



NEAT: Nurse Effort Assessment Tool – Human Factors Considerations in Designing for Appropriate Staffing

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1. BACKGROUND

- The quantity and acuity of mental health challenges in the US has increased.
- Mental health inpatient care facilities have remained critically understaffed.
- Accurately measuring patient acuity is essential for estimating nurse staffing needs.
- Currently, there are no empirically developed algorithmic solutions; instead, nursing staffing is determined by surveys of nurses.
- The Harbor Performance Initiative developed an algorithm to measure behavioral health acuity from patient-level information from electronic health records (EHRs) and nurse-input-driven parameters.

2. OBJECTIVES

To refine the NEAT to address the increasing acuity of behavioral patients. Specifically:

1. To examine if nurses' subjective scores are associated with the overall NEAT score.
2. To determine how much individual nurse scores account for predictive variance.

3. METHODS

- Initial pilot test of algorithm identified 9417 archived patient records (November 2023 - January 2024) from a healthcare facility in the southeastern U.S.
- 14 different types of input in the algorithm: 12 from EHRs and 2 from nurses delivering the care.
- To understand the relationship between the subjective variables from the nurses and their impact on the overall score:
 - Bivariate correlation analysis assessed the correlation between the nurse-reported inputs and the overall NEAT score.
 - Linear regression assessed the overall nurse score.

4. RESULTS

1. The Pearson correlations revealed:
A significant relationship of **67%** between the NEAT Score and the subjective current measurement of patient need ($0.671, p < 001$) and the subjective future measurement of patient need ($0.672, p < 001$)
2. The regression model analysis determined that current and future intervention scores predicted **46%** of the NEAT score variance ($p < .001$);
3. The regression analysis limited to 142 instances where scores shifted for the current and future intervention, these changes predicted **29%** of the NEAT score variance ($p < .001$).

5. CONCLUSIONS

- This study is the first step in incorporating the rich objective measures documented in EHR with nurse assessments to determine the level of nursing care patients require.
- A strength of NEAT is the inclusion of 12 measures derived based on EHR data and 2 measures based on nurse assessments of patient level of care.
- Correlation analysis indicated that nurse scores predicted 46% of the NEAT variance. Therefore, **NEAT is capturing nearly half of the patient needs that nurse assessments do.**
- NEAT advances the field of nursing care by developing an algorithmic and less time-intensive approach to determine nurse-to-patient staff ratios.
- As NEAT is implemented, the information gained will provide inpatient mental health facilities with evidence-based staffing requirements during payment rate negotiations.

6. ACKNOWLEDGEMENTS

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