EVALUATION OF AN OBSTACLE COURSE, THE SHERBROOKE FUNCTIONAL EVALUATION OF THE RISK OF FALLS IN ELDERLY (SFERE) : RELIABILITY AND VALIDITY STUDY

Mihret Karahasanovic, Caroline Baril, Jérémi Bédard, Nemanja Djilas, Mathieu Juteau, Julie Larochelle, Marcel Rivard, Hélène Corriveau

INTRODUCTION

The prevalence of falls among elderly is a growing concern in our community because of hospitalisation, healthcare costs, disability and mortality that are associated. The third of those falls could potentially be prevented. It is essential to have a reliable and valid tool allowing the identification of fallers. To be more accurate, this tool needs to be representative of daily living and must include double tasking as present in real life. This is the reason why an obstacle course has been suggested, the Sherbrooke Functional Evaluation of the Risk of Falls in Elderly (SFERE).

AIM

The aim of this study was to investigate some psychometric properties of the SFERE.

METHOD

Research design : descriptive correlational

Data collection : it included two phases, first in 2004 for the reliability and second in 2013 for the validity.

Tasks of the SFERE

① Sit to stand transfer from a chair with armrests and 1.83m (6') walk
② Move 2 towels using only the foot
③ Open a door, cross the door sill and close the door
④ Walk 1.83m (6'), sit and stand up from a chair without armrests
⑤ Open a door, cross the door sill and close the door
⑥ Zigzag through 6 obstacles
⑦ Walk 6.1m (20') while counting from 20 to 10
⑧ Walk 4.57m (15') while identifying 4 visual targets and passing over a carpet
⑨ Subjective assessment of the participant's endurance
⑩ Subjective assessment of the participant's impulsivity

Figure 1 : SFERE obstacle course

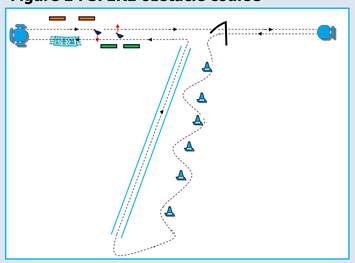
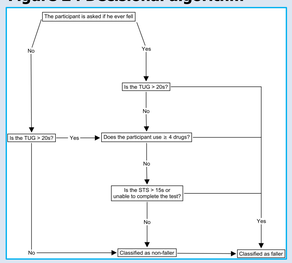


Figure 2 : Decisional algorithm



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	Reliability	Validity
Sampling	N = 41	N = 95 (45 fallers; see figure 2 for definition)
Mean age	72.2 years	83.7 years
Inclusion criteria:	Able to walk with or without walking aids Able to follow simple instructions Medically stable 55 years or older	
Exclusion criteria:	Important comorbidity preventing them from accomplishing the obstacle course	
Recruitment	In retirement homes, consecutive volunteers were recruited: Poster announcing an explicative conference Explicative conference explaining the subject Appointment for the participation to the study	
Data collection	Social demographic (questionnaire) Mobility (TUG) Dual tasking (TUG manual) Lower limb strength (Sit to Stand)	
	Interrater and Test-retest reliability 1st session : 2 raters evaluate each participant 2nd session (2-5 days later) : one of the raters evaluates the participant again	Validity 1 session : 1 student in physical therapy evaluate each participant doing the SFERE
Data analysis	Intraclass correlation coefficients (ICC)	Criterion concurrent validity : sensibility and specificity with receiver operating characteristic (ROC) curves for : • Total score of the SFERE • Time to complete the SFERE • Time to complete the TUG Pearson's correlation coefficient for the construct convergent validity

RESULTS

Figure 2 : ROC Curve for the SFERE time

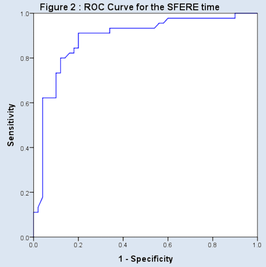

Figure 3 : ROC Curve for SFERE score

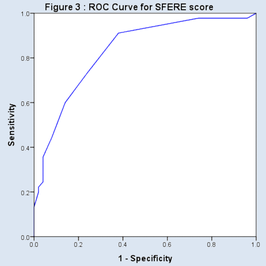

Table 1. Clinical variables for the validity study

	Mean	Standard deviation
SFERE score (/30)	26 ± 0	3
SFERE time (s)	126.8 ± 6.0	58.9
TUG (s)	19.6 ± 1.2	11.5
TUG manual (s)	15.1 ± 1.0	4.7
STS (s)	27.01 ± 1.77	17.2

Table 2. Reliability

Inter-rater	0.90
Test-retest	0.74

Table 3. Criterion concurrent validity

Cut-off	Sensibility	Specificity
SFERE score ≤ 27/30	0.911	0.620
SFERE time ≥ 89.2s	0.911	0.800

Table 4. Construct convergent validity

SFERE score and SFERE time	-0.804
SFERE time and TUG time	0.846
SFERE score and TUG time	-0.731

Table 5. Sensitivity and specificity for screening tools

	Sensibility	Specificity
Berg	0.84	0.78
TUG	0.87	0.87
TUG manual	0.80	0.93
Sit-to-stand	0.67	0.72

DISCUSSION

• The SFERE was found to have excellent inter-rater reliability (ICC = 0.90) and good test-retest reliability (ICC = 0.73). The results of the obstacle course are influenced by an unequal performance of the participants during a short period. Therefore, clinicians must be aware that different factors, such as anxiety and learning, could influence the performance during the obstacle course.

• The TUG test is a valid and reliable tool for identifying risk of falls among elderly, and is widely used by physical therapists. The specificity and sensibility of the SFERE are as good as of the TUG.

• The cut-off of the time variable (89.2s) of the SFERE has values of sensitivity (0.911) and specificity (0.800) that are even better than those of the total score (≤27), sensitivity (0.911) and specificity (0.680). Therefore, with an excellent sensitivity, it is possible to admit that an elderly having a score inferior to 89.2s is a faller. Furthermore, the good specificity allows for identification of non-fallers.

• Clinically, it is important that a tool assessing the risk of falls has a good capacity of ruling out a non-faller because the consequences of wrongly ruling out a faller are greater than the consequences of wrongly ruling in a non-faller.

CONCLUSION

In comparison with traditional instruments, the numerous functional tasks present within the SFERE help health care professionals in developing a plan of treatment and preventive measures, in order to reduce the risk of falls. Furthermore, the SFERE has the advantage of having cognitive tasks.

Acknowledgments

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Université de Sherbrooke – Faculté de médecine et des sciences de la santé