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A study to assess the effectiveness of dual task exercise to improve balance and gait pattern in patient with selected neurological problems admitted in SMI Hospital, Dehradun.

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Abstract: ***Neurological disorders*** *are diseases of the brain, spine and the nerves that connect them. There are more than 600 diseases of the nervous system, such as brain tumors, epilepsy, Parkinson's* ***disease*** *and stroke as well as less familiar ones such as fronto temporal dementia.. Stroke is a global health problem. It is the second commonest cause of death and fourth and fourth leading cause of disability worldwide. Dual task exercise is an examine the effectiveness of improve balance and gait pattern in selected neurological problem patient. Objectives-To assess the balance and gait pattern in selected neurological problems with patient. To determine the effectiveness of dual task exercise and gait pattern program on walking ability patient with selected neurological problems. To find the association between dual task exercise with selected variable. Methods- pre-experimental one group pre-test and post- test research design was conducted on 30 samples in medical ward, neurological ward, neurosurgery ward of SMI Hospital Dehradun. The sampling technique used in the study was purposive sampling technique.* ***Conclusion*** *Result revealed that the balance and gait pattern after the dual task exercise was improved. This indicates that the dual task exercise is significantly effective in improving the balance and gait pattern.*

Key Words: *Dual task exercise, balance and gait pattern, neurological problems.*

1. INTRODUCTION:

Neurological disorders pose a large burden on worldwide health. The most recent estimates show that the neurological disorders included in the Global Burden of Disease (GBD) Study–Alzheimer's and other dementias, Parkinson's disease, multiple sclerosis, epilepsy, and headache disorders (migraine, tension-type headache [TTH], and medication-overuse headache [MOH])–represent 3 percent of the worldwide burden of disease. Although this is a seemingly small overall percentage, dementia, epilepsy, migraine, and stroke rank in the top 50 causes of disability-adjusted life years (DALYs).

People with stroke have reduced walking activity. It is not known whether this deficit is due to a reduction in all aspects of walking activity or only in specific areas. Understanding specific walking activity deficits is necessary for the development of interventions that maximize improvements in activity after stroke

2. PURPOSE:

Dual task exercise improves the balance and gait pattern after neurological problems for better daily living activities.

3. OBJECTIVES:

- To assess the balance and gait pattern in selected neurological problems with patient.
- To determine the effectiveness of dual task exercise and gait pattern program on walking ability patient with selected neurological problems.
- To find the association between dual task exercise with selected variable.

4. MATERIALS AND METHODS:

Pre-experimental one group pre-test and post- test research design was conducted on 30 samples in medical ward, neurological ward, neurosurgery ward of SMI Hospital Dehradun. The sampling technique used in the study was purposive sampling technique. Tool is consist in three section i.e., Section- A- Demographic variables, Section –B- Clinical variables, Section – C – Tinetti Assessment Tools on balance and gait pattern.

Frequency and percentage distribution of patient with selected neurological problems according to their demographic variables.

N=30

Sl.No	Demographic Variables	No. of patients with selected neurological problems	
		frequency	Percentage
1.	Age in years		
a)	30 – 40	7	23%
b)	41 – 50	9	30%
c)	51 – 60	10	33.3%
d)	Above 60	4	13.3%
2.	Gender		
a)	Male	26	86.6%
b)	Female	4	13.3%
3.	Education		
a)	Primary	8	26.6%
b)	Secondary	5	16.6%
c)	Graduate	12	40%
d)	Post graduate	3	10%
e)	No formal education	2	6.6%
4.	Occupational status		
a)	Government job	11	36.6%
b)	Private job	8	26.6%
c)	Business	1	3.3%
d)	Other	10	33.3%
5.	History of taking		
a)	Alcohol	9	30%
b)	Smoking	3	10%
c)	Chewing tobacco	0	0%
d)	Others	18	60%
6.	Family history with neurological problems Yes		
a)	No	2	6.6%
b)		28	93.3%

Objective 1: To assess the balance and gait pattern in selected neurological problems with patient.

The table I shows the demographic data details, illustrated as based on their age group 33.3% were 51 – 60 years, 30% belongs to the age group of 41 – 50 years, 23.33% belongs to the age group of 30 – 40% and 13.33% belongs to the age group of above 60 years.

Distribution of patient with selected neurological problem in relation to their gender shows that 86.7% were male and 13.3% were female.

