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Correlation between Sit to Stand and Fall among Stroke Individuals

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ABSTRACT
Stroke is life threating neurological disorder . The Purpose of this study was to know the Correlation Between Sit to stand and Fall Among stroke individuals . This is Observational study . Forty seven stroke individuals participated in the study , based on the inclusion criteria . In this study the outcome measures are Berg balance scale and sit to stand component of balance master . The Purposive sampling method was used . The collected data were analyzed using SPSS version 23 software and Correlation was done by Z test . According to Berg Balance scale 11% Stroke individuals are at High risk of fall , 27% stroke patients stroke individuals are at medium risk of fall and 62% stroke individuals are at Low risk of fall . The Present study showed a Significantly Negative correlation (R value were -0.495 and P value were <0.0001 with Berg balance scale and weight transfer (component of sit to stand) . The Result Suggested that , Berg balance scale and weight transfer were significantly negative correlated as The Berg Balance Scale value rises then risk of fall were Less and Weight transfer reduces and as it is clinically correlated therefore , Berg balance scale value reduces then weight transfer rises .
Keywords: sit to stand , stroke , balance , physical therapy , Balance master

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INTRODUCTION

Stroke ranks first in importance and frequency among all the neurologicial.Stroke accounts for half of neurological illness in Hospitals . After heart disease and cancer stroke is third most common cause of death.Stroke is sudden focal neurologicial syndrome Particularly the type caused by cerebrovascular disease .Cerebrovascular disease denotes abnormality of brain results from pathological process of blood vessel , including rupture of vessel , altered peremeability of the vessel wall or viscocity increases or change in quality of blood flowing through the cerebral vessel and occlusion of the lumen by thrombus or embolus occurs [1] .

Stroke is known as acquired injury of the brain which is caused by less blood supply or occlusion of blood vessel leading to and hemorrhage or infarction within the parenchyma of the brain . The largest cause of acquired disability is stroke . Risk factors for stroke are smoking, diabetes , hypertension , age , and sex [2]. Stroke (cerebrovascular accident) is the life threating neurologicial disorder in which there is disturbance in blood flow to the brain . There are two types of stroke – ischemic stroke and hemorrhagic stroke . Loss of motor functions are characterized by weakness (Hemiparesis) or paralysis (Hemiplegia),Stroke affecting one side which result in neurologicial complication on another side[3]. 11,645 number of people identified with incident of stroke. crude prevalence rate is 26/100,000[24] to 1000,000[27] [4] . Neurological impairment should be continue for 24 hours to be classified as a stroke . Focal impairment in stroke consist of changes in cognition, language , perceptual , level of consciousness , sensory and motor functions Because of Stroke there is long term disability occurs in individuals. The major contributory factor in stroke individual is Atherosclerosis .[3]. The most common symptoms of stroke are aphasia , sensory loss visual field impaired, weakness or difficulty in swallowing and speaking .[5]

Falls are part of abnormal aging process [6]. Fall is nonintentional loss of balance which leads to loss of postural stability or unexpected and sudden change in position results in landing on floor [7]. Fear of fall is seen in individuals who has sustained a previous fall [6] . Falls are leading causes of poor balance in older individuals [5]. Female report more falling than male because females are at greater risk of fall as compared to males in elderly individuals[8]. The main impairment in stroke individuals is balance , cerebrovascular accident related conditions have more postural sway and very less body weight support on limb which is more affected [9].Stroke individuals not able to maintain standing posture[10]. Ability to stand up without assistance is crucial for stroke patients to live independently and prevents falls [11].

Various different types of techniques are used for examination of balance in stroke individuals[9]. The sit to stand activity is most important activity of daily living as peoples frequently use when they are move from sitting to standing position and walking[11]. Sit to stand test (STS) is mostly used for assessing strength and and function of lower extremity and also balance control in elderly individuals[12]. Sit to stand test (STS) is used to measure risk of fall in individuals . Sit to stand test is a physical function performance test[8]. Sit to stand test is rapid , easy and commonly used to major functional performance that includes measuring time taken to sit to stand position [13] .

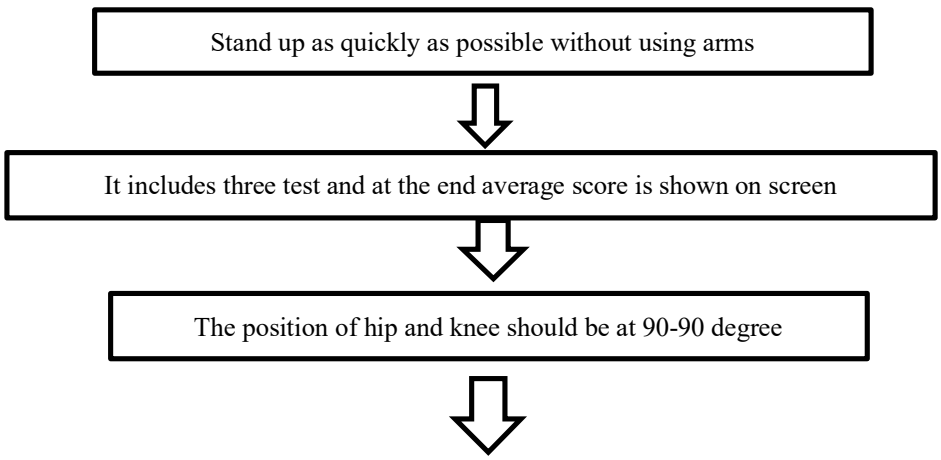
Stroke individuals are at more risk of fall than non stroke individuals because of the pathologicial condition imposed on their physiologicial aging process [14].

