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ORIGINAL ARTICLE

EFFECTIVENESS OF GOAL ATTAINMENT SCORING AS A CLINICAL MEASUREMENT IN ELDERLY PARKINSON PATIENTS WITH GAIT ABNORMALITIES	**Search engine:** www.ijmaes.org

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Abstract

Aims and objectives of the study: The aim of this study was to establish an effective scoring method for evaluation of functional outcomes and to measure the changes in functional ability among Parkinson patients. Objectives of this study were to evaluate the effectiveness of outcome measurement of Goal Attainment Scaling in Parkinson patients with gait abnormalities and also to establish a standardized method to detect the changes in function of the patients. **Methodology:** The design of the study was a prospective quasi experimental study. This study conducted for three months in a home based physiotherapy care for Parkinson's patients with gait abnormalities. Twenty Parkinson patients were participated in this study. The therapeutic goals of individual were established in consultation with the patients and their care givers. The weightage for the importance of each goal was determined and entered into a tabulator and baseline GAS scores calculated along with Dynamic Gait index scores and Timed Up and Go Scores. At the appointed review date the levels achieved was determined by the patients and the team. **Results:** The Goal Attainment Scores for the patients before and after treatment for 3 months were statistically analysed with TUG and DGI scores and they showed a significant improvement in their functional status, which is evident from the unpaired t test with p value 0.0001. **Conclusion:** The study reinforced the importance of Goal Attainment Scaling as a versatile tool to be used to evaluate the changes in function as rehabilitation of Parkinson patients in addition to providing a quantitative measure of the service outcomes.

Keywords: Goal Attainment Scaling (GAS), Parkinson diseases, Dynamic Gait index scores, Timed Up and Go Scores.

INTRODUCTION

Measuring effectiveness of treatment in rehabilitation imposes major problems due to the heterogeneity of patient's deficits and desired outcomes. So goals are very important for effective patient participation. Goal setting has become a routine part of rehabilitation and many multidisciplinary approaches to clinical care[1]. There substantial evidence which demonstrates its usefulness, both as part of communication and decision making process, and as person centered outcome measure for rehabilitation. Measurement of functional outcome through Goal Attainment Scaling was first introduced by Kirusek and Sherman for assessing outcomes in mental health settings[2]. Since then it has been modified and applied in many other areas.

Goal Attainment Scaling offers number of potential advantages as an outcome measure for rehabilitation. As goal setting is already a part of routine clinical practice in many centers, it builds on this already established process to encourage communication and collaboration between multidisciplinary team members and patient involvement - as goals are set in consultation with patients and also patients are motivated to reach their goals[3]. Originally goal attainment scaling was developed simply as an outcome measure but the process may also be in itself a therapeutic intervention and a useful tool in case management.

Goal Attainment Scoring is a method of scoring the extent to which patient's individual goals are achieved in the course of intervention. In effect each patient has their own outcome measure but this is scored in a standardized way as to allow statistical analysis[4]. In this type of scoring, tasks are individually identified to suit the patient and the levels are individually set around their current and expected levels of performance.

It is well recognized that goal setting is an effective way of achieving behavioural change in people. It is generally agreed that good goals should be Specific, Measurable, Achievable, Realistic, Timed (SMART). An important feature of Goal Attainment Scaling is the 'a priori' establishment of criteria for a successful outcome in that individual, which is agreed between the patient and therapist .

At the appointed review date the level achieved is determined by the patient and the team. In rehabilitation, GAS is more sensitive to change than the Barthel Index and Functional Independence Measure. In some studies, GAS is the only method capable of detecting a change after treatment[5].

Goal Attainment Scoring has been applied in various settings like community rehabilitation of elderly, reduction of upper limb spasticity[6] etc. This study is about the effectiveness of Goal Attainment Scoring in elderly individuals affected by parkinsonism.

Parkinson's disease (PD) is a neurodegenerative disorder characterized by cardinal features resting tremor, rigidity, bradykinesia, and postural difficulties. Patients with PD have difficulties in performing various motor tasks, such as walking, writing and speaking. Postural instability (PI) is a disabling disorder, which is associated with sudden falls, progressive loss of independence, Gait disorders, along with turning and balance disturbances, are the most important determinants of falls[7]. Hence an effective goal setting in consultation with patient and their care takers is essential for interventions aimed at improving functional mobility in these patients. A variety of standardized instruments have been used to assess outcomes of rehabilitation in these Parkinson affected patients but none have involved the patients in process of goal setting[8].

Parkinson is a neurodegenerative disorder producing gradual reduction in the functional mobility of the patients. Interventions are targeted to maintain the level of functional mobility of the patients.

