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NORMATIVE DATA OF DYNAMIC GAIT INDEX AND 5 TIMES SIT TO STAND TEST AMONG ELDERLY POPULATION AND CORRELATION WITH ANTHROPOMETRIC PARAMETERS

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Abstract

Anthropometric factors affect the stability limits of the individual and can affect the motor strategies relating to balance control. The objective of this study was to take normative measurement of dynamic gait index and 5 times sit to stand test among elderly population and to compare the preliminary values of above mentioned tests with age. Data was collected from the elderly population from old age homes of Lahore and community dwelling population who meet the inclusion criteria between the age group 45-60 divided into 3 groups (G1: 45-50, G2:50-55, G3:55-60). Data was collected through the performance of dynamic gait index and 5 time sit to stand test were performed. There was a significant positive correlation between BMI and 5STS score as $R=0.94$ and $p<0.05$. The highest and lowest effect of BM1 on 5 time sit to stand test score were found in the age groups of 45-50, 51-55 and 56-60. A negative relationship between DGI and BMI was found. Another strong correlation of -0.320 was observed between age and total DGI score. This study concluded that mean 5STS score was found to be 16.71seconds. The effects of BMI on 5 time sit to stand test performance increased with increasing age. Average dynamic gait index score was 16.10.

Keywords: Anthropometric Measures, BMI, DGI, Normative Values, Older Population, 5STS. 5xSST.

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1. INTRODUCTION

Falls are common and repetitive issues among older individuals and one of the significant reason that influence the exercises of day by day living (ADL) and life quality. One out of three people more than 65 years old and practically 50% of the individuals who were more than 80 years old apparently fell at least once a year (1).

As the age increases chance of falling again and again also increase, almost 8-17% of people aged more than 75 years show multiple falling histories. The outcomes of falls incorporate hip breaks, delicate tissue injuries, dread of falling, hospitalization and more prominent disability. Furthermore, falls can prompt loss of self confidence in one's capacity to perform routine day by day tasks, in the end leading towards the event of social withdrawal ("post-fall syndrome"). Various hazard components of falls have been raised dependent on both types of studies retrospective and prospective (2).

Previous investigations have demonstrated that diminished muscle quality and poor balance lead to the fall. Most past findings identified with falls chance have been founded on both clinical assessment methods and self-revealed confidence to achieve ADL, yet relatively few of which were picked up from the consequences of genuine physical execution tests. Activities of everyday living is a term ordinarily utilized in a wide spectrum of disciplines, and there are many factors that may add to ADL, for example, age, functional capacity and balance, however its definition and conceptualization change from wellbeing status to satisfaction of life. Routinely, different instruments, for example, the Barthel Index (BI) and Functional Independence Measure (FIM) 19 had been utilized for the evaluation of ADL (3).

The rationale of this study was to find out normative values for 5 times sit to stand test and dynamic gait index by age groups and gender. It would also determine the association of their anthropometric measures with dynamic gait index and five times sit to stand test. In previous studies there were no association between dynamic gait index and five times sit to stand test with anthropometric measures.

2. METHODOLOGY

An Observational study was held using convenient sampling technique. Data was collected from happy old age home in Lahore. Sample size of 400 subjects were recruited and divided into 3 groups to find out the normative values for dynamic gait index and 5time sit to stand test in different age groups: **Group 1**: 45-50 years, **Group 2**: 50-55 years, **Group 3**: 55-60 years. Data was collected from older population using DGI and 5 times sit to stand test. To perform 5 time sit to stand test individuals sit on the chair with their back against the back of chair. Take each stand clearly so that the individual stays align. Finish the trial when the individual attains the standing position on the fifth repetition without stopping in between. Dynamic gait index (DGI) consists of 8 items: each item is scored from 0-3 points, with 3 recommended normal and 0 recommended disability. The total score for Dynamic gait index (DGI) is 24, and 24 considered best score with no risk

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of fall, score of 19 or less then indicates fall in elders and score of 22 or greater then indicates no fall risk or safe walkers.