Distribution of patient with selected neurological problem in relation to their education reveals that majority of the patients 40% were graduate, 26.60% were primary educated, 16.60% were secondary educated, 10% were post graduate and 6.6% were have no formal education.

Distribution of patient with selected neurological problem in relation to their occupation shows that majority of the patients 36.60% were government job,33.30% patients were others (unemployed, retired, housewife etc.), 26.60% were private job and 3.30% were business.

Distribution of patient with selected neurological problem in relation to their history of taking shows that 60% of patient had the habit of others (none of above mention i,e. there is no any bad habits), 30% had the habit of alcoholism, 10% had the habit of smoking and 0% had the habit of chewing tobacco.

Distribution of patient with selected neurological problem in relation to their family history shows that 93.31% of patients don't had the family history of neurological problems and 6.60% patients had the family history of neurological problems (stroke, hypertension, diabetic etc).

Distribution of patient with selected neurological problem in relation to duration of stroke shows that majority of the patients 63.30% had the neurological problem above 6 months, 20% had the neurological problem patient within 3 – 6 months and 20% had the neurological problem within 3 months.

Distribution of patient with selected neurological problem in relation to affected side shows that 53.30% of the patients were affected on right side, 26.60% were affected on left side, 13.30% were not affected (others) and 6.60% were affected on both sides.

Distribution of patient with selected neurological problem in relation to co – morbidity shows that 83% of the patients had hypertension and 17% of the patient had no any co – morbidity symptoms.

Distribution of patient with selected neurological problem in relation to under gone any rehabilitation therapy shows that 80% patients had undergone rehabilitation therapy (physiotherapy) and 20% patients had no any undergone rehabilitation therapy.

Distribution of patient with selected neurological problem in relation to any type of medication used/ using shows that 60% patients had no used any type of medication used/ using and 40% patient had used medication (tab. Amlodipine, glimiparide, telmasartin, gabapantinetc).

Distribution of patient with selected neurological problem in relation to whether undergoing any alternative therapy shows that all the patients 100% were not gone to any alternative therapy.

Frequency and percentage distribution of patient with selected neurological problems to their clinical variables.

N=30

Sl.No	Demographic Variables	No. of patients with selected neurological problems	
		frequency	Percentage
1.	Age in years		
a)	30 – 40	7	23%
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e)	No formal education	2	6.6%
4.	Occupational status		
a)	Government job	11	36.6%
b)	Private job	8	26.6%
c)	Business	1	3.3%
d)	Other	10	33.3%
5.	History of taking		
a)	Alcohol	9	30%
b)	Smoking	3	10%
c)	Chewing tobacco	0	0%
d)	Others	18	60%
6.	Family history with neurological problems		
a)	Yes	2	6.6%
b)	No	28	93.3%

Age of the patient with selected neurological problems:
Table shows that among 30 patients, majority of patients 33.3% were 51 – 60 years, 30% were in the age group of 41 – 50 years,23.33% were in the age group of 30 – 40% and 13.33% were in the age group of above 60 years.

Gender of the patient with selected neurological problems:
Table shows that 86.7% were male and 13.3% were female.

Education of the patient with selected neurological problems:
Reveals that majority of the patients 40% were graduate, 26.60% were primary educated, 16.60% were secondary educated, 10% were post graduate and 6.6% were have no formal education.

Occupational status of the patient with selected neurological problems: Shows that majority of the patients 36.60% were government job,33.30% patients were others (unemployed, retired, housewife etc.), 26.60% were private job and 3.30% were business.

History of taking of the patient with selected neurological problems:

Suggest that 60% of patient had the habit of others (none of above mention,i.e. there is no any bad habits), 30% had the habit of alcoholism, 10% had the habit of smoking and 0% had the habit of chewing tobacco.

Family history with selected neurological problems:

Illustrate that 93.31% of patients don't had the family history of neurological problems and 6.60% patients had the family history of neurological problems (stroke, hypertension, diabetic etc).

Association of pre –test score with their selected demographic variables among selected neurological problem patient.