Rehabilitation of postural and gait disturbances in Parkinson's disease involves rehabilitation of postural instability and

strategies to prevent falling, Strengthening and balance exercises, stepping training, auditory and visual cueing[9].

Aim of the study
To establish an effective scoring method for evaluation of functional outcomes and to measure change in functional ability in Parkinson patients with gait abnormalities.

Need of the study
Though Goal Attainment Scaling method of measuring function has been effectively applied in various conditions like Low Back Pain, Communication disorders, measuring arm function in stroke patients, none of the studies have been done on its application in Parkinson patients.

Background of the study
Goal Attainment Scaling is a valid instrument for measuring change in function in rehabilitation as compared to any other standardized scoring instruments. The success of Goal Attainment Scaling depends on the following characteristics. Setting up Specific, Measurable, Achievable, Realistic, Timed goals, Quantify Performance, Evaluating goal achievement.

Hypothesis

Null hypothesis: Goal Attainment Scaling is not a valid scoring instrument for measurement of change in functional ability in Parkinson patients.

Alternate hypothesis: Goal Attainment Scaling is a valid scoring instrument for measurement of change in functional ability in Parkinson patients.

METHODOLOGY

Study design: Prospective quasi experimental Study with pre and post experimental design.

Study setup: Home based physiotherapy care.

Study population: Parkinsons disease with gait abnormalities.

Sample size: Twenty Parkinson patients were studied for three months.

Inclusion criteria:
Age greater than 60 years, Parkinson Disease for more than 3months, Unified Parkinson's Disease Rating Scale 1, 2 and 3, Mini Mental Scale Examination score greater than 24, Dynamic Gait Index score of less than 16, falling under risk of falls category, Agreement on an achievable goal set and ability to comply with the prescribed treatment.

Exclusion criteria:
Surgical conditions of brain, Patients with fractures or deformities in Lower limbs, Patients who are not under medication for Parkinson disease, Previous Traumatic injuries of brain.

Materials used: Stop watch, chair, marking cones and pencil were used as materials for this study.

Procedure

Informed consent was obtained from the participants of the study after verbally explaining the characteristics of the study to the patient and his care giver.

On inclusion into the study, the following assessments were recorded by the investigator; Demography and history of Parkinson including type, location and time since onset.The pattern of impairment and stage of disease using UPDRS scaling and the presence of any generalised impairments that may affect outcome (including cognitive, emotional and behavioural function) were recorded using MMSE scale. Clinical examination and observational gait assessment were done. Goal setting and GAS were applied using the 'GAS-light' method as detailed below with emphasis on setting SMART (specific, measurable, achievable, realistic and timed) goals agreed between the investigator, the patient and the treating team. One primary and up to three secondary goals were set and assigned to one of the seven goal categories, Figure 1,2.

The individual therapeutic goals were established in consultation with the patients and their care givers. The weightage of importance of each of goals were determined and entered into the tabulator in consultation with the patient and their stake holders or care givers. The baseline GAS scores were calculated according to the weightage of the goals according to the guidelines set by Kiresuk and Sherman et al. Their baseline Dynamic Gait index scores and Timed Up and Go Scores were entered into their respective data collection forms specifically designed for the study.

The scores were then converted to a GAS T-score using the formula provided by Kiresuk et al. using the GAS tools tabulator.

Each goal was examined by the corresponding treating therapist together with the patients and its relative achievement rated as follows: At the expected level (score of 0), no change from baseline; -1 Less than expected, -2 much less than baseline, +1 more than expected and +2 much more than expected.

At the appointed review date the level achieved is determined by the patients and the team. The level of achievement is again entered into the GAS tools tabulator.The dynamic gait index and functional ambulation scores at end of one, two, three months were also calculated and entered into separate data collections forms.

Outcome measures

Timed up and go test: The patient seated in a chair, a distance of 5 metres is marked using a marking cone. The patient is then asked to get up from the chair walked up to the marked cone and return back and sit in the chair again. The time taken for the task is noted, Figure 3, 4.

Dynamic gait index: The patient is asked to walk a preset marked distance with varying surfaces and with vertical and sideward head turns. The time taken and gait abnormalities are rated on a four point scale, Figure 5, 6.

Figure 1: Training interventions

Figure 2: Training interventions

Figure 3: Timed Up and Go test

Figure 4: Timed Up and Go test

Figure 5: Dynamic gait index test

Figure 6: Dynamic gait index test

RESULT

The collected data were tabulated and analyzed using descriptive and interferential statistics. The data was analyzed using paired t-test and then by the one way ANOVA.

