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Correlation between Dynamic Gait Index and Falls Efficacy Scale -International in Community Dwelling Ambulatory Elderly

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ABSTRACT

Background: Balance deficits leading to fall is leading cause of injury in adults more than 65yrs of age, often associated with significant morbidity and sometimes mortality. Falls trigger a vicious cycle of injury - muscular weakness - bedridden condition - overall deconditioning - isolation. Thus screening of the elderly for risk of falls is important for its prevention. If this research proves a correlation between the two outcome measures (DGI and FES-I), the FES-I, which provides a more functional evaluation, can be used alone in the assessment to construct more functional goals and for quick screening.
Method: 70 community ambulating geriatric individuals from 65yrs to 75yrs were included in the study. They answered the 16 FES - I questions, and performed the 8 DGI components. Scores of the two were statistically correlated.
Results & conclusion: Statistical analysis was done using spearman's correlation coefficient. There was negative correlation between the two outcome measures, dynamic gait index and falls efficacy scale international, in community dwelling ambulatory elderly.

Keywords: Elderly, Fall-risk, Balance, Screening, Geriatrics

INTRODUCTION

Geriatrics is a medical specialty which focuses on the care and treatment of elderly, usually people who are 65 years of age or older[1]. According to center for disease control and prevention, roughly more than one third of the adults aged more than 65 years, fall each year[2]. Falls are leading cause of injury related deaths. Balance deficits and fear of falling are few of the major causes for falls. Such balance deficits leading to falls are a leading cause of injury in adults above 65 years of age; often associated with significant morbidity and sometimes mortality. For instance most of the hip fractures occur due to falls leading to further complications, altogether decreasing the confidence of the elderly and their quality of life. Hip fractures contribute to 50% of total mortality in geriatrics[3]. Lack of balance, or balance deficits leading to falls is a risk factor that can be modified or altered, so that the incidence of falls can be reduced. Fear of falling is reported by one in four older people in the community[4]. A worldwide caregiving crisis is predicted owing to changing gender roles, cultures, and erosion of traditional family values and increased trend for nuclear families. The number of geriatrics living on their own has increased; they have to care for themselves & if left alone with such balance deficits & fear of falling they have increased risk of falls and in turn injuries, eventually leading to social isolation which triggers a vicious cycle of: injury – muscle weakness – bedridden condition – social isolation – overall deconditioning. Thus there is a need

to evaluate and work upon the causes of balance deficits in elderly, by appropriate interventions, to promote Independence, function, wellness and safety, therefore overall enhancing their quality of life.

There are many tests to assess balance in geriatrics. Some of them are- ABC, FES, BBS, DGI, FRT, TuG etc.

Amongst these, the DGI is a standardized, valid and reliable clinical assessment tool[5].

It is widely used and is a performance based outcome measure for checking subject's dynamic physical balance, where the person performs all the 8 components of the test.

The FES – I, an elaborate version of the FES also a valid and reliable measure, is an interview based functional outcome measure which measures the subject's dynamic balance through functional activities. The subject has to grade his own 'concern of fall' in various activities mentioned in the scale. The grading is from 1 to 4, where 1 is no concern of fall & 4 is severe concern of fall[4].

If there is correlation between the two, any one of the above mentioned outcome measures can be used for balance assessment in geriatric population.

Need of the study:

Balance assessment can be performance based (which is done by the DGI) or it can be functional activity based (which is measured by the FES-I). Performance based assessment is better interpreted by the therapist, and functional activity based assessment is better understood by the patient and helps him to be more aware of his balance status.

As balance decreases, the person's mobility gets restricted and with it the functional activities too get restricted. These patients may be reluctant to perform DGI. If there exists a correlation between the DGI and FES-I, in such patients initial evaluation can be done with FES- I and later on after improving their balance DGI can be administered; and it can be shown to them that their balance is improved and they can now perform the tasks which were not easily possible. Thus not only the balance will improve but the fear or concern of fall will also go down in that particular functional activity, reducing the incidence of falls and enhancing the quality of life[6].

Study done by Suraj Kumar et al., also suggested further research to be carried on to improve understanding of the interaction between falls efficacy and balance performance.

Thus the study was done to see if there is a correlation between DGI and FES – I.

METHODOLOGY

This is a cross-sectional analytical study performed on 70 community dwelling elderly between 65-75 years of age. Sample size calculated with consultation of statistician. Convenient sampling was done. Power was set at 80% and confidence interval at 95%.

***Inclusion criteria*:**

(i) Healthy community dwelling ambulatory elderly, with or without assistive device. (ii) Elderly above 65yrs to 75yrs. of age.