N=30

S.No	Demographic variables	Motor function			Chi square	Degree of freedom	Table value	Level of significant
		High	Moderate	Low				
1.	Age in years							
a)	30 – 40	**4**	**3**	**0**				
b)	41 – 50	**4**	**4**	**0**				#
c)	51 – 60	**7**	**4**	**0**	**1.05**	**3**	**7.82**	
d)	Above 60	**3**	**1**	**0**				
2.	Gender							
a)	Male	**16**	**10**	**0**	**0.22**	**1**	**3.84**	#
b)	female	**2**	**2**	**0**				
3.	Education							
a)	Primary	**5**	**3**	**0**				
b)	Secondary	**2**	**4**	**0**				#
c)	Graduate	**6**	**2**	**0**	**3.06**	**4**	**9.49**	
d)	Post graduate	**3**	**1**	**0**				
e)	No formal education	**2**	**2**	**0**				
4.	Occupational status							
a)	Government job	**8**	**2**	**0**				
b)	Private job	**5**	**3**	**0**				
c)	Business	**2**	**2**	**0**	**3.45**	**3**	**7.82**	#
d)	Other	**3**	**5**	**0**				
5.	History of taking							
a)	Alcohol	**7**	**2**	**0**				
b)	Smoking	**2**	**2**	**0**				
c)	Chewing tobacco	**0**	**0**	**0**	**1.69**	**1**	**3.84**	#
d)	Others	**9**	**8**	**0**				
6.	Family history with neurological problems							
a)	Yes	**2**	**2**	**0**				
b)	No	**16**	**10**	**0**	**0.18**	**1**	**3.84**	#

***p<0.05 statistically significant #– not significant**

The table shows that there was no association between the age, gender, education, occupation, history of taking and family history with neurological problems. So, null hypothesis was accepted and research hypothesis was rejected.

Association between pre – test score and their clinical variables among selected neurological problem patients.

SL. NO	Clinical variables	Balance and gait pattern			Chi square value	Degree of freedom	Table value	Level of significance
		High	Moderate	Low				
1.	Duration of neurological problem							
	a)<3 months	3	3	0				
	b)3 – 6 months	4	1	0	1.11	2	5.99	#
	c)above 6 months	11	8	0				
2.	Affected side							
	a)right side	8	5	0				
	b)left side	6	3	0	0.49	3	7.82	#
	c)both	2	2	0				
	d)others	2	2	0				
3.	Co – morbidity							
	a)yes	17	8	0	1.42	1	3.84	#
	b)no	2	3	0				
4.	Undergone any rehabilitation therapy							
	a)yes	15	8	0	3.9	1	3.84	*
	b)no	3	4	0				
5.	Whether any undergoing medication							
	a)yes	7	5	0	0.02	1	3.84	#
	b)no	11	7	0				

The table was shows that there was association between clinical variables in undergone any rehabilitation therapy with the pre test value. So the research hypothesis was accepted.

5. DISCUSSION:

Objective 1: To assess the balance and gait pattern in selected neurological problems with patient.

The study findings shows the demographic data details, illustrated as based on their age group 33.3% were 51 – 60 years, 30% belongs to the age group of 41 – 50 years, 23.33% belongs to the age group of 30 – 40% and 13.33% belongs to the age group of above 60 years. Distribution of patient with selected neurological problem in relation to their gender shows that 86.7% were male and 13.3% were female. Distribution of patient with selected neurological problem in relation to their education reveals that majority of the patients 40% were graduate, 26.60% were primary educated, 16.60% were secondary educated, 10% were post graduate and 6.6% were have no formal education. Distribution of patient with selected neurological problem in relation to their occupation shows that majority of the patients 36.60% were government job,33.30% patients were others (unemployed, retired, housewife etc.), 26.60% were private job and 3.30% were business. Distribution of patient with selected neurological problem in relation to their history of taking shows that 60% of patient had the habit of others (none of above mention i,e. there is no any bad habits), 30% had the habit of alcoholism, 10% had the habit of smoking and 0% had the habit of chewing tobacco. Distribution of patient with selected neurological problem in relation to their family history shows that 93.31% of patients don't had the family history of neurological problems and 6.60% patients had the family history of neurological problems (stroke, hypertension, diabetic etc).Distribution of patient with selected neurological problem in relation to duration of stroke shows that majority of the patients 63.30% had the neurological problem above 6 months, 20% had the neurological problem patient within 3 – 6 months and 20% had the neurological problem within 3 months. Distribution of patient with selected neurological problem in relation to affected side shows that 53.30% of the patients were affected on right side, 26.60% were affected on left side, 13.30% were not affected (others) and 6.60% were affected on both sides. Distribution of patient with selected neurological problem in relation to co – morbidity shows that 83% of the patients had hypertension and 17% of the patient had no any co – morbidity symptoms. Distribution of patient with selected neurological problem in relation to undergone any rehabilitation therapy shows that 80% patients had undergone rehabilitation therapy (physiotherapy) and 20% patients had no any undergone rehabilitation therapy. Distribution of

patient with selected neurological problem in relation to any type of medication used/ using shows that 60% patients had no used any type of medication used/ using and 40% patient had used medication (tab. Amlodipine, glimiparide, telmasartin, gabapantinetc).