Tukeys HSD test was then performed to analyse the individual difference of three outcome measures. The statistical package for social sciences (SPSS) package was used to calculate and analyze the significance of intervention.

1. To assess all parameters descriptive statistics like mean and standard deviation were used.

2. To find the changes that occurred in the same group during study measure of inferential statistics called unpaired 't' test was used.

The calculated t – values were then compared with standard tabulated t a n-1 value where a is the level of significance which is usually maintained at 95%.

3. One way ANOVA was performed to know the difference between the three outcome measures.

The Goal Attainment Scores for patients before and after treatment for 3 months were statistically analysed and they show a significant improvement in their functional status evident from the unpaired t test p value of less than 0.0001 as given in table 1

The Timed Up and Go scores for the patients before and after treatment for 3 months were compared using unpaired t test produced a significant value of less than 0.0001 as given in table 2

Similarly the Dynamic Gait index scores before and after treatment for 3 months also produced a significant p value of less than 0.0001 for the unpaired t test as given in table 3.

The graphical representation of pre intervention and post intervention scores for Goal Attainment Scaling, Time up and Go scoring and Dynamic Gait Index Scoring are also given the graphical representations 1, 2, 3 respectively.

The Goal attainment scores, Timed up and Go scores and the Dynamic Gait Index scores were statistically compared using One way Anova analysis for three independent outcome measures and it also produced a statistically significant P value of 1.1102E-16. This value showed that the three outcome measures were significantly different and is given in table 2.

Results of one way ANOVA: The p value corresponding to the F-statistic of one way ANOVA is lower than 0.05, suggesting that the one or more treatments are significantly different.

Tukeys HSD test was performed to analyse the difference between the three outcome measures.

Analysis is given in Table 3. Tukey HSD test was applied to identify which of the pairs of treatments are significantly different from each other. From the table it can be noted that the p values for comparison of individual outcome measures were less than .01 indicating that all three outcome measures were statistically different.

The results show that all three outcome measures show significant improvement in function and are equally effective.

	MEAN		SD		T VALUE	P VALUE
	PRE	POST	PRE	POST		
TUG	13.04	11.205	1.076	1.317	4.842	0.0001
GAS	30.375	63.23	4.063	7.412	17.383	0.0001
DGI	9.30	15.20	3.74	3.65	5.047	0.0001

Table 1 T test for TUG, GAS, DGI

|	DEGREES OF FREEDOM	MEAN SQUARE	F STATISTIC	P VALUE
TREATMENT	2	5620.147	387.327	1.1102E-16
ERROR	57	14.5101		
TOTAL	12067.37	59		

Table 2 One way anova for 3 independent treatments

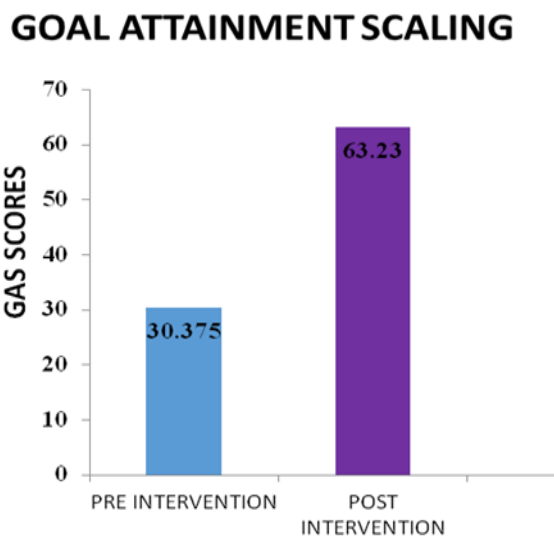| Treatments Pair	Tukey HSD Q Statistic	Tukey HSD p-value	Tukey HSD Inference
A vs B	36.1866	0.0010053	p<0.01
A vs C	4.6815	0.0045464	p<0.01
B vs C	31.5052	0.0010053	p<0.01