***Exclusion criteria*:**

Subjects with,

(i) Diagnosed neuromuscular conditions (ii) Diagnosed cardiorespiratory conditions (iii) Diagnosed Cognitive impairments (iv) Uncorrected visual or auditory deficits

PROCEDURE

Approval was obtained from the ethics committee prior to commencement of the study. The study was explained to all participants and Informed consent taken from all subjects. The demographic data was collected as per the Case Record sheet. All subjects answered the 16 FES-I questions and then performed the 8 DGI components. Scores of the two were statistically correlated.

A. Falls Efficacy Scale-International (FES-I)

This is a 16 component self-rated scale where each question has to be rated between 1-4 based on; 1=not at all concerned, 2=somewhat concerned, 3=fairly concerned,

4=very concerned. The subject replies by thinking how he would usually do the activity. Lesser the score is better.[4]

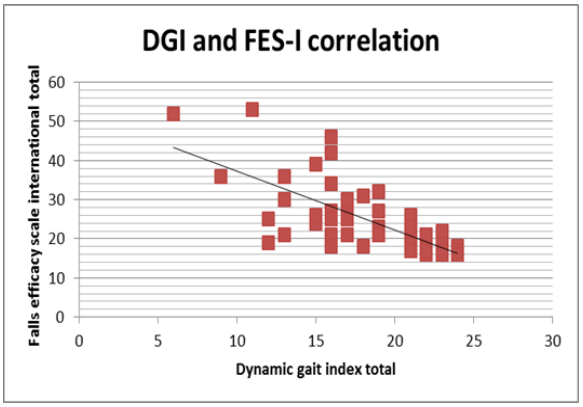
B. Dynamic Gait Index (DGI)

This is a 8 component therapist rated scale where each component is rated between 0 to 3, in which 0=severe impairment, 1=moderate, 2=mild, 3=normal. Higher the score is better.

RESULTS AND STATISCIAL ANALYSIS

Data was entered using MS Excel 2010 and analyzed using Graph pad instat software version 3.1. The Kolmogorov and Smirnov test was used to test for normal distribution of the data. Spearman's correlation coefficient used for data analysis. P value of <0.05 was taken as statistically significant. Negative correlation was obtained between the two outcome measures. The r value obtained was -0.7573. Significant p value was obtained i.e. <0.0001.

The graph shows that there is a negative correlation between DGI & FES – I.



Graph 1: Correlation between FES-I and DGI

DISCUSSION

In DGI, higher the score better is the balance and in FES – I, lesser the score better is the balance, thus a negative correlation was obtained.

Another study had concluded that there is a negative correlation between fear of fall and BBS, such as when fear of fall decreases the BBS scores are altered too[7].

As balance increases, the person's mobility increases and the fear or concern of fall goes down, therefore the score of FES – I goes down as there is improvement in performance of the functional activities, thus there was correlation obtained between balance (DGI) and concern of fall (FES – I).

This is in accordance with the study performed by Suraj Kumar, Venu Vendhan, et al which concluded that, there was a significant association between the fall efficacy, the balance performance and the functional mobility in the elderly people[8]. This relationship has an important implication for the development of the rehabilitation programs that aim to improve the balance confidence and diminish its impact on function in elderly people.

Also the DGI and FES – I both included, staircase climbing; walking with vertical head turns in DGI challenges the vestibular system and the item of removing an object from a higher shelf in FES - I also challenges the vestibular system; walking over and around an obstacle in DGI resembles the question of FES – I i.e. how much concern of fall do you feel while walking on uneven surfaces. Thus due to these similarities between the two outcome measures the negative correlation must have been obtained.

Also, when balance is poor the DGI score decreases and FES – I increases which indicates that the person is more prone for falls therefore having impaired mobility; and there is association of falls with the quality of life of the person; which is confirmed in the study by Fuzhong Li[6]. As there is a negative correlation between the two outcome measures i.e. DGI and FES-I, anyone can be used initially in the evaluation of balance in geriatrics.

For example, subjects with high fear or mental concern of fall may be reluctant to take the performance based DGI test, so in them for an initial evaluation FES – I can be taken alone; and after working on their balance, for a second evaluation DGI can be now taken and the subject can be convinced that he is now safe to perform the functional

activities which were not possible earlier due to fear of fall or underrating oneself in the FES – I.

Through subject's scoring in the FES – I, we can come to know about the areas of deficit in his functional activities, then we can directly target the weak component in the management, by formation of functional goals. This will not only improve the physical balance of the person but also reduce his fear or mental concern of fall.

CONCLUSION

There is a strong negative correlation between Dynamic gait index (DGI) and Falls efficacy scale-international (FES-I), in community dwelling ambulatory elderly.

Future Scope

This study can be done in a population with a particular disorder.

Correlation between each component of DGI and FES – I can be found out, so which component of FES – I correlates with which one in the DGI can be established.

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