Distribution of patient with selected neurological problem in relation to whether undergoing any alternative therapy shows that all the patients 100% were not gone to any alternative therapy.

The study findings supported by Yan-Ci Liu presented that cognitive and motor dual task gait training improve dual task gait performance after stroke - A randomized controlled pilot trial. This study investigated effects of cognitive and motor dual task gait training on dual task gait performance in stroke. Participants (n = 28) were randomly assigned to cognitive dual task gait training (CDTT), motor dual task gait training (MDTT), or conventional physical therapy (CPT) group. Parameters included gait speed, dual task cost of gait speed (DTC-speed), cadence, stride time, and stride length. After CDTT, cognitive-motor dual task gait performance (stride length and DTC-speed) was improved ($p = 0.021$; $p = 0.015$). After MDTT, motor dual task gait performance (gait speed, stride length, and DTC-speed) was improved ($p = 0.008$; $p = 0.008$; $p = 0.008$ respectively). It seems that CDTT improved cognitive dual task gait performance and MDTT improved motor dual task gait performance although such improvements did not reach significant group difference. Therefore, different types of dual task gait training can be adopted to enhance different dual task gait performance in stroke.

6. IMPLICATIONS:

Dual task exercise therapy for the nurses who are providing exercise to the selected neurological problems patients. The nurse researcher's role is to prepare the patient's with selected neurological problems to perform daily activity by himself or herself as soon as possible after affecting neurological problems.

7. MAJOR FINDINGS OF THE STUDY:

Among 30 selected neurological problem patients, 10 patients (33.3%) were in the age group of 51 – 60 years, 9 patients (30%) were in the age group of 41 – 50 years, 7 patients (23%) were in the age group of 30 – 40 years and 4 patients (13.3%) were in the age group of above 60 years. Selected neurological problem patient,26 patients (86.7%) were male and 4 patients (13.3%)were female. Neurological problems majority of the patients, 12 patients(40%) were graduate, 8 patients (26.60%) were primary educated, 5 patients (16.60%) were secondary educated, 3 patients(10%) were post graduate and 2 patients (6.6%) were have no formal education.

Majority of the11 patients (36.60%) were government job, 10 patients (33.30%) were others (unemployed, retired, housewife etc.), 8 patients (26.60%) were private job and 1patient(3.30%) were business. 18 patients(60%) of patient had the habit of others (none of above mention i,e. there is no any bad habits), 9 patients (30%) had the habit of alcoholism, 3 patient (10%)had the habit of smoking and 0% had the habit of chewing tobacco. 28 patient (93.31%) of patients don't had the family history of neurological problems and 2 patient(6.60%) patients had the family history of neurological problems (stroke, hypertension, diabetic etc). Majority of the patients19(63.30%) had the neurological problem above 6 months,6 patients(20%) had the neurological problem patient within 3 – 6 months and 5 patient(20%) had the neurological problem within 3 months. 16 patients(53.30%) of the patients were affected on right side, 8 patients(26.60%) were affected on left side, 4 patients (13.30%) were not affected (others) and 2 patients(6.60%)were affected on both sides. 24 patients (83%) of the patients had hypertension and6 patients(17%) of the patient had no any co – morbidity symptoms. 24 patients (80%) patients had undergone rehabilitation therapy and 6 patients (20%) patients had no any undergone rehabilitation therapy. 18 patients(60%) patients had no used any type of medication used/ using and 12 patients(40%) patient had used medication (tab. Amlodipine, glimiparide, telmasartin, gabapantinetc) and all the patients 100% were not gone to any alternative therapy.

8. LIMITATION:

1. Those who are not willing to participate.
2. Patient who are unconscious.
3. Patient who have Spinal cord injury.
4. Patient who are suffering from quadriplegia.

9. CONCLUSION:

The study was conclude that the effectiveness of dual task exercise therapy in improving the balance and gait pattern among the patient with selected neurological problems in SMI hospital. The investigator main aim behind the study is to make the neurological problem patients understand the dual task exercise is effective in improvement of balance and gait pattern in selected neurological patient.

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