Incorporating Usability Testing in the Implementation of the Hopkins Pediatric Early Warning Score (HPEWS)

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Introduction

Problem and Background

- Johns Hopkins Children’s Center (JHCC) has a higher rate of patients transferred to the PICU after a rapid response team is called (approx. 75% compared to 50% nationally)
- Pediatric Early Warning Scores (PEWS) can provide earlier identification of critically ill children

Aims of Hopkins PEWS (HPEWS) (figure 2):

- Enable early identification of patients likely to decompensate
- Standardize communication about patient status
- Effectively transition patients to different levels of care (McLellan et al., 2017 & Fenix et al., 2015)

Usability testing

- Usability testing not incorporated in previous studies
- Identify usability problems in HPEWS adoption
- Use user-centered design to suggest integration of HPEWS with workflow

Research question

- What are barriers to HPEWS use, and do they relate to short- and long-term HPEWS adoption?

Objectives

3. Barriers to care escalation
2. How to interpret scores
1. How to compute and document scores

What are barriers to intended use?

Usability evaluation in industry


STUDY 1: PRE-IMPLEMENTATION

Captured how nurses are using tool and if they understand how to document scores

Research Questions:

- Is the HPEWS a usable tool to understand and communicate about patient status?
- What are barriers to intended use?

Participants:

8 nurses from Bloomberg 9N

Materials

1. HPEWS
2. 2 scenarios yielding different HPEWS scores

Procedure

- Introduction of HPEWS
- Administration of cases (using counterbalancing)
- Nurses computed score for each system and final score
- Elicitation of intended action

Results

1. 4 scenarios yielding different HPEWS scores
2. 88% disagreement
3. 75% computation confusion

STUDY 2: POST-IMPLEMENTATION

Research Questions:

- Is the HPEWS an effective tool in communicating about patient status?
- What are barriers to continued adoption of HPEWS?

STUDY 2a – Immediate Post-Implementation

Education plan rolled out and HPEWS superusers identified in each unit

Participants:

23 nurses from Bloomberg 9N, 9S, 10N, 10S, and 11S

Materials and Procedure

- Survey 1: Assessing persistence of barriers from pre-implementation
- Survey 2: Assessing general usability of HPEWS with the Systems Usability Scale (SUS, Brook, 1996).
- Administered 3 days post-implementation

Results

- 79% had difficulty with documenting final score
- 87% expressed no difficulty with documenting system score

STUDY 2b: Delayed Post-Implementation

Residents tasked with documenting goal vital signs (lower input workload for nurses)

Participants:

95 nurses from Bloomberg 9N, 9S, 10N, 10S, and 11S

Materials and Procedure

- Survey 1 and 2
- Administered 2 months post-implementation survey

Results

- 79% above the midpoint for difficulty with documenting final score
- 41% above the midpoint for wanting continued use of HPEWS

Figure 2: HPEWS usability tool

Figure 3: Pre- vs. Post-implementation results

Future Directions

- Incorporate usability testing at the onset of development cycle
- Incorporate HPEWS into workflow by designing it into EPIC
- Changes to HPEWS have been made since usability testing. Need to see if changes have given nurses less time-consuming factors in completing the tool
- Reduce the amount of criteria nurses have to sort through
- Resident surveys to address similar issues of usage

References


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