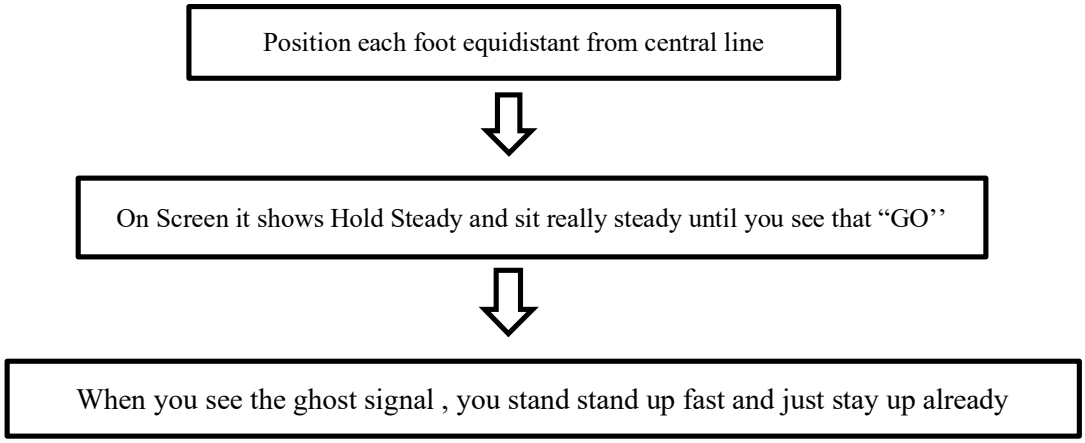
In stroke individuals greater than one third of fall occurs while they are rising or sitting down [14].Berg balance scale is used to determine individuals to safely balance during standing and sitting[10].The stroke non fallers and healthy subjects had significantly higher rate of rise in force than the stroke fallers[14].

There are a few articles showing correlation of sit to stand ability, dynamic balance , gait speed and quality of life in stroke individuals. They conclude that sit to stand performance affect dynamic balance and gait in stroke individuals .The sit to stand test is functionally important to asses balance in stroke individuals . Also there is a study showing Accuracy of modified chair stand test for predicting fall in older adults and another study showing Association of modified sit to stand predicts fall in older individuals in that they conclude modified sit to stand test had ability to discriminate between non fallers and faller , since time up and go test not discriminate it .But there is lack of evidence showing the correlation of sit to stand and fall in stroke individuals. It is essential to assess fall in stroke individuals to know the risk of fall in stroke individuals. From this study we obtained the correlation between Weight transfer (sit to stand) and fall among stroke individuals.

MATERIAL AND METHODS

This study setting was Tertiary Health care center . This study was the observational type of study . Sampling population was stroke individuals age group of 40 to 60 years . The sampling method was the purpose sampling . 47 Stroke individuals was participated in the study . After the Ethical clearance from the institutional ethical committee was obtained , Participants were selected on the basis of inclusion and exclusion criteria . Inclusion criteria includes , Age between 40 to 60 years , Both Gender (male and female) , Diagnose with stroke , Individuals were physically and mentally capable of completing the assessment (MMSE score more than 24) and Willing to participate in study . Exclusion criteria includes Other Neurological conditions . Screening was done on the basis of inclusion and exclusion criteria . Berg balance scale assessment was performed which consist of 14 items , in that the patients was instructed to maintain a given position for a specific time or perform a task , Berg balance scale was used to evaluate the Risk of fall in stroke individuals . After Evaluation of berg balance scale the sit to stand assessment on balance master was performed, in that following instructions was given to the patients ,





The Duration of study was 6 months . Data were Analyzed using SPSS version 23 software . Correlation was done by Z test .

RESULTS

Demographic data showed that (87% male and 13% female) Particpated in the study and mean age of all the participants was 49.5 years . Result were presented on the basis of cut off scoring . On Berg balance scale Risk of fall were determined , 11 % are at High risk of fall , 27 % are at Medium risk of fall and 62% are at Low risk of fall as mentioned in Table 1 . Weight transfer Abnormal in 68% stroke individuals , Rising index Abnormal in 25% stroke individuals and COG sway Abnormal in 4% stroke individuals and Weight symmetry Abnormal in 79%Affected and Abnormal in 79%Unaffected as mentioned in Table 2. The correlation between berg balance scale and weight transfer (sit to stand) the P value is <0.0001, which is considered as significantly negative correlation as mention in Table3.