3. RESULTS

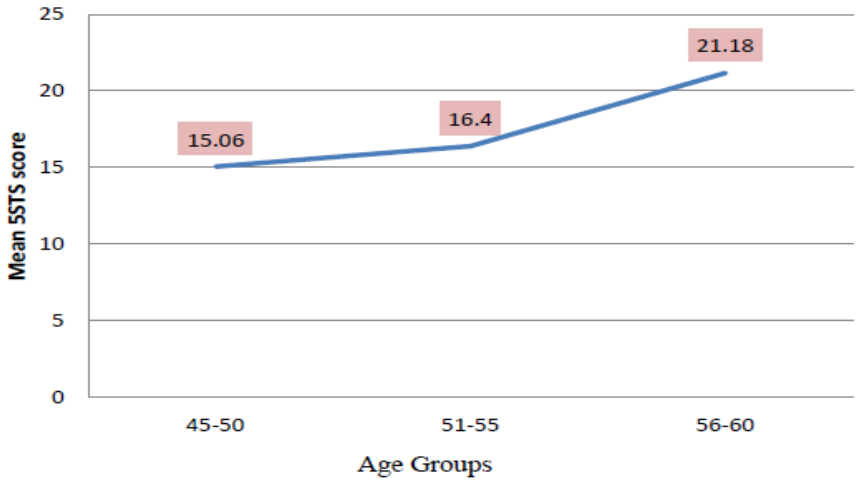

Figure 1: Mean 5STS score against different age: Fig. 1 showed increase trend in 5STS score was observed with proceeding age group. Thus it can be concluded that 5STS score increases with the increasing age in current study

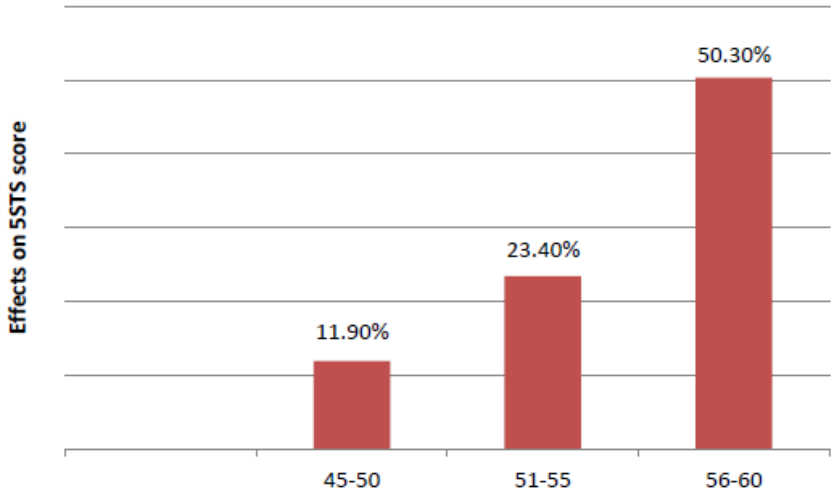

Figure 2: Effect of BMI on 5STS score in different age groups: The fig. 2 presents the percentage effect of body mass index in defining 5STS score in different age groups. It can be observed that an increasing trend line comes into existence, depicting that this effect increases with increasing age

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Table 1: p-value with in each age group for the effect of BMI on 5STS

	45-50	51-55	56-60
p value	0.000	0.000	0.001
R square	0.119	0.234	0.282
r value	0.333	0.484	0.612
significant	yes	yes	yes

