing Association (ASHA), 1 million people in the United States and 250,000 people in the UK have been reported with aphasia. And 80,000 new cases reported annually.[2] According to a study, 15% of people under the age of 65 presented with a complaint of aphasia.[3] Aphasia is more common problem as compared to cerebral palsy, Parkinson's disease or muscular dystrophy.[4, 5]

According to the literature, the patients' who have an intact cognitive abilities have different pathology from those who are non-linguistic.[6, 7] The people with aphasia have speech and language problems in four communication modalities, i.e. auditory understanding, oral expression, reading, writing and functional communication.[8] The patients' with Wernicke aphasia have difficulty in building a syntactic structure because of the lack of understanding or using these structures in proper sentence form.[9-11] The previous evidence showed that, the global aphasic person have a serious language concerns that restricts the non-verbal means of expression such as gesture and attraction. And these patients, therefore, have poor communication skills.[12]

The patient with Wernicke's aphasia maintains a rich conceptual system, and some of the cognitive functions that are required for natural language. Aphasic patients who had a little or no communication ability, were taught natural language through visual communication system (VCS).[13] Another study showed that, the Alternative and Augmentative Communication (AAC) is a way of communication technique, when communicating skills are not working.[14]

According to literature, eight aphasic patients who didn't respond to traditional treatment were treated with the visual action therapy (VAT). The patients were hospitalized to produce symptoms of non-restless problem. The Porch Index of Capacity Ability (PICA) showed significant improvement in the VAT points.[15] Visual Action Therapy (VAT) is mainly a non-verbal technique that trains an individual suffered from any neurological disease so can convey message from representative gestures, which is without speech.[3]

The aim of present study helps to increase the patient's comprehension skills, a good daily living activities. This study helps them in spending good quality of life and makes them able to communicate effectively. Previously, some studies has been conducted on Visual Action Therapy (VAT and Auditory Comprehension Therapy (ACT along

with any other therapy and with different types of aphasia on Wernicke's aphasic patients. But, the RCT of both VAT and ACT were not conducted so far in Pakistan, for the management of patients with Wernicke's aphasia. The objective of study is to determine the effectiveness of visual action therapy versus auditory comprehension therapy in patients with Wernicke's aphasia.

METHODOLOGY

A Pilot Randomized Clinical, Trail was conducted in with the approval from a competent authority for duration of 3 months. The age range for both male and female was 30-60 years, patients with neurological impairment and Wernicke's Aphasia after stroke were included in the study, while, patients with any other co-morbidities were excluded from the study. The participants n=12 were recruited through purposive sampling technique and randomly divided into two groups through lottery method as shown in Figure 1. One group receives visual action therapy (VAT), while other group receives auditory comprehension training (ACT) as shown in Table 1 and 2 respectively. Each participant of the both groups received three sessions per week in their homes for a time period of 10 weeks. The duration of each session was 30 minutes.

