



Development and Psychometric Evaluation of the Patient Care Associates' Work Environment Scale

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OBJECTIVE: The purpose of this study is to examine the psychometric properties of the Patient Care Associates' Work Environment Scale (PCA-WES).

BACKGROUND: Few studies exist examining patient care associates (PCAs) working in acute care settings, and no instruments are available to examine the impact of the work environment on their practice.

METHODS: A psychometric evaluation using a nonprobability purposive sample of 390 PCAs was undertaken.

RESULTS: Cronbach's α internal consistency reliability of the total score was .95. Principal components analysis with varimax rotation and Kaiser normalization identified 5 components that accounted for 57.2% of variance and confirmed the original theoretical structure. The resulting 35-item scale had subscale Cronbach's α reliability estimates that ranged from .84 to .93.

CONCLUSIONS: The multidimensional PCA-WES is a psychometrically sound measure of 5 components of the PCA practice environment in the acute care setting and is sufficiently reliable and valid for use as independent subscales in healthcare research.

In the US workforce, there are almost 2 million unlicensed assistive personnel (UAPs)¹ providing direct care to patients and families.¹ Taken as a group, they are among the top 6 occupations in Massachusetts and

are expected to generate the greatest number of jobs in the next few years.² In the past 3 decades, healthcare in the United States has undergone many changes, chief among them being the use of the managed care model of care delivery. This model has brought forth the use of unlicensed healthcare providers, often called UAPs, direct care workers, certified nurses' aides, nursing assistants, patient care associates (PCAs), or patient care technicians.²⁻⁴ Regardless of title, UAPs are defined as individuals who routinely perform nursing tasks delegated by a registered nurse (RN) or licensed practical nurse for compensation.⁵ In the US workforce, there are more than 1.4 million UAPs,⁶ with almost 41 000 employed in Massachusetts and almost 100 000 employed in New York.⁶ Direct care occupations, taken as a group, are among the top 6 occupations in Massachusetts expected to generate the greatest number of jobs in the next few years.²

With all of the changes in healthcare, there is an increased emphasis on evaluating care providers' perceived satisfaction with the workplace. The authors believe that measuring satisfaction with the work environment and making subsequent improvements are critical components of achieving cost-effective, high-quality, patient/family-centric care outcomes. Although measuring perceptions is important, there are few published reports focusing on the recruitment, retention, and turnover of UAPs. No instruments measuring UAPs' perceptions of their work environment were found in the published literature.

Background

Most of the literature on UAPs focuses on their work in long-term care settings, not on their work in acute care

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settings,⁶ mainly because most UAPs work in long-term care. Published research to date addresses issues that focus on recruitment, retention, and turnover⁷ of UAPs and numerous reports on RN perceptions of working with UAPs but not on UAPs' perceptions of working with RNs.⁸ One study of certified nursing assistants found that supportive RN supervision (no demographic factors available) was significantly related to job satisfaction⁹ for the UAPs. Another study, undertaken because of the increased use of UAPs due to the shortage of RNs, evaluated the psychometric properties of a knowledge-based screening test to assess the competency of UAPs.¹⁰ No other instruments focusing on UAPs were found in the published literature. Given the increasing focus on assessing health staff overall satisfaction with the workplace, it is increasingly important to have evaluations that address UAPs' satisfaction with their practice environment. To this end, the following psychometric study was undertaken.

Instrument Development: The Patient Care Associates' Work Environment Survey

Patient care associates are valuable and integral members of the Massachusetts General Hospital (MGH) healthcare teams providing care at the bedside to patients and their families. In the mid-1990s, under the leadership of the vice president for patient care services and chief nurse executive, the Patient Care Services (PCS) Department at MGH was created. Beginning in 1999, evaluating its effectiveness became an important goal, which led to the 1st Staff Perceptions of the Professional Practice Environment (SPPPE) Survey (unpublished work). The PCS leadership use survey data to identify strengths as well as opportunities to continuously improve the environment of care for MGH clinicians, patients, and families. The SPPPE Survey is undertaken every 18 months, with the next survey scheduled for 2015.

