Nurses represent a significant proportion of clinician end users, yet little is known about the incidence or impact of alert fatigue among healthcare professionals. The purpose of this study was to evaluate the psychometric properties of an adapted nurse alert perception survey. A total of 1088 nurses were invited to participate and 146 surveys were submitted. Data were entered in SPSS 22. Likert scale responses were converted to standardized z-scores for analysis. The “Does not apply” response option and unanswered survey items were treated as missing data.

Table 1: Bivariate correlations among age and subscales of survey (N=116)

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Age</th>
<th>Facilities</th>
<th>Barriers</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities</td>
<td>0.67**</td>
<td>0.72**</td>
<td>0.75**</td>
<td>0.72**</td>
</tr>
<tr>
<td>Barriers</td>
<td>0.72**</td>
<td>0.75**</td>
<td>0.72**</td>
<td>0.72**</td>
</tr>
<tr>
<td>Benefits</td>
<td>0.72**</td>
<td>0.75**</td>
<td>0.72**</td>
<td>0.72**</td>
</tr>
</tbody>
</table>

Discussion

The discussion included the development of an adaptive form of this survey instrument in a nursing population. The survey demonstrated acceptable psychometric properties; however, the subscale items composed of the adapted instrument were not replicated in this study. The combination of PE/UB items in the Barnesf el subscale (Factor 1) was an unexpected finding. A literature search to identify the optimal number of BPAs to present during this work shift was conducted. In addition, the lack of a comparable validated instrument precluded the ability to perform concurrent validity assessments.

Although the modest number of BPAs received per work shift (6.2) and nurse responses in this study do not provide clear evidence of cognitive overload and/or alert fatigue, BPAs represent only one type of the EHR that may be deemed cognitively fatiguing. The concept of alert fatigue is complex and not directly measurable; perceptions alone may not be sufficient to elucidate the phenomenon. The survey demonstrated potential benefit for use in future investigations of nurse alert perceptions. Future investigations with larger sample sizes that incorporate actual EHR system alert data and direct observations to triangulate nurse perceptions would contribute to a greater understanding of nurse alert fatigue.

References


Nurses (n = 136) reported receiving an average of 6.2 BPAs (SD 7.78, range 0-50) during a work shift. The impact of alert fatigue and the burden of cognitive overload was presented to clinicians for further discussion.

The study was conducted at a 586-bed Midwest hospital. Following IRB approval, data were collected for one month from hospital based nurses using SurveyMonkey. An invitation containing an overview of the study, human subject considerations, and a hyperlink for survey access was distributed via hospital email accounts. Participation was voluntary and survey completion informed individual consent. A total of 1088 nurses were invited to participate and 146 surveys were submitted. Data were entered in SPSS 22. Likert scale responses were converted to standardized z-scores for analysis. The “Does not apply” response option and unanswered survey items were treated as missing data.

The distributions of item responses were generally normal with a skewness range of -3.91 to 1.88 (Q11) to -1.88 (Q15), indicating more positive agreement/less perceived use behavior. The KMO index value of .874, Bartlett’s test of sphericity (Q2 = 1703.096, df = 210, p < .0001), and communality findings supported a decision to proceed with factor analysis. Subject responses to the 21 theoretical construct items were subjected to factor analysis using principal component factor extraction with Varimax rotation. Factual data about individual nurse’s day-to-day workflow was collected to develop items for the subscales. The final subscales were the FP, Benefits (4 items), PE, UB, BC, and SI subscales. Item scores are available for interested readers. All factor analysis were subjected to factor solution by removing items with factor loadings less than .4 on the subscales. The distributions of item responses were generally normal with a skewness range of -3.91 to 1.88 (Q11) to -1.88 (Q15), indicating more positive agreement/less perceived use behavior. The KMO index value of .874, Bartlett’s test of sphericity (Q2 = 1703.096, df = 210, p < .0001), and communality findings supported a decision to proceed with factor analysis. Subject responses to the 21 theoretical construct items were subjected to factor analysis using principal component factor extraction with Varimax rotation. Factual data about individual nurse’s day-to-day workflow was collected to develop items for the subscales. The final subscales were the FP, Benefits (4 items), PE, UB, BC, and SI subscales. Item scores are available for interested readers. All factor analysis were subjected to factor solution by removing items with factor loadings less than .4 on the subscales.