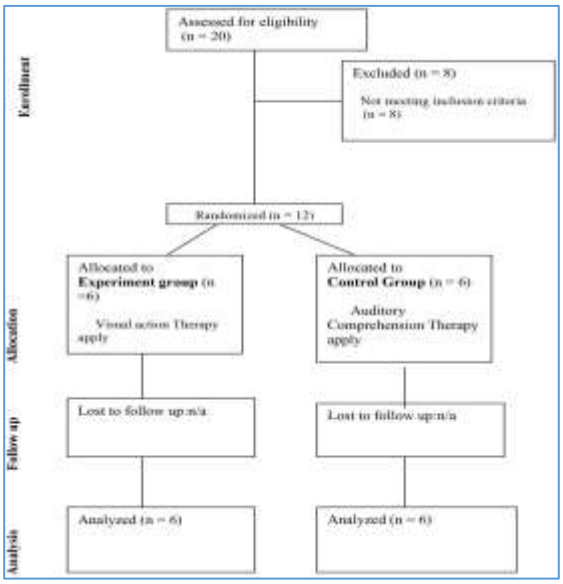

Figure 1: CONSORT Diagram

Table 1: Visual Action Therapy (VAT) Protocol

Session No.	Duration	Tasks VAT
Screening session	• 35 -45mint	• Introduction • Consent taking • Administration of quick assessment
1st session -	• 30mint	LARGE PICTURE MATCHING • Object to picture matching(8 items) • Picture to object matching
2nd session	• 30mint	• Object to picture pointing • Picture to object pointing (8 items of large pictures)
3rd session	• 30mint	• Object to picture matching • Picture to object matching (8 items of small pictures)
4th session	• 30mint	• Object to picture pointing • Picture to object pointing (8 items of small pictures
5th session	• 30mint	• Step 3. Object Use Training. • Step4. Action picture taking.
6th session	• 30mint	• Step5. Following action picture command. • Step6. Pantomimed gesture demonstration
8th session	• 30mint	• Step7. Pantomimed gesture recognition. • Step8. Pantomimed gesture training.
9th session	• 30mint	• Step9.Pantomime gesture production. • Step10. Representational gesture for absent object training
10th session	• 30mint	• Step11. Representational gesture for absent object
11th session	• 30mint	• Step6. Pantomimed gesture demonstration With Action card
12th session	• 30mint	• Step7. Pantomimed gesture recognition. • Step8. Pantomimed gesture training. With Action card
13th session	• 30mint	• Step9.Pantomime gesture production. With Action card • Step10. Representational gesture for absent object
14th session	• 30mint	• Step11. Representational gesture for absent object
15th session	• 30mint	• Step6. Pantomimed gesture demonstration
16	16th session • 30mint	Small cards • Step7. Pantomimed gesture recognition. • Step8. Pantomimed gesture training. Small cards
17	17th session • 30mint	• Step9.Pantomime gesture production. • Step10. Representational gesture for absent object Small cards
18	18th session • 30mint	• Step11. Representational gesture for absent object Small cards
19	19th session • 30mint	• Step6. Pantomimed gesture demonstration Small cards
20	20th session • 30mint	• Step7. Pantomimed gesture recognition. • Step8. Pantomimed gesture training. Small cards
21	21th session • 30mint	• Step9.Pantomime gesture production. • Step10. Representational gesture for absent object Small cards
22	22th session • 30mint	• Step11. Representational gesture for absent object Small cards
23	23th session • 30mint	• Step6. Pantomimed gesture demonstration With action cards
24	24th session • 30mint	• Step7. Pantomimed gesture recognition. • Step8. Pantomimed gesture training. With action cards
25	25th session • 30mint	• Step9.Pantomime gesture production. • Step10. Representational gesture for absent object With action cards
26	26th session • 30mint	• Step11. Representational gesture for absent object With action cards
27	27th session • 30mint	• Step6. Pantomimed gesture demonstration through small card
28	28th session • 30mint	• Step7. Pantomimed gesture recognition. • Step8. Pantomimed gesture training. through small card
29	29th session • 30mint	• Step9.Pantomime gesture production. • Step10. Representational gesture for absent object through small card
30	30th session • 30mint	• Step11. Representational gesture for absent object through small card

Table 2: Auditory Comprehension Training (ACT)