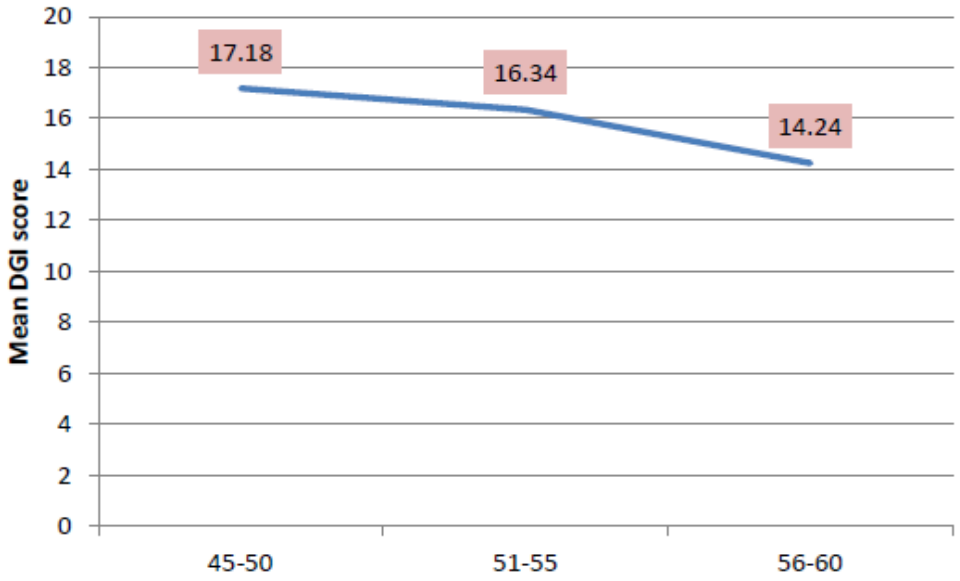

Figure 2: Mean DGI score against different age groups

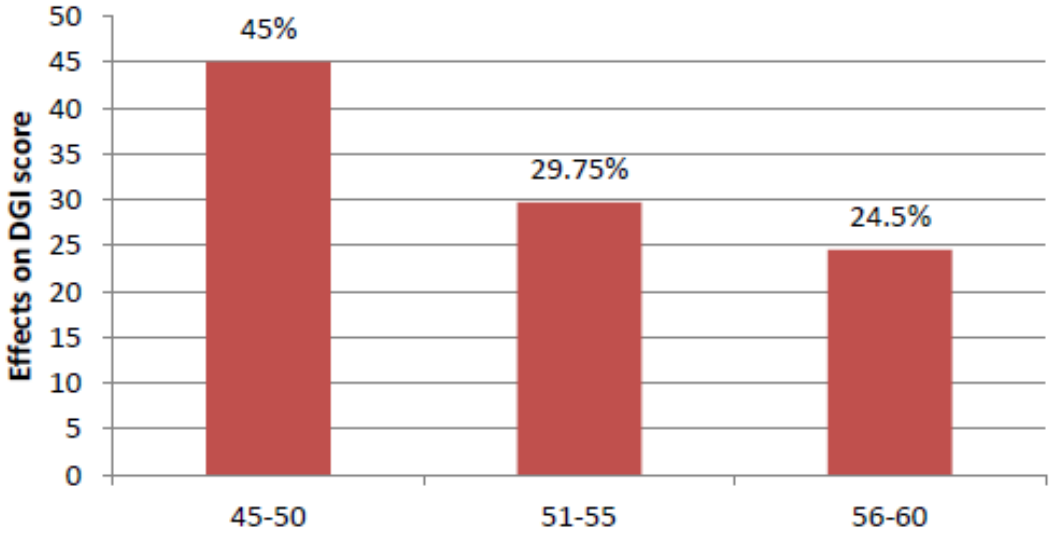

Figure 3: Effect of BMI on DGI score in different age groups

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Table 2: Correlation chart of Age and BMI with DGI and 5XSST

Correlations					
		Age	BMI	5xSST	DGI
Age	Pearson Correlation	1	.204**	.383**	-.320**
	Sig. (2-tailed)		.000	.001	.000
BMI	Pearson Correlation	.204**	1	.594**	-.113*
	Sig. (2-tailed)	.000		.000	.000
5xSST	Pearson Correlation	.383**	.594**	1	
	Sig. (2-tailed)	.001	.000		
DGI	Pearson Correlation	-.320**	-.113*		1
	Sig. (2-tailed)	.000 .000			

The correlation of age and 5xSTS was 0.383 which was not significant at 0.01 level and correlation between BMI and 5xSTS was found 0.594 which was also not significant at the 0.01 level. This table showed the correlation among dynamic gait index (DGI) and all other parameters. A medium correlation of -0.320 was observed between age and total DGI score which is found significant at 0.01 level.

