Treatment Outcome of Proprioceptive Neuromuscular Facilitation Exercise on Gait Performance in Ambulatory Stroke Patients: A Pre and Post Treatment Outcome Study

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ABSTRACT

Introduction: Stroke is a most important cause of mortality and morbidity worldwide. The objective of the study was to find out the pre & post treatment outcome of Proprioceptive neuromuscular facilitation (PNF) exercise on gait performance in ambulatory stroke patients.

Material and Methods: It was a cross sectional comparative study. 20 ambulatory stroke patients were treated by Proprioceptive neuromuscular facilitation (PNF) exercise from 6 to 8 weeks with a frequency of 4 to 6 sessions per week. Functional outcome was assessed by Wisconsin Gait Scale. A pre tested semi structured questionnaire & purposive sampling technique was done to collect data.

Results: The mean age of the respondents were 52.55±9.682 years with a range from 40 to 66 years. 70% of the respondents were male and 30% of the respondents were female. The mean BMI of the respondents were 25.365±2.112 with BMI range from 22.4 to 30. Majority of the respondents (65%) were affected in right side hemi paresis followed by left side hemi paresis (35%). The mean Wisconsin Gait scores were 28.50±2.975 with a range from 21 to 34 before treatment. The mean Wisconsin Gait score were 26.10±2.936 with a range from 19 to 31 after treatment which indicates that Proprioceptive neuromuscular facilitation (PNF) exercise is effective on gait performance in ambulatory stroke patients that was measured by Wisconsin Gait Scale. There was a significant ($p<0.05$) effect of Proprioceptive neuromuscular facilitation (PNF) exercise on gait performance in ambulatory stroke patients that was measured by Wisconsin Gait scale.

Conclusion: Study concluded that Proprioceptive neuromuscular facilitation (PNF) exercise is statistically sound & effective on gait performance in ambulatory stroke patients.

Keywords: Proprioceptive Neuromuscular Facilitation (PNF), Stroke & Wisconsin Gait Scale.

INTRODUCTION

Stroke is a most important cause of mortality and morbidity worldwide.[1- 6] Stroke is the third most common cause of death and the main cause of long time disability.[1,5-12&14] Approximately 130,000 individuals experience a first ever stroke per year.[1] The World Health Organization (WHO) outlines mortality due to stroke in Bangladesh as number 84 in the world.[3] The simple death rate per 1000 people in Bangladesh was reported at 5·8%. The male & female life expectancies were reported as 65·1 years old & 64·4 years old respectively.[13] Stroke is an important cause of early death and disability in low-income[11, 14] and middle-income countries like India & Bangladesh.[14] Due to demographic changes and improved by the rising prevalence of the key modifiable risk factors resulting early death and disability in low-income and middle-income countries.[14] As a result, developing countries were showing to a double burden of both communicable and non-communicable diseases. The poor are increasingly affected by stroke, because of both the changing population exposures to risk factors and getting able to afford the high cost for stroke management. Majority of stroke survivors carry on to live with disabilities. Because of asymmetry of stride length and time, muscle weakness, abnormal muscle tone and abnormal muscle activation patterns of the affected side resulting this disability. The costs of current rehabilitation and long term treatment were mainly undertaken by family members.[14] The most effective exercise program like Proprioceptive neuromuscular facilitation (PNF) was determined for enhance recovery time for the residual problem of stroke survivors of this population.[7] The objective of the study is to find out the pre & post treatment outcome of Proprioceptive neuromuscular facilitation (PNF) exercise on gait performance in ambulatory stroke patients.

MATERIAL AND METHODS

It was a cross sectional comparative study which was conducted to find out the pre & post treatment outcome of Proprioceptive neuromuscular facilitation (PNF) exercise on gait performance in ambulatory stroke patients. 20 ambulatory stroke patients were selected in this study. Ambulatory stroke patients were treated by Proprioceptive neuromuscular facilitation (PNF) exercise from 6 to 8 weeks with a frequency of 4 to 6 sessions per week. Treatment outcome was measured by Wisconsin Gait Scale by pre and

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post treatment. This study was conducted from January 2015 to June 2015. Patients were followed up in the outpatient department of the Physiotherapy centre, Ibn Sina Hospital & Diagnostic Centre (FK Unit), Kallaynpur, Dhaka, Bangladesh. Purposive sampling technique was done for sample selection. Only ambulatory stroke patients with first-time stroke and both male & female respondents with the age from 40 to 66 years were included in the study. Patients having recurrent stroke, aphasia, severe cardiac illness (myocardial infarction), fracture, pregnancy were excluded in this study. A pre tested semi structured questionnaire, Wisconsin Gait Scale, digital weight machine & measuring tape was used as data collection instrument. Pen, pencil & paper were used as a data collection material. After data collection, data was stored & quality control check was performed. Statistical package of Social Science (SPSS), version 16 was used for data analysis. After data collection, data was stored & quality control checked for their completeness, correctness & internal consistency in order to exclude missing or inconsistent data. Corrected data were entered into the computer. Data analysis was done according to the objectives of the study. P-value more than 0.05 was considered insignificant