Session no	Duration	TASKS OF ACT
1st Session	35-45 mint	Screening session • Informed consent • Administration of quick aphasia assessment
2nd Session	30 mint	Continuation of screening session • Administration of western aphasia battery
3rd Session	30 mint	Auditory awareness (patient will detect sound)
4thSession	30 mint	Sound localization (patient will locate the sound source) Auditory Attention(here patient will attend to important auditory information including attending in the midst of competing background noise)
5th Session	30 mint	Sound localization (patient will locate the sound source) Auditory Attention(here patient will attend to important auditory information including attending in the midst of competing background noise)
6th Session	30 mint	Auditory Discrimination of environmental sounds(patient will detect differences between sounds in the environment)
7th Session	30 mint	Auditory Discrimination of environmental sounds(patient will detect differences between sounds in the environment)
8th Session	30 mint	Auditory discrimination of suprasegmentals (here the patient will detect differences in non-phoneme aspects of speech including rate,intensity,prosody,duration and pitch)
9th Session	30 mint	Auditory discrimination of suprasegmentals (here the patient will detect differences in non-phoneme aspects of speech including rate,intensity,prosody,duration and pitch
10th Session	30 mint	Auditory discrimination of suprasegmentals (here the patient will detect differences in non-phoneme aspects of speech including rate,intensity,prosody,duration and pitch
11th Session	30 mint	Auditory discrimination of segmentals(patient will detect differences between specific speech sounds)
12th Session	30 mint	Auditory discrimination of segmentals(patient will detect differences between specific speech sounds)
13th Session	30 mint	Auditory discrimination of segmentals(patient will detect differences between specific speech sounds)
14th Session	30 mint	Auditory indentification auditory association (here the patient will attach meaning to sounds and speech)
15th Session	30 mint	Auditory indentification auditory association (here the patient will attach meaning to sounds and speech)
16th Session	30 mint	Auditory feedback(here the patient will change the speech production based on the information you get from hearing yourself speak)
17th Session	30 mint	Auditory feedback(here the patient will change the speech production based on the information you get from hearing yourself speak)
18th Session	30 mint	Phonological awareness (patient will be able to identify,blend,segment and manipulate oral language structure)
19th Session	30 mint	Phonological awareness (patient will be able to identify,blend,segment and manipulate oral language structure)
20th Session	30 mint	Auditory comprehension (here the patient will understand longer messages , including engaging in conversation, following directions and understanding stories.
21th Session	30 mint	Auditory comprehension (here the patient will understand longer messages , including engaging in conversation, following directions and understanding stories.
22th Session	30 mint	Auditory closure (here the patient will make sense of auditory messages when a piece of auditory information is missing;fill in the blanks)
23th Session	30 mint	Auditory closure (here the patient will make sense of auditory messages when a piece of auditory information is missing;fill in the blanks)
24th Session	30 mint	Auditory memory (patient will retain auditory information both immediately and after a delay)
25th Session	30 mint	Linguistic auditory processing (here the patient will interpret ,retain, organize and manipulate spoken language for higher level learning and communication)
26th Session	30 mint	Auditory memory (patient will retain auditory information both immediately and after a delay)
27th Session	30 mint	Auditory memory (patient will retain auditory information both immediately and after a delay)
28th Session	30 mint	Linguistic auditory processing (here the patient will interpret ,retain,organize and manipulate spoken language for higher level learning and communication)
29th Session	30 mint	Linguistic auditory processing (here the patient will interpret ,retain,organize and manipulate spoken language for higher level learning and communication)
30th Session	30 mint	Linguistic auditory processing (here the patient will interpret ,retain,organize and manipulate spoken language for higher level learning and communication)

The data was collected through Western Aphasic Battery (WAB). It is actually an instrument which is used for the assessment of language function for an adult who suffers from some neurological condition or disease, i.e. stroke, head injury, any trauma or dementia. It has proven validity and reliability.[16]

The demographic data were collected such as age, gender, and occupation and presented as percentage, frequency distribution, mean±SD. The normality testing was done and parametric test was used for analysis. For between group comparisons independent sample t-test was used while for within group comparison paired sample t-test was applied. Data was analyzed by using SPSS version 21 and, therefore, the level of significance was set at a $p<0.05$.

RESULTS

The mean age of the study participant of VAT and ACT group was 51.83±7.83 and 60.3±2.05 respectively. In VAT group, the male participants were 5(55.6%), while female was 1(33.3%). However, in ACT group, the males were 4(44.4%) and females were 2(66.7%).

Within-group analysis showed that VAT group significantly improved WAB scoring ($p<0.05$) after 10 weeks of intervention, except information content and responsive speech as shown in Table 3.

Furthermore, between the group analysis showed significant improvement in VAT group in terms of spontaneous speech, word fluency, and naming words ($p<0.05$) as compare to ACT group as shown in Table 4.

