Measuring a Healthy Work Environment in Acute Care Hospital Settings

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No Disclosures

- Penny Huddleston, PhD, RN, CCRN
- Baylor Scott & White Medical Center Irving
- No sponsorship or commercial support was given to the author
Brain Teaser

- **THINK**-about a HWE (How would you define it? What does it mean to you?)
- **PAIR**-up with another person
- **SHARE**-your responses
Background and Significance

- Unhealthy work environments lead to medical errors, RN turnover, and higher costs to replace RNs in healthcare setting.
- Deaths from preventable adverse events estimated between 210,000 and 440,000 annually (James, 2013).
- Number of additional RNs needed 439,300 by 2024 (Bureau of Labor Statistics, 2016).
- Cost to replace medical/surgical nurse $92,000 and specialty nurse $145,000 (Juraschek et al., 2012; Sredl & Peng, 2010).
- Healthy work environments (HWEs) may lead to better patient and nurse outcomes, and retention of RNs (Aiken et al., 2002; Kramer & Schmalenberg, 2008; Ritter, 2011).
Framework

- Donabedian’s model of structures, processes, and outcomes
- Kanter’s theory of Structural Empowerment
- Spreitzer’s theory of Psychological Empowerment
- Characteristics of a HWE guide the structures, processes, and outcomes

Adapted from Huddleston, 2014
Baylor Health Care System Professional Nursing Practice Model

HEALTHY WORK ENVIRONMENT

PROFESSIONAL NURSING PRACTICE

NURSE COMPETENCIES

• Clinical Judgment
• Clinical Inquiry (Innovator/Evaluator)
• Facilitation of Learning
• Collaboration
• Systems Thinking
• Advocacy and Moral Agency
• Caring Practices
• Response to Diversity

SYNERGISTIC NURSING PRACTICE

Clinical Excellence

Optimal Patient Outcomes

Culture of Inquiry

Nursing Research

EVIDENCE BASED PRACTICE

PATIENT NEEDS

• Resiliency
• Vulnerability
• Stability
• Complexity
• Resource Availability
• Participation in Care
• Participation in Decision-making
• Predictability

SAFE PASSAGE

AUTHORITY

ACCOUNTABILITY

AUTONOMY

Effective Decision Making

Appropriate Staffing/Resources

Meaningful Recognition

Authentic Leadership

True Collaboration

Skilled Communication

Nurse Competencies

Patient Needs

1 Nurse Competencies and Patient Needs from the AACN Synergy Model for Patient Care, American Association of Critical Care Nurses, 2006. Used with permission.

Purposes of Part 3 Studies

- To develop Healthy Work Environment Scale for Direct Care Nurses (HWES for DCNs) and HWES for Nurse Leaders (HWES for NLs) in formal positions

- To assess validity and reliability of HWES for Direct Care Nurses and HWES for Nurse Leaders

- To describe direct care nurses’ and nurse leaders’ perceptions of a HWE
Research Questions

- What were the psychometric properties of the HWES for DCNs used to assess the work environment in acute care settings?

- What were the psychometric properties of the HWES for NLs used to assess the work environment in acute care settings?

- What were the direct care nurses’ and nurse leaders’ perceptions of a HWE in acute care settings?
Human Subjects Protection

- Approval obtained from Baylor Health Care System Institutional Review Board
- Approval obtained from University of Texas at Arlington (UTA) Institutional Review Board
- Standard processes for human subjects protection were used in these studies
Settings

Baylor Scott and White Health (BSWH) North Division

- Phase One-conducted with one hospital and the Office of the CNOs

- Phase Two-conducted in all hospitals throughout BSWH North Division

- Located in the Dallas/Fort Worth area
## Subject Demographics for Phase One

<table>
<thead>
<tr>
<th>Demographic Characteristic</th>
<th>DCN Sample</th>
<th>NL Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>n=50</td>
<td>n=32</td>
</tr>
<tr>
<td>Females</td>
<td>n=39 (78%)</td>
<td>n=26 (81%)</td>
</tr>
<tr>
<td>Mean Age</td>
<td>n=48 (SD 10.02)</td>
<td>n=42 (SD 8.89)</td>
</tr>
<tr>
<td>Position</td>
<td>DCN n=43 (86%)</td>
<td>APRN n=5 (16%)</td>
</tr>
<tr>
<td></td>
<td>Supervisors n=43 (14%)</td>
<td>Frontline NM n=9 (28%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurse administrators n=10 (31%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurse executives n=3 (9%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other n=5 (16%)</td>
</tr>
<tr>
<td>Highest Level Degree</td>
<td>BSN n=28 (56%)</td>
<td>MSN n=12 (39%)</td>
</tr>
<tr>
<td>Greatest Number of Years as RN</td>
<td>1 to 5 years n=16 (32%)</td>
<td>11 to 15 n=9 (28%)</td>
</tr>
<tr>
<td>Greatest Number of Years on Current Unit</td>
<td>1 to 5 years n=27 (54%)</td>
<td>1 to 5 years n=17 (53%)</td>
</tr>
<tr>
<td>Greatest Number of Years at BSWH</td>
<td>1 to 5 years n=27 (54%)</td>
<td>1 to 5 years n=11 (34%)</td>
</tr>
</tbody>
</table>
Procedures for Phase One