The Wisconsin Gait Scale (WGS) was used to evaluate the gait problems experienced by a patient with hemiplegic following stroke. This can be used to monitor the effectiveness of rehabilitation training. The tool is comprised of 14 items that measure clinically relevant temporal and distance gait parameters and kinematics that are frequently altered after a stroke. A total summative score which can be ranged from 13.35 to 42.0 was calculated for the items. The minimum score was 13.35 & maximum score was 42. The higher score, the more seriously affected the gait & lower score indicate better gait performance.[26]

Body Mass Index (BMI)	Proprioceptive neuromuscular facilitation (PNF) exercise	
	Frequency	Percentage
Under weight (<20)	0	0
Normal (20-25)	10	50
Overweight(25-30)	10	50
Total	20	100
Mean±SD	25.365±2.112	

Table-1: Distribution of respondents by BMI (n=20)

RESULTS

The mean age of the respondents were 52.55±9.682 years with a range from 40 to 66 years. Figure 1 shows that age group of 30-45 years, 46-60 years and above 60 years were 40%, 30% and 30% respondents respectively. Highest respondents were found from 30 to 45years.

Study found that 70% of the respondents were male and 30% of the respondents were female (Figure -2)

Study showed that 50% of the respondents were normal weight and 50% were overweight respectively. The mean BMI of the respondents were 25.365±2.112 with BMI range from 22.4 to 30 (Table 1).

Figure 3 shows that, majority of the respondents (65%) were affected in right side hemi paresis followed by left side hemi paresis (35%).

Study showed that majority of the respondents were Graduate (40%) followed by higher secondary level (25%), secondary level (20%) and post Graduate (15%) respectively. No respondent was found in primary level education (Figure 4).

Table 2 shows that 70% of the respondents were found 21-30 score, 30% were more than 30 scores & no respondents were found less than 20 scores before treatment. 90% of the respondents were found from 21 to 30 scores, 5% were less than 20 scores & 5% were more than 30 scores after treatment. Study showed that the mean Wisconsin Gait scores were 28.50±2.975 with a range from 21 to 34 before treatment. The mean Wisconsin Gait score were 26.10±2.936 with a range from 19 to 31 after treatment by Proprioceptive neuromuscular facilitation (PNF) exercise. That indicate that Proprioceptive neuromuscular facilitation (PNF) exercise is effective on gait performance in ambulatory stroke patients that measured by Wisconsin Gait Scale. According to Wisconsin Gait Scale, Lower score suggesting higher gait performance.

Table 3 shows that t-value was 9.747 which were greater than tabulated t-value (2.845) and p-value was <0.05 that was statistically significant & it was measured by Wisconsin Gait Scale. There was a significant effect of Proprioceptive neuromuscular facilitation (PNF) exercise on gait performance in ambulatory stroke patients.

Wisconsin Gait Scale (score/point)	Pre treatment		Post treatment	
	Frequency	Percentage	Frequency	Percentage
<20	0	0	1	5
21-30	14	70	18	90
>30	6	30	1	5
Total	20	100	20	100
Mean±SD	28.60±2.909		26.10±2.936	

Table-2: Distribution of respondents by Wisconsin Gait Scale (Pre & post treatment) (n=20)

	Mean Wisconsin Gait Scale		t-Value	P- value
	Pre treatment	Post treatment		
Proprioceptive neuromuscular facilitation (PNF) exercise	28.60±2.909	26.10±2.936	9.747	0.000

Table-3: Distribution of respondents by Wisconsin Gait Scale between Pre & post treatment by paired t- test

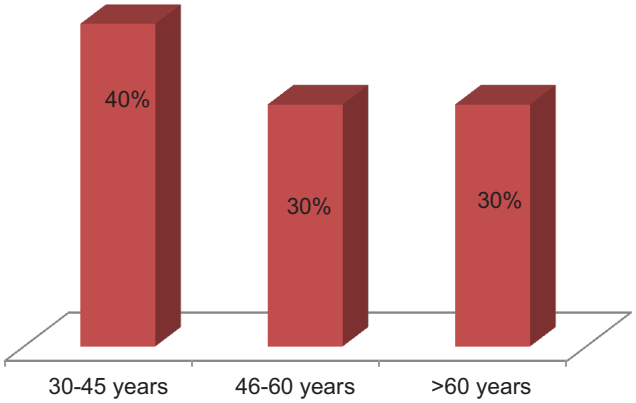

Figure-1: Distribution of the respondents by age (n=20)