In late 2009, MGH nursing leadership decided to undertake the 1st Patient Care Associates' Perceptions of the Work Environment (PCA-PWE) Survey to provide PCS leadership with timely feedback about PCAs' work experience. The survey was designed to assess PCAs' primary work environment using the Patient Care Associates' Work Environment Scale (PCA-WES) designed for this purpose, their overall work satisfaction, and several demographic and work characteristics. The PCA-WES was developed by MGH nurse scientists in the Yvonne L. Munn Center for Nursing Research. Initially, it was a 60-item, multidimensional measure of 5 components of the PCAs' work environment, namely: Staff Attitude Toward the PCA Role (17 items), PCAs' Attitude Toward Work (13 items), PCAs' Com-

munication With Nursing Manager/Leader (10 items), PCAs' Teamwork (10 items), and PCAs' Respect for Patients and Their Families (10 items). This 60-item PCA-WES was developed solely to be used in this psychometric evaluation.

When the PCA-WES test pool was completed, a panel of 5 MGH PCAs helped to establish content validity by determining the extent to which each item represented the conceptual category it was designed to measure. Their review of the items for readability, clarity, and meaning resulted in minor wording changes to several items; all items were retained. Each PCA-WES item was placed on a 4-point Likert scale of N (never), S (sometimes), O (often), and A (always). A brief set of instructions were developed to guide PCA test-takers by asking them to think about the unit on which they usually work and circle the letter on the 4-point response scale that best indicates the degree to which the statement applies.

Survey Dimensions

The PCA-WES dimensions were defined as follows. Staff Attitude Toward PCA Role was defined as the PCAs' report of the general outlook of the staff with whom they work regarding their performance. PCAs' Attitude Toward Work was defined as PCAs' general outlook about their work, including what motivates them in their work and what they, as PCAs, contribute to patients and their families. Communication With Nursing Manager/Leader was defined as the degree to which patient care information was relayed promptly to the people who need to be informed through open channels of discourse.⁶ PCAs' Teamwork was viewed as a conscious activity designed to achieve unity of effort in the pursuit of shared objectives.⁷ PCAs' Respect for Patients and Their Families was defined as a set of attitudes, practices, and/or policies that accepts others as they are.

Study Population

Two healthcare agencies, MGH and New York University (NYU) Langone Medical Center Tisch Hospital, were the settings used in the PCA-WES Survey; MGH is a 993-bed acute care academic medical center in Boston, and NYU Langone Tisch Hospital is a 705-bed academic medical center in New York City. The PCA-PWE Study was conducted by MGH Munn Center nurse scientists in late Spring 2009. After receiving approval from the MGH institutional review board (IRB), all PCAs currently employed by MGH's PCS Department (n = 463) were invited to participate in the study. The PCAs were mailed survey packets containing a letter of invitation to participate in the

study, the PCA-WES Survey, and a stamped, addressed return envelope to their home address. The PCAs were assured that participation in the study was voluntary and all responses would be kept confidential. The PCAs were also asked whether they wished any written comment they made on the survey to be shared with others in written reports, publications, and/or presentations. Return of completed surveys by the PCAs served as their consent to participate in the study. A total of 229 MGH PCAs returned such surveys.

Nursing leadership at NYU Langone Medical Center were also invited and decided to participate in this survey. Nurse scientists in the MGH Munn Center for Nursing Research conducted the survey in late Spring 2011, after approval was secured from the agency's IRB. Of 420 PCAs eligible to participate, 205 returned completed surveys. Their return of these surveys indicated their consent to participate in the study.