Face Validity
- Assigned items to one of eight characteristics of a HWE

Content Validity Indices
- Used Lynn’s (1986) method of assigning a relevancy score to each item on scale
- Ranged from:
  - 1-not relevant, 2-somewhat relevant, 3-quite relevant, or 4-very relevant
Results for Phase One

- HWES for DCNs (version 2)
  - 51 items (v1) 4 items deleted due to face validity
  - 47 items (v2)
  - S-CVI 0.897 or 0.90
  - I-CVI 0.52 to 1.00

- HWES for NLs (version 2)
  - 48 items (v1) 1 item deleted due to face validity
  - 47 items (v2)
  - S-CVI 0.939 or 0.94
  - I-CVI 0.66 to 1.00

- Acceptable criteria for S-CVI 0.90 or higher accepted and I-CVI 0.78 or higher accepted

- Items modified or deleted on tools based on I-CVI
## Subject Demographics for Phase Two

<table>
<thead>
<tr>
<th>Demographic Characteristic</th>
<th>DCN Sample n</th>
<th>NL Sample n</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>n=986</td>
<td>n=314</td>
</tr>
<tr>
<td>Females</td>
<td>n=884 (90%)</td>
<td>n=286 (91%)</td>
</tr>
<tr>
<td>Mean Age</td>
<td>n=41.5 (SD 11.87)</td>
<td>n=48 (SD 9.36)</td>
</tr>
<tr>
<td>Position</td>
<td>DCN n=883 (90%)</td>
<td>APRN n=28 (9%)</td>
</tr>
<tr>
<td></td>
<td>Supervisors n=103 (14%)</td>
<td>Frontline NM n=77 (25%)</td>
</tr>
<tr>
<td></td>
<td>Nurse administrators n=41 (13%)</td>
<td>Nurse executives n=12 (4%)</td>
</tr>
<tr>
<td></td>
<td>Other n=156 (50%)</td>
<td>Other n=156 (50%)</td>
</tr>
<tr>
<td>Highest Level Degree</td>
<td>BSN n=672 (68%)</td>
<td>BSN n=143 (46%)</td>
</tr>
<tr>
<td>Greatest Number of Years as RN</td>
<td>1 to 5 years n=267 (27%)</td>
<td>16 to 20 n=55 (18%)</td>
</tr>
<tr>
<td>Greatest Number of Years on Current Unit</td>
<td>1 to 5 years n=482 (49%)</td>
<td>1 to 5 years n=147 (47%)</td>
</tr>
<tr>
<td>Greatest Number of Years at BSWH</td>
<td>1 to 5 years n=444 (45%)</td>
<td>1 to 5 years n=100 (32%)</td>
</tr>
</tbody>
</table>
Procedures for Phase Two

- Subjects received informed consent and link to survey by email

- Likert scale
  - Extent of agreement of observed characteristic in work environment using:
    - 1-strongly disagree, 2-disagree, 3-agree, or 4-strongly agree

Data Analyses

- Continuous variables-calculated mean, standard deviation, range
- Categorical variables-calculated percentages and frequencies
- Any missing variables recoded as system-missing and deleted
- Mean scores and standard deviations-calculated for each HWE characteristic at organizational, entity, and unit levels
Results for Phase Two HWES DCNS & NLS

Direct Care Nurses
- Bartlett's Test of Sphericity $X^2=18727.676; \; df\; 741; \; p < .001$
- Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy $0.973$

Nurse Leaders
- Bartlett's Test of Sphericity $X^2=9372.944; \; df\; 780; \; p < .001$
- Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MSA) $0.971$

Bartlett’s Test of Sphericity demonstrated significance, KMO and MSA $>.70$

Met all assumptions so rejected the null hypothesis and ran PCA
Psychometric Testing

- Principal Component Analysis (PCA) determines minimal number of items and simplest structure
- Oblique method Promax rotation with Kaiser Normalization
- Principal Axis Factoring (PAF) explains common variance from unique variance of item
- Items reviewed for correlations of >.40 or higher
Methods Used to Identify and Retain Components

- Kaiser Criterion-loadings with eigenvalues >1
- Total Cumulative Variance-explains shared variance for each factor in correlation matrix
- Scree plot-point where curve levels out
- Visual scan of component matrix for highest loadings
- Best fit based on statistical criteria, theoretical sense, intuitiveness, and factor interpretability
# Components-HWES for DCNs Version 3

