Multisite, Prospective Validation of the eHDS for Predicting Emergency Department Falls

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Objectives

- Falls continue to be a significant safety concern for patients in emergency departments (EDs).
- Foundational to preventing falls is being able to determine which patients are at risk.
- Published literature evidences three fall prediction tools which have been tested in the ED setting. [1-3]
- Both the Hendrich II (retrospective) and KINDER 1 (prospective) performed questionably yielding a sensitivity of 37.5%[1] and 73%[2], respectively. The MEDFRAT tool has been evaluated prospectively without reports of specific predictive ability/ precision and with a κ of 0.70 reflecting only moderate scoring agreement among clinicians.[3]
- No publications have evidenced an ED specific tool that has had complete psychometric validation.

Purpose

The purpose of this study was to prospectively validate a derivative of the Hester Davis Scale© (HDS), the emergency department HDS (eHDS), to determine if a more precise tool for predicting anticipated physiologic falls occurring in the ED setting could be developed.

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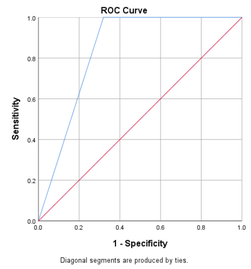
Methods

- Retrospective data on 152 ED fallers was evaluated to determine which variables of the HDS were salient to predicting anticipated physiologic falls occurring in the ED setting.
- Three variables emerged consistently including mobility, medications and behavior. These variables were operationalized into a fall risk screening tool for use by nurses in the ED.
- Nurses were trained to use the tool before it was prospectively deployed into patient care via the Epic electronic medical record for a ten month study period at an academic medical center in the southern US and at a large metropolitan medical center on the West Coast.
- Inter rater reliability (κ=0.90), content validity and construct validity were previously established for all three predictor variables.[4]
- Factor Analysis was utilized to measure each variable's predictive contribution to ED falls.
- Sensitivity and specificity of the eHDS were measured for fallers and non-fallers, respectively.

Results

- Thirteen patients experienced anticipated physiologic falls during the study period (representing 110,445 combined visits) including seven females (54%) and six males (46%).
- The average age of fallers was 52.1 yrs.
- The sensitivity of the eHDS including all three variables was 100% and the specificity (obtained from a random sample of 216 non-fallers) was 41%.
- Factor analysis of the variables evidenced that none of the fallers scored medications only. Each time medications scored positive, it was in addition to either mobility or behavior.
- Dropping medications from the model did not affect the sensitivity and increased the specificity to 68%.
- ROC Curve analysis of the final model yielded an Area Under the Curve (AUC) of 0.84.



Tool Comparison

	Hendrich II	KINDER 1˜	eHDS˜
Sensitivity	37.5%	73%	100%
Specificity	n.d.	n.d.	68%

˜=Tested Prospectively; n.d.=no data reported

Conclusion

The final eHDS model is the first known ED fall risk screening tool to undergo full prospective psychometric evaluation in a multisite study. Results reveal it is suitable for use in clinical practice. Although we anticipate the sensitivity will not remain perfect over time, the tool has continued to perform well in the two years since its initial validation.

References:

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