



# Clinical Research

## Clinical Services – Physiotherapy

<b>TITLE</b>	<b>Which Outcome Measure is most appropriate for Falls Prevention Programmes?</b>
<b>AUTHORS</b>	<i>Cahalan, R.,<sup>1,2</sup> Coote, S.,<sup>2</sup> Saunders, J.<sup>3</sup> Physiotherapy Department, St. Camillus Hospital, Limerick<sup>1</sup> Physiotherapy Department, University of Limerick<sup>2</sup> Statistical Consulting Unit, University of Limerick<sup>3</sup></i>

### INTRODUCTION

The efficacy of physiotherapeutic treatment is best assessed, and thus justified, by the use of an appropriate outcome measure. The Irish Health Service Executive (HSE) in its 2004 Standard recommended that the clinician is obliged to;

“Take account of the patient’s problems, and where possible (use) a published, standardised, valid, reliable and responsive outcome measure to evaluate the change in the patient’s health status”.<sup>1</sup>

Regarding mobility, balance and falls risk in an elderly population, a number of such tools exist.

### OBJECTIVE

The aim of this study was to ascertain which of a number of commonly used outcome measures, namely the Berg Balance Scale (BBS), the Elderly Mobility Scale (EMS), the Tinetti Performance Oriented Mobility Assessment (T-POMA) and the Biodex Balance System (Biodex), provides the greatest intra-rater reliability and sensitivity in such a population.

### METHODOLOGY

15 patients actively receiving physiotherapy treatment at St. Camillus hospital in Limerick were recruited for the study. Participants were required to be over the age of 65 years with impaired balance or mobility. Additional inclusion criteria included the ability to mobilise independently, with or without a walking aid, fluency in the English language and a Mini-Mental Status Examination (MMSE) score greater than 24. A same day test-retest design was used to investigate intra-rater reliability. All subjects were then retested after 4 weeks to assess sensitivity. Reliability was calculated using the intraclass correlation coefficient (ICC) and Bland & Altman methodologies. Sensitivity was assessed using paired t-tests, effect size and standardised response means.

### RESULTS

Excellent relative intra-rater reliability was demonstrated by the EMS, BBS and the T-POMA, as indicated by an ICC in excess of 0.75 and 95% confidence intervals (CI) values.<sup>2</sup> While the ICC values of the two components of the T-POMA and the Biodex showed excellent relative reliability, the greater variability inherent in the 95% CI reflected fair to good reliability for Tinetti Gait and Tinetti Balance subsections, and poor reliability for the Biodex. Bland & Altman analysis calculates measures of error and variability. Analysis on this basis also identified EMS as the most reliable tool, and the Biodex was found to have the poorest intra-rater reliability of measures assessed.



Regarding sensitivity analysis, all data were assumed to be normally distributed and treated parametrically using paired t-tests. It is acknowledged, given the small study population, that this assumption of normality may be defective and should be investigated more fully in any larger future studies.

On analysis, none of the differences between test occasions was found to be statistically significant ( $p=0.05$ ). A comparative sensitivity analysis was performed by calculating the effect size and standardised response mean for each outcome measure. In both instances, the Biodex proved to be the most sensitive of the outcome measures assessed, followed by the BBS. The EMS had the worst comparative sensitivity.

## CONCLUSIONS

This pilot study of the comparative intra-rater reliability and sensitivity of the EMS, BBS, T-POMA and Biodex balance system found excellent reliability for the EMS, BBS and T-POMA. While the Biodex proved to be the least reliable, it was the most sensitive. Of the outcome measures investigated, the BBS appears to have the best combination of reliability and sensitivity. An investigation in a larger more homogenous group with adequate rest periods and an amended Biodex protocol is advocated. The findings of this research are currently being used to evaluate the efficacy of the elderly falls prevention programme conducted by the Physiotherapy Department at St. Camillus Hospital, Limerick.

## REFERENCES

Available on request.

## PRESENTED

As a poster presentation at the Annual Health Research Board "Let's Talk Health" Conference in the Gresham Hotel, Dublin on Thursday, December 6<sup>th</sup>, 2007.

## FUNDING

This study was funded by the Health Research Board Summer Student Scholarship programme, 2007.