Table 3: Western Aphasia Battery with-in group analysis

Domains		VAT Group Mean±SD	*p-value*	ACT Group Mean±SD	*p-value*
Spontaneous Speech	Pre Post	1.50±1.64 5.00±.894	*0.000****	1.50±1.97 3.00±1.67	*0.007***
Picture Description	Pre Post	.166±.408 1.00±.000	*0.004***	.166±.408 .666±.516	*0.076*
Information Content	Pre Post	3.00±3.22 3.83±1.47	*0 .402*	.666±.516 1.33±1.75	*0.025**
Scoring Fluency	Pre Post	2.00±2.19 4.66±1.50	*0.000****	1.33±2.16 2.83±1.94	*0.007***
Auditory Verbal	Pre Post	10.83±8.56 27.16±9.13	*0.000****	8.50±9.37 18.33±7.68	*0.001***
Auditory Word	Pre Post	19.50 ±.170 39.16± .918	*0.000****	15.16±17.50 29.33±11.94	*0.032**
Sequential	Pre Post	16.83±19.29 38.83±18.87	*0.000****	14.16±20.92 27.66±18.07	*0.001***
Repetition	Pre Post	17.33 ±.259 47.00 ±18.63	*0.000****	14.16±21.54 33.50±17.42	*0.001***
Word Fluency	Pre Post	16.50±19.65 40.66±12.17	*0.002***	11.33±17.65 .833±.752	*0.191*
Responsive Speech	Pre Post	.500±.547 .833±.408	*0.363*	.333±.516 .500±.547	*0 .363*
Sentence	Pre Post	.833±.983 1.66±.516	*0.042**	.500±.836 1.16±.752	*0.025**

Level of significance= p<0.05, p<0.01**, p<0.001****

Table 4: Western Aphasia Battery between group analyses

Domains		Mean±SD	*p-value*
Spontaneous speech	Exp. Con.	5.00±.894 3.00±1.67	*0.027**
Picture description	Exp. Con.	.894±.000 1.67±.516	*0.145*
Scoring fluency	Exp. Con.	4.66±1.50 2.83±1.94	*0.097*
Information content	Exp. Con.	3.83±1.47 2.00±2.00	*0.101*
Sequential	Exp. Con.	38.83±18.87 27.66±18.07	*0.320*
Auditory verbal	Exp. Con.	27.16±9.13 18.33±7.68	*0.100*
Auditory word	Exp. Con.	39.16±14.91 29.33±11.94	*0.236*
Repetition	Exp. Con.	47.00±18.63 33.50±17.42	*0.224*
Naming word	Exp. Con.	40.66±12.17 24.50±13.91	*0.041**
Word fluency	Exp. Con.	1.66±.516 .833±.752	*0.049**
Responsive	Exp. Con.	.833±.408 .500±.547	*0.260*
Sentence	Exp. Con.	1.66±.516 1.66±.752	*0.209*

Level of significance= p<0.05, p<0.01**, p<0.001****

DISCUSSION

The aim of the study was to find out the effectiveness of visual action therapy and auditory comprehension therapy on Western Aphasic Battery (WAB) among the patients of Wernicke's Aphasia after stroke.

The with-in analysis showed significant improvement in visual action therapy (VAT) group, which enhanced the domains of fluency, auditory verbal, and repetitions. Therefore, visual action therapy (VAT), a non-verbal approach, was used to train patients for communication through gestures. The pre and post analysis showed improvement on subtests which measure pantomimic and sound-related perception abilities.[17]

Furthermore, the picture description on western aphasic battery (WAB) was also significantly improved after visual action therapy (VAT). A previous study conducted on Wernicke aphasic patient. And results showed significant improvement after visual action therapy. Additionally, VAT is effective for the improvement of communication skills through pictures in the patients of Wernicke's aphasia.[18]

While, within group comparison also showed significant improvement in auditory comprehension treatment (ACT) in terms of spontaneous speech, fluency, auditory verbal and word, sequential, sentence formation and repetitions. A study conducted by Knollman-Porter K et al. showed effectiveness of ACT in the patients with aphasia.[19]

However, in the present study between groups comparison showed improvement in the sequential commands, word formation, and auditory word in visual action therapy (VAT) group. A previous study supported the currents findings, that the visual action therapy was used for the Wernicke aphasic patients. And significant improvement had been observed in the formation of words, sentences and composition levels of the patients.[20, 21]

Moreover, in the current study between groups comparison showed significant improvement in naming word, fluency and spontaneous speech which was also in coherence with the previous study. The current findings of the study corresponded with the previous studies. In which conventional treatment was used for aphasic patients but no significant response was observed.[17] The visual action therapy was used for the Wernicke aphasic patients. And significant improvement had been observed in the formation of words, sentences and composition levels of the patients.[20, 21]

CONCLUSION

It was concluded that the visual action therapy (VAT) is more effective for Wernicke aphasic patients than auditory comprehension treatment (ACT). These findings provided us a direction that VAT and this type of treatment approaches must be used for management of Wernicke's aphasia. Further study should be conducted on large sample size so that generalization can be done with long-term follow-up must conducted to see level of improvement

REFERENCES

Chengyi L. Designing An Assistive Naming App for Mandarin-Speaking Anomic Aphasia Patients. 2016.