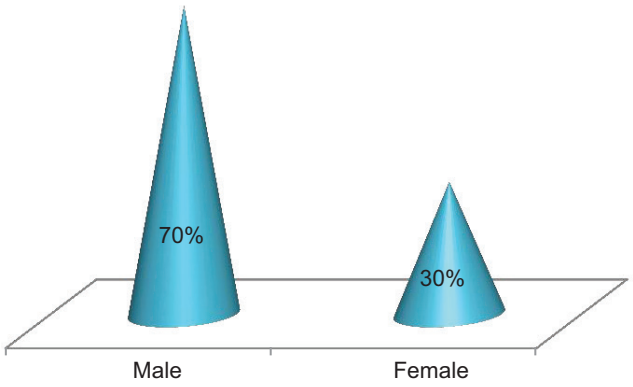

Figure-2: Distribution of respondents by sex (n=20)

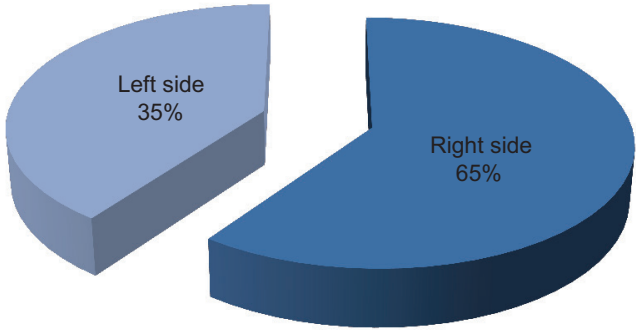

Figure-3: Distribution of respondents by affected side (n=20)

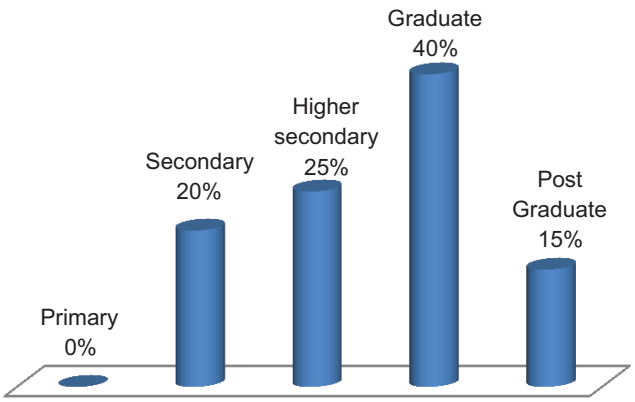

Figure-4: Distribution of respondents by educational status

DISCUSSION

Study showed that age group of 30-45 years, 46-60 years and above 60 years were 40%, 30% and 30% respondents respectively. Similar findings have been supported to the findings of previous study.[14-17] Study showed that highest respondents were found from 30 to 45 years. Different findings carried out in the previous study.[18, 20, 21] The mean age of the respondents were 52.55±9.682 years with a range from 40 to 66 years. This study was correlated with the findings of previous study of Khealani BA, et al.editors[19] who found that the mean age of the respondents were 60 years & Kumar S, et al editors[20] who found that the mean age of the respondents were 59.30 years. This study showed that male respondents were 70% and female respondents were 30%. Similar findings have been supported to the finds of previous study of Chowdhury AH.et.al editors, [4] Pizz A, et al editors[21] & Basri R, et al editors[22] who found that male respondents were more than female. The stroke prevalence was significantly higher in male than female.[22] Study showed that 50% of the respondents were normal weight and 50% were overweight respectively. The mean BMI of the respondents were 25.365±2.112, with BMI range from 22.4 to 30. This study was correlated with the findings of previous study of Basri R, et al. editors[22] who found that body mass index (BMI) was higher with stroke patients compared to non stroke respondent. Study showed that, majority of the respondents (65%) was affected in right side hemi paresis followed by left side hemi paresis (35%). Different findings carried out in the previous study of Siddique MA, et al. editors[23] who found that the incidence of both right and left sided hemi paresis was almost equal. Study showed that majority of the respondents were Graduate (40%) followed by higher secondary level (25%), secondary level (20%) and post Graduate level (15%) respectively. No respondent was found in primary level education. Different findings carried out in the previous study of Khanam MA, et al. editors.[24] Study showed that the mean Wisconsin Gait scores were 28.50±2.975 with a range from 21 to 34 before treatment. The mean Wisconsin Gait score were 26.10±2.936 with a range from 19 to 31 after treatment by Proprioceptive neuromuscular facilitation (PNF) exercise. That indicate that Proprioceptive neuromuscular facilitation (PNF) exercise is effective on gait performance in ambulatory stroke patients that measured by Wisconsin Gait Scale. This study was correlated with the findings of previous study of Lee MK, et al.[25] & Jeong WS, et al. editors.[27]

CONCLUSION

Study concluded that Proprioceptive neuromuscular facilitation (PNF) exercise is statistically sound & effective on gait performance in ambulatory stroke patients that measured by Wisconsin Gait Scale. Need to attention of researchers all over the world. Further study should be needed to evaluate the effect of Proprioceptive neuromuscular facilitation (PNF) exercise on gait performance in ambulatory stroke patients.

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