Validation of Fall Risk Assessment Tools in an Acute Hospital

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Introduction

- Falls amongst inpatient remains one of the most common reported adverse events in the acute care facilities. It often results in morbidity, mortality, prolonged length of stay, and also gives rise to potential medicolegal problems.
- Fall Risk Assessment Tools have been used to identify patient at risk for falls . Most tools in literature were developed for use in a specific setting and are found to have perform differently when used in population outside the validated cohort
- Validation of a tool in local setting is important to look at the feasibility and performance of the tool before incorporating into a hospital programme
- Our current tool used in our hospital have not been validated and over identifies patients at high risk resulting in dilution of the fall prevention efforts.

Aim of Study

- The aim of the study was to validate the Hendrich II (HFRM II) and the Western Health Fall Risk Assessment (WHeFRA) tool against current tool (TTSH FRA) used in the hospital for use in our hospital fall prevention programme.



Methodology

- This was a prospective cohort study carried out in 28 acute wards for a period of 8 weeks
- Patients from Intensive care, high dependency wards and those who are dangerously ill were excluded.
- The subjects were identified from ward admission records using a stratified sampling procedure.
- 6 research nurses were trained to use the instruments by Falls Nurse Clinician as well as the physiotherapist for the functional assessment.
- Interrater studies was done and results was compared to a single "gold standard" assessment by Falls Nurse Clinician.
- The subjects were screened using the two research tools by research nurses within 48 hours of admission and Informed consent was obtained prior to screening.
- 482 subjects were screened, 77 refused consent and 406 were enrolled in the study.
- The subjects were followed up till they were discharged or to the end of the study period.
- Data on patients demographic, diagnosis, co-morbidities, medications, length of stay, time to first fall, fall data as reported in the hospital occurrence system for falls (eHOR) were collected using a standardized data form.
- Data Analysis:
  - Kappa statistics are generated for assessing the Inter-rater agreement of nominally-scaled data.
  - Intraclass correlation is applied for assessing the raters' level of agreement of total scores of the tools.
  - The data are entered into Stata 9.0 (Stata Corp, Texas, USA) for analysis. All statistical tests are conducted at 5% level of significance.
  - ROC was used to explore the relationship between sensitivity and specificity of the tools.

Results

- Agreement among the 6 research nurses for Henrich II and WHeFRA are extremely high.

Agreement		
	Kappa	Range
Henrich II	0.95	(95% CI: 0.90-1.00)
WHeFRA	0.94	(95% CI: 0.89-1.00)

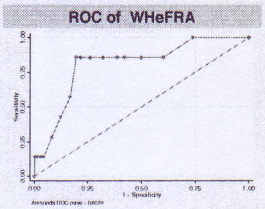
Demographics	Fallers (N = 7)	Non-Fallers (N = 399)	Total (N = 406)
Age (year)			
Mean	73.2	62.6	62.8
Range	58.2 – 86.6	15 – 95.7	15 – 95.7
Gender (%)			
Male	42.9	50.1	50.2
Female	57.1	49.9	49.8
Ethnicity (%)			
Chinese	71.4	69.7	69.7
Malay	14.3	15.8	15.8
Indian	14.3	12.3	12.3
Others	0.0	2.2	2.2
Length of Stay (Days)			
Mean	11.9	6.3	6.4
Range	1 - 30	0 - 56	0 - 56
No of Medications			
Mean	3.7	4.9	4.8
Range	1 - 6	0 - 15	0 - 15
Disciple (%)			
Medical	57.1	50.1	50.2
Surgical	0.0	33.8	33.3
Geriatric	28.6	4.3	4.7
Neurology ward	14.3	11.8	11.8

- Subjects who fall tends to be older, stay longer, fall within the 1st week of hospitalization and are from general medical, neurology and geriatric wards.
- The causes of falls were mainly due to subject 's underlying cognitive impairment and changes in their health status.
- 57% of the subjects sustained injuries and others had no injury
- From the study we identified the optimal cutoff for WHeFRA as ≥9 and for Hendrich II it was ≥5.

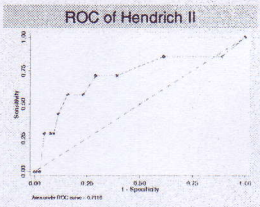
Optimal Cutoff	Sensitivity	Specificity	AUC
TTSH	100%	25.8%	N.A
WHeFRA ≥ 9	85.7%	80.5%	0.81
Hendrich II ≥ 4	71.4%	70.9%	0.71

Published Cutoff	Sensitivity	Specificity
WHeFRA ≥ 10	57.1	83.1
Hendrich II ≥ 5	57.1	76.9

ROC of WHeFRA



ROC of Hendrich II



Discussion/Conclusions

- From the study, falls tend to occur in older patients and coming from the medical wards. They also tend to have longer length of stay.
- Both WHeFRA and Hendrich II possess high sensitivity and specificity which are important attributes of a good screening tool.
- Apart from the above, we would also need to consider the practical aspect such as the duration and simplicity in administering the tool.

References

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