2. Bax M, Goldstein M, Rosenbaum P, Leviton A. Proposed definition. Dev Med Child Neurol.2005(08):571-6.
3. Helm-Estabrooks N, Fitzpatrick PM, Barresi B. Visual action therapy for global aphasia. J Speech Lang Hear Res.1982;47(4):385-9.
4. Bassett DI, Currie PD. The zebrafish as a model for muscular dystrophy and congenital myopathy. Hum Mol Genet.2003;12(suppl_2):R265-R70.
5. Engelter ST, Bonati LH, Lyrer PA. Intravenous thrombolysis in stroke patients of≥ 80 versus< 80 years of age—a systematic review across cohort studies. Age Ageing.2006;35(6):572-80.
6. Nespoulous J-L, Joanette Y, Ska B, Caplan D, Lecours A. Production deficits in Broca's and conduction aphasia: Repetition vs. reading. Motor sensory processes in language.1987:53-79.
7. Shallice T. Specialisation within the semantic system. Cogn Neuropsychol..1988;5(1):133-42.
8. Damasio AR. Aphasia. N Engl J Med. 1992;326(8):531-9.
9. Caramazza A, Zurif EB. Dissociation of algorithmic and heuristic processes in language comprehension: Evidence from aphasia. **Brain Lang**.1976;3(4):572-82.
10. Caplan D, Hildebrandt N, Makris N. Location of lesions in stroke patients with deficits in syntactic processing in sentence comprehension. Brain. 1996;119(3):933-49.
11. Zurif E, Swinney D, Prather P, Solomon J, Bushell C. An on-line analysis of syntactic processing in Broca' s and Wernicke' s aphasia. **Brain Lang**.1993;45(3):448-64.
12. Gardner H, Zurif EB, Berry T, Baker E. Visual communication in aphasia. Neuropsychologia. 1976;14(3):275-92.
13. Burger L, Uittenhove K, Lemaire P, Taconnat L. Strategy difficulty effects in young and older adults' episodic memory are modulated by inter-stimulus intervals and executive control processes. Acta Psychol. 2017;175:50-9.
14. Code C, Petheram B. Delivering for aphasia. Int J Speech Lang Pathol.2011;13(1):3-10.
15. Hier DB, Yoon WB, Mohr J, Price TR, Wolf PA. Gender and aphasia in the stroke data bank. **Brain Lang**.1994;47(1):155-67.

16. Shewan CM, Kertesz A. Reliability and validity characteristics of the Western Aphasia Battery (WAB). J Speech Lang Hear Res.1980;45(3):308-24.
17. Wilson SM, Eriksson DK, Schneck SM, Lucanie JM. A quick aphasia battery for efficient, reliable, and multidimensional assessment of language function. PloS one. 2018;13(2):e0192773.
18. Brotons M, Koger SM. The impact of music therapy on language functioning in dementia. J Music Ther.2000;37(3):183-95.
19. Knollman-Porter K, Dietz A, Dahlem K. Intensive auditory comprehension treatment for severe aphasia: A feasibility study. Am J Speech Lang Pathol. 2018;27(3):936-49.
20. Erdodi LA, Dunn AG, Seke KR, Charron C, McDermott A, Enache A, et al. The Boston Naming Test as a measure of performance validity. **Psychol Inj Law**.2018;11(1):1-8.
21. Diehl-Schmid J, Jox R, Gauthier S, Belleville S, Racine E, Schüle C, et al. Suicide and assisted dying in dementia: what we know and what we need to know. A narrative literature review. Int Psychogeriatr. 2017;29(8):1247.

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