<table>
<thead>
<tr>
<th>Components</th>
<th>Total Eigenvalues</th>
<th>% of Variance</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Authentic Leadership and Meaningful Recognition</td>
<td>15.008</td>
<td>38.483</td>
<td>38.483</td>
</tr>
<tr>
<td>2 Effective Decision-making and Skilled Communication</td>
<td>2.360</td>
<td>6.051</td>
<td>44.534</td>
</tr>
<tr>
<td>3 Genuine Teamwork</td>
<td>1.357</td>
<td>3.480</td>
<td>48.014</td>
</tr>
<tr>
<td>4 Appropriate Staffing</td>
<td>1.260</td>
<td>3.231</td>
<td>51.245</td>
</tr>
<tr>
<td>5 Physical and Psychological Safety</td>
<td>1.018</td>
<td>2.611</td>
<td>53.856</td>
</tr>
</tbody>
</table>
Scree Plot-HWES for DCNs Version 3
## Components-HWES for NLs Version 3

<table>
<thead>
<tr>
<th>Components</th>
<th>Total Eigenvalue</th>
<th>% of Variance</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Authentic Leadership, Effective Decision-making, Genuine Teamwork, and True Collaboration</td>
<td>20.466</td>
<td>51.164</td>
<td>51.164</td>
</tr>
<tr>
<td>2 Meaningful Recognition</td>
<td>2.023</td>
<td>5.057</td>
<td>56.221</td>
</tr>
<tr>
<td>3 Appropriate Staffing</td>
<td>1.201</td>
<td>3.002</td>
<td>59.223</td>
</tr>
<tr>
<td>4 Skilled Communication</td>
<td>1.137</td>
<td>2.843</td>
<td>62.066</td>
</tr>
</tbody>
</table>
Scree Plot-HWES for NLs Version 3
# Item Trimming and Item Retention

<table>
<thead>
<tr>
<th></th>
<th>Version 1</th>
<th>Version 2</th>
<th>Version 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Care Nurses</td>
<td>51 Items 4 deleted</td>
<td>47 Items 8 deleted</td>
<td>39 Items Retained</td>
</tr>
<tr>
<td>Nurse Leaders</td>
<td>48 Items 1 deleted</td>
<td>47 Items 7 deleted</td>
<td>40 Items Retained</td>
</tr>
</tbody>
</table>
## Reliability Testing

<table>
<thead>
<tr>
<th>Tools</th>
<th>Mean (SD)</th>
<th>Number of Scale Items</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWES for Direct Care Nurses Version 3 (N=986)</td>
<td>119.67 (16.239)</td>
<td>39</td>
<td>.957</td>
</tr>
<tr>
<td>HWES for Nurse Leaders Version 3 (N=314)</td>
<td>127.74 (18.756)</td>
<td>40</td>
<td>.974</td>
</tr>
<tr>
<td>Characteristic</td>
<td>Direct Care Nurses Mean Score (Standard Deviation)</td>
<td>Nurse Leaders Mean Score (Standard Deviation)</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td>---------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Appropriate Staffing</td>
<td>2.96 (0.60)</td>
<td>3.14 (0.55)</td>
<td></td>
</tr>
<tr>
<td>Authentic Leadership</td>
<td>3.03 (0.50)</td>
<td>3.28 (0.51)</td>
<td></td>
</tr>
<tr>
<td>Effective Decision-making</td>
<td>3.51 (0.43)</td>
<td>3.25 (0.50)</td>
<td></td>
</tr>
<tr>
<td>Genuine Teamwork</td>
<td>3.10 (0.46)</td>
<td>3.22 (0.52)</td>
<td></td>
</tr>
<tr>
<td>Meaningful Recognition</td>
<td>2.79 (0.59)</td>
<td>2.96 (0.56)</td>
<td></td>
</tr>
<tr>
<td>Physical and Psychological Safety</td>
<td>3.08 (0.53)</td>
<td>3.28 (0.51)</td>
<td></td>
</tr>
<tr>
<td>Skilled Communication</td>
<td>3.19 (0.38)</td>
<td>3.25 (0.49)</td>
<td></td>
</tr>
<tr>
<td>True Collaboration</td>
<td>3.19 (0.43)</td>
<td>3.30 (0.51)</td>
<td></td>
</tr>
</tbody>
</table>
Limitations to Studies

- External validity threatened due to studies being conducted in only one healthcare system in Dallas/Fort Worth
- Sample size for HWES for Nurse Leaders (314 participants)
Implications to Nursing Practice

- Identification of a potential gap in literature
- Evidence to nursing community by strengthening psychometric properties of tools
- Ability to develop, implement, and measure interventions on work environment
- Ability to identify early warning signs when something is wrong in work environment
- Ability to improve health of work environment for nurses at all levels in acute care settings
Recommendations for Future Research

- Replicate studies
  - Use larger sample size
  - Replicate in different types of hospitals including teaching versus non-teaching, rural versus urban, for-profit versus not-for-profit, and Magnet versus non-Magnet organizations

- Conduct interventional studies on individual eight characteristics of a HWE

- Examine HWE characteristics in different professions and settings
References


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