Data from these 2 sets of surveys were combined ($n = 434$) and examined for the presence of missing data on the PCA-WES. Forty-four cases had missing data on the scale and were dropped from the sample. A sample size of 390 PCAs who had no missing data on the 60-item PCA-WES was used to undertake a psychometric evaluation of the measure. This evaluation included (a) internal consistency reliability using Cronbach's α , (b) principal components analysis (PCA) with varimax rotation and Kaiser normalization, and (c) internal consistency reliability of resulting components using Cronbach's α . Table 1 contains demographic information on the MGH and NYU Langone PCA combined sample.

As Table 1 shows, the typical PCA respondent was female (96%), with ages ranging from 18 to 67 years, with an average age of 41.4 ± 1.2 years. More than 37% of PCAs reported their highest level of education as partial college or technical school and almost 19% were college graduates (15%) or nursing school graduates (4%) from outside the United States. Most respondents worked full-time (79%) or part-time (8%), with 11% working per diem. The PCA respondents reported being in their current occupation an average of 10.4 ± 11.8 years and working at MGH or NYU Langone an average of 8.5 ± 8.1 years.

Initial Reliability Estimates and Item Analyses

Item-total correlations were 1st computed for the 60-item PCA-WES. The Cronbach's α was .95 for the total scale, with 24 items having item-total correlations below the .30 cutoff.¹¹ Initially, these items were kept in the PCAs with varimax rotation and Kaiser normalization procedures to see how they would fare. However, the final solution was not parsimonious and

Table 1. 2013 PCAs: Demographic and Work Characteristics (N = 390)

Characteristic	Mean	SD
Age	41.4	1.2
Years PCA	10.4	11.8
Years agency	8.5	8.1
Characteristic	n	%
Gender		
Female	376	96.4
Male	3	0.8
Missing	11	2.8
Highest educational level		
Grade school	4	1.0
Partial high school	16	4.1
High school graduate or GED	113	29.0
Partial college or technical school	146	37.4
College graduate	58	14.9
Nursing school graduate outside United States	15	3.8
Other (mainly certifications, nondegrees)	21	5.4
Missing	17	4.4
Current work status		
Full-time (36 h/wk)	308	79.0
Part-time (<36 but >20 h/wk)	30	7.7
Per diem (not regularly scheduled)	43	11.0
Missing	9	2.3
Satisfaction working on primary unit		
Very dissatisfied	11	2.8
Dissatisfied	4	1.0
Somewhat dissatisfied	17	4.4
Somewhat satisfied	76	19.5
Satisfied	127	32.6
Very satisfied	144	36.9
Missing	11	2.8

Abbreviation: GED, general educational development test.

interpretable based on the 5 components the PCA-WES was designed to measure. Thus, these 24 items were dropped at this point and 36 PCA-WES items with item-total correlations of 0.30 or higher were subjected to PCA varimax rotation and Kaiser normalization procedures. Its purpose was to determine if the items designed to measure each of the 5 specified subsets would significantly load on the expected component, thus confirming the authors' initial hypothesis of how the items should hang together.¹² Table 2 reports the PCA and internal consistency reliability results of the psychometric evaluation.

Principal Components Analysis

Principal components analysis, followed by varimax rotation and Kaiser normalization, was next performed on the sample (N = 390). Initially, there were 7 components with eigenvalues greater than 1, explaining 64.1% of variance. An examination of this rotated solution was

Table 2. PCA Loadings and Cronbach's α Values for Varimax-Rotated Factor Matrix for the PCA-WES (N = 390)