4. DISCUSSION

Mean 5STS score was found increasing with the increasing age (40). This is in accordance with various studies conducted in this regard. Mean 5STS score was found to be 13.082 with a standard deviation of 2.708 that are in close relationship with other studies (4).

There is a significant positive relationship between BMI and 5STS score as R = 0.594 and $p<0.05$. When BMI increases 5STS score increase. Yet only, 35.27% of variability in 5STS score explained by BMI values which makes it a fair predictor (42). A higher BMI represents obese physique, making it difficult to perform five time sit to stand test thus taking more time to complete the task (5).

The highest and lowest effect of BM1 on 5STS score were found in the age groups of 45-50, 51-55 and 56-60. Overall this effect was found increasing with increasing age. Within each subgroups of age, BMI was found significant. From this we can conclude that BM1 has a great impact on their mobility.

Age plays only 3.16% role in predicting 5STS. A significant relationship between age and 5STS was found as $P<0.05$. A correlation of 0.178 has also been observed that is a weak relationship. Overall 5STS score increases with increasing age but the slope of this increment was not found as strong as in the case of BMI. This shows that BMI is more significant compared to age that influences 5STS performance (6). Using Kolmogorov Simronov normality test, it was found that $p<0.010$, skewness 1.049 and kurtosis 1.292. It shows that the distribution is not statistically normal. Thus the functional ability is mainly based upon body mass index of somebody compared to the age. An overall average DGI score was found 16.10 ranging from 7 to 24. Decreasing trend in DGI score was found

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with increasing age. Gait with vertical head turn was found the most difficult task while gait level surface was the easiest task to perform (7).

A negative relationship between DGI and BMI was found. BMI plays 17.62% role in predicting fall. When BMI increases DGI score decreases. Yet only, 17.62% of variability in DGI score explained by BMI values which makes it a fair predictor. Age plays a huge percentage of 85.26% role in predicting DGI with correlation of -0.923. With the increasing age DGI score decreases. Thus age has a greater impact on DGI performance.

Through Kohnogorov Sitnonov normality test, it was found that $p<0.010$, skewness -0.380 and kurtosis -0.320, showing that the distribution is not statistically Normal. Thus the DGI performance is mainly based upon age of somebody compared to BMI.

From the above data it can be concluded that there is no effect of gender on 5STS and DGI performances. Skipping this least affecting parameter, it is supposed only body mass index and age are the two significant factors playing role in the performance of 400 old aged Population (8). Age is several folds significant in defining Dynamic gait score compared to 5 times sit to stand test performance (9). On the other hand BMI is around two folds more significant in defining 5STS performance compared to DGI. An Increasing effect of BMI and age on 5STS performance can be seen. Contrary to this BMI and age leaves inverse effect on DGI. The below graph is the key representation of the whole work of this study. There are certain drawbacks of this graph such as it does not explain the normative exact values of all parameters for this study. It is just a trend representation. A strong Pearson correlation of 0.594 was found between BMI and 5STS. This shows 5STS is defined strongly by the body mass index. Another weak correlation of -0.320 was observed between age and total DGI score. This is the representation of the significance of age in defining DGI (10).

5. CONCLUSION

This study concluded that mean 5STS score was found to be 16.71 and increasing BMI also increases 5 times sit to stand test score. The effects of BMI on 5 times sit to stand test performance increased with increasing age. Average dynamic gait index score was 16.10. Gait with vertical head turn was found the most difficult task to perform during the assessment of dynamic gait index. With the increasing age dynamic gait index score decreases. Age plays a role of huge percentage of 85.26% in predicting dynamic gait index with correlation a -0.923. Data distribution for 5 times sit to stand test and dynamic gait index scores was not found statistically normal.

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