Table 3 Tukeys HSD test for analysis of difference between individual outcome measures
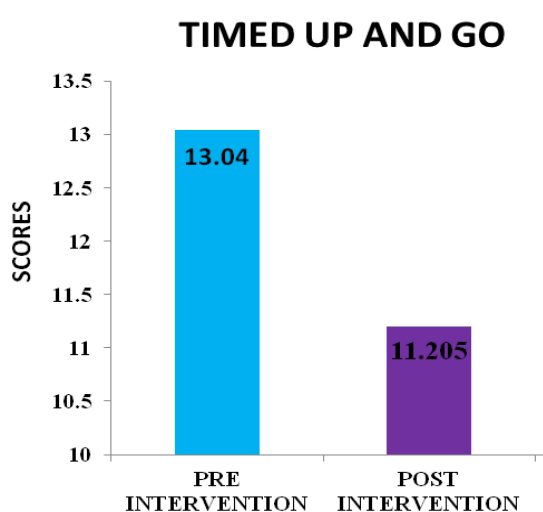
Graph 1 Graphical representation of timed up and go test
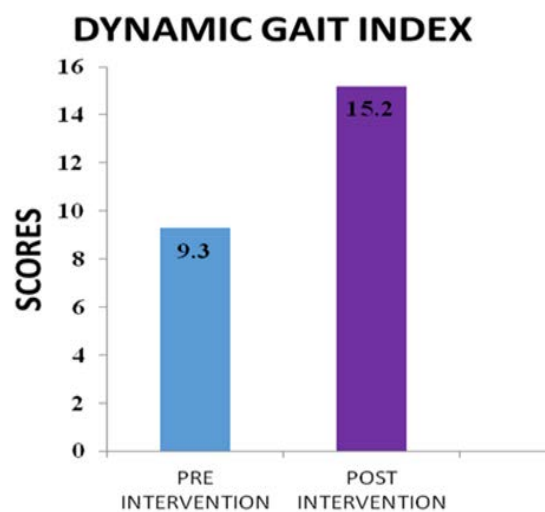
Graph 3 Graphical representation of dianamic goal index

Graph 2 Graphical representation of goal attainment scaling

DISCUSSION

The above study was conducted to evaluate the effectiveness of Goal Attainment Scoring in evaluating the functional changes in persons affected with Parkinson. After informed consent, the baseline goal attainment score was calculated for the participants. After three months of intervention, the goal attainment scores were calculated and compared with baseline score. The change in Goal attainment score was in concordance with the changes in Timed Up and Go scores and Dynamic Index Scores measured similarly at baseline and after three months of intervention.

The one way ANOVA conducted on the three outcome measures produced a significant

p value noting that the three outcomes measures were different from each other. Further the Tukeys HSD test also established the fact that all three outcome measures correlate well and produce a statistically significant change in function.

The validity of GAS is supported in this study by the significant correlations between GAS scores obtained at baseline and at program end and between final GAS scores and other outcome measures.

These results are in line with the study conducted by Malec et al on the effectiveness of Goal Attainment Scoring in Traumatic Brain Injured patients which compared the Goal Attainment Scoring with Portland Adaptability Inventory scores[10] Similarly study conducted by Lynne Turner stokes et al incorporating Goal Attainment Scoring in upper limb spasticity following treatment with botox also concluded the validity of Goal Attainment Scoring.

Thus The Goal Attainment Score also evaluates function and gait improvements similar to any other standardised score. Since the establishment of goals are done in consultation with the patient, effective participation from patient is also obtained. Hence Goal Attainment Scoring method can be incorporated into clinical practice to measure changes in function along with other standardised functional measurements[11].

Results of this study and case analyses suggest that GAS offers the rehabilitation team a quantifiable and individualized assessment of progress that is useful for

- Monitoring patient progress,
- Ongoing rehabilitation planning and decision-making,
- Concise, relevant communication to family, referral sources,
- Overall program evaluation[12].

Our findings lead us to concur with previous studies which, in addition to documenting pretreatment expectations on change and sharpening the focus of treatment, GAS is able to capture subtle but important change in client-centered functioning. However, overall, GAS should be considered a useful adjunct to the present standardised options for assessing patient outcomes after rehabilitation.

Limitations and Recommendations

- Smaller size of study population meant the results cannot be generalised. The complex nature of calculations involved in goal setting and evaluation requires expertise and training and cannot be applied as such to large community set up.
- Specifically, ratings on all measures were not made by blind raters. Clinicians rating goal attainment and other outcome measures were aware of subjects' outcomes and scores on other measures.
- As others have noted, the highly individualized assessment offered by GAS may only partially meet requirements for program evaluation, because progress toward personal goals does not necessarily correspond with progress toward goals of societal value (eg, employment). A comprehensive program evaluation should include other objective measures, employment outcome, and level of independent living.
- Although academically and clinically important, it was not feasible to make a proper rigorous assessment of responsiveness of GAS. Nevertheless, the study was able to demonstrate that the scoring did actually detect the desired clinical changes.

CONCLUSION

The study reinforced the importance of Goal Attainment Scaling as a versatile tool to be used to evaluate change in function in rehabilitation of Parkinson patients in addition to providing a quantitative measure of service outcomes. Goal Attainment Scaling also has therapeutic utility, increasing patients' self awareness, goal orientation as well as helping the rehabilitation process to be goal directed.

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