Table 1: Assessment of Berg Balance Scale in stroke individuals

Berg Balance Scale	No of cases	Percentage
0 – 20 (High risk)	5	11
21 – 40 (Medium risk)	13	27
41 – 56 (Low risk)	29	62
Total	47	100

Table 2: Assessment of the SIT TO STAND by using balance master in stroke individuals

SIT TO STAND	Weight transfer (%)	Rising index (%)	COGs sway velocity (%)	Weight Symmetry (Affected)	Weight Symmetry (Unaffected)
Abnormal	32 (68)	12 (25)	2 (4)	37 (79%)	37(79%)
Normal	15 (32)	35 (75)	45 (96)	10 (21 %)	10 (21%)
Total	47 (100)	47 (100)	47 (100)	47 (100%)	47 (100%)

Table 3: Correlation between Berg Balance scale and Weight Transfer (Sit to stand)in Stroke individuals

Correlation between Berg Balance Scale and Weight Transfer	**R Value**	**P Value**
	-0.495	<0.0001

DISCUSSION

The present study was conducted with aim to correlate sit to stand and fall in stroke individuals and the objective of study is to assess sit to stand by using balance master and assess fall in stroke by balance master and to find out the correlation between weight transfer (Sit to stand) and fall in stroke individuals .

There were 47 stroke individuals participated in study , include 87 % males and 13 % females .

While assessing berg balance scale in stroke individuals we find out that 11 % High Risk of fall , 27 % are at medium risk of fall , and 62 % are at Low risk of fall .

A study conducted by Pao-Tsai Cheng MD et al , conducted a study titled , "The sit-to-stand movement in stroke patients and its correlation with falling" which is retrospective study done on 33 stroke individuals

in three different groups (fallers , nonfallers , healthy). This study was done in rehabilitation unit of hospital . Individual perform sit to stand. The rate of rise in force was less in stroke fallers compare to stroke non fallers . Clinical evidence revealed that when a healthy individual stands or sits down, body weight is typically distributed nearly symmetrically on the two legs. However, if the individual plans to go to the right or to the left after getting up, their body weight may be distributed more evenly between one leg and the other. Hemiplegic patients typically use the unaffected side's compensatory activity after a stroke, in contrast. When getting out of and sitting in a chair, they voluntarily and repeatedly place more body weight on the non-paretic leg . This study conclude that more postural sway and less rate of rise in force while rising or sitting down may be useful in identifying risk of falling in stork individuals .

A study conducted by NarintipRoongbenjawan and AkkradateSiriphorn,Which is a prospective cohort study , this study done on 73 individuals perfrom 30s-chair sit to stand and modified 30 chair sit to stand to investigate the risk of fall in older individuals . This study conclude that m30CSTs have excellent , valid and reliable accuracy to determine non falling and falling in older individuals , modified 30 seconds chair sit to stand has highest accuracy to determine risk of fall in community dwelling older adults. The Sit to stand activity needs dynamic weight transfer from sitting to standing posture which involves a center of mass towards a new base of support which becomes a smaller area provided by the feet . Non fallers have higher COG transfer velocities and lower vertical ground reaction force than fallers .

In present study , Berg Balance Scale were used to evaluate risk of fall in stroke individuals and 5 Times sit to stand test were performed to know ability of stroke patients while performing sit to stand on the balance master .

A study conducted by Muhammed Azharuddin et al ,Which is Non Randomized Pilot Study , There is Scaecity of literature on relationship between sit to stand ability and other measures of functional independence . The purpose of this study to investigate relationship of 5 times sit to stand with the gait speed , dynamic balance and quality of life in stroke patients . In this study correlation between outcomes variable was analyzed using pearson correlation co-efficient . For a successful performance of the 5 times sit to stand test , lower limb strength and balance reaction of either or both lower extremities are required . This study concluded that 5 times sit to stand performance can affect balance and gait as well as quality of life and The exercise training which focusing on sit to stand ability may influence activity of daily living after suffering from stroke .

In present study , 5 times sit to stand is used to check ability of sit to stand in stroke individuals before assessing on balance master . In our study cut of score more than 12 seconds describes healthy adults from individuals with stroke . All the 47 stroke individuals scored above 12 seconds.

LIMITATIONS

Unilateral neglect was not checked in our study

Generalized stroke individuals were taken into the study , We did not differentiate them on the basis of their type .

CONCLUSION

Based on Stastistical analysis , we conclude that there was significantly Negative correlation between weight transfer (sit to stand) and betrg balance scale , As Berg balance scale value rises then weight transfer reduces and as it is clinically correlate therefore , Berg balance scale value reduces then weight transfer increases .

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