	Component				
	1	2	3	4	5
Total explained variance, 57.2%					
Component 1: Staff Attitude Toward PCA Role					
21.0% variance (Cronbach's α = .92)					
The nurses make me feel I am an important member of our team.	0.82				
I feel part of the team.	0.77				
I feel respected for my work.	0.75				
I feel respected for who I am.	0.73				
Other staff on my unit think the PCA role is important.	0.73				
I know I am an important person on my team.	0.72				
PCAs and nurses work well together.	0.71				
When I ask for help from nurses, I get the help I need.	0.71				
I feel valued for the work I do.	0.67				
When I report a problem to the nurse, the nurse responds right away.	0.66				
The PCA role is important to my agency. ^a	0.65				
Nurses ask me for my ideas about patients.	0.52				
Component 2: PCAs' Attitude Toward Work					
14.9% variance (Cronbach's α = .87)					
The work I do makes patients' families feel better.		0.76			
The care I give makes patients feel better.		0.75			
I help patients.		0.67			
I keep patients safe.		0.67			
Family members trust me caring for their loved ones.		0.66			
Patients feel safe when I care for them.		0.66			
My work is important to me.		0.62			
I care about my patients.		0.59			
I like the work I do.		0.58			
I watch over patients.		0.57			
I feel prepared for the job I am asked to do.		0.43			
I am always trying to learn new things.		0.42			
I can do the work I am given.		0.42			
Component 3: PCAs' Communication with Nursing Manager/Leader					
9.2% variance (Cronbach's α = .86)					
My nursing manager/leader asks for my opinion.			0.74		
My nursing manager/leader makes sure I know what is happening on my unit.			0.74		
When a problem comes up, my nursing manager/leader asks for everyone's opinion before making a decision.			0.74		
My nursing manager/leader supports me.			0.68		
My nursing manager/leader is a good manager.			0.67		
Component 4: PCAs' Teamwork					
6.6% variance (Cronbach's α = .84)					
PCAs work well together.				0.74	
When I ask for help from other PCAs, I get the help I need.				0.73	
I get help from other PCAs without asking for it.				0.72	
Component 5: PCAs' Respect for Patients and Their Families					
5.5% variance (Cronbach's α = .93)					
All patients are treated with respect.					0.88
All families are treated with respect.					0.86

^aThe term *my agency* was substituted for the agency name in component 1.

uninterpretable. Because the PCA-WES was designed to produce 5 factors and the scree test indicated a 5-component solution, a PCA specifying 5 components was next calculated and examined. After inspection of the PCA rotated component matrix, the researchers judged the 5-component solution to be the most parsimonious and interpretable. All but 1 of the 36 items loaded greater than the 0.30 component loading cutoff on 1 of the 5 components. There were very few sub-

stantial side loadings. Table 2 displays the PCA-WES items and their component loadings on the PCA-derived scales, which accounted for a total of 57.2% of initially extracted common variance. Component 1, labeled Staff Attitude Toward the PCA Role, defined by 12 items with an eigenvalue of 11.6, accounted for 21.0% of variance. Component 2, called PCAs' Attitude Toward Work, defined by 13 items, with an eigenvalue of 4.1, explained an additional 14.9% of variance.

Component 3, called PCAs' Communication With Nursing Manager/Leader, defined by 5 items, had an eigenvalue of 1.9 and added 9.2% of variance. Component 4, named PCAs' Teamwork, defined by 3 items, with an eigenvalue of 1.6, explained an additional 6.6% of variance. Component 5, labeled PCAs' Respect for Patients and Their Families, defined by 2 items, with an eigenvalue of 1.5, explained an additional 5.5% of variance. These 5 components accounted for a total of 57.2% of explained variance.

Internal Consistency Reliability of PCA-WES Subscales

Before computing PCA-WES subscale scores, Cronbach's α internal consistency reliabilities for each of the 5 PCA-derived components were next computed. As Table 2 shows, component 1, with 12 items, had a Cronbach's α of .92; component 2, with 13 items, had a Cronbach's α of .87; component 3, with 5 items, had a Cronbach's α of .86; component 4, with 3 items, had a Cronbach's α of .84; and component 5, with 2 items, had a Cronbach's α of .93. Thus, the now 35-item PCA-WES measuring 5 major components of PCAs' work environment was judged sufficiently reliable and valid for use as independent measures in subsequent research. Because the component scores were formed by unequal numbers of items in each scale, mean scores should be calculated and used so that equal weight is given to each subscale.

Administration and Scoring of the PCA-WES

The PCA-WES is self-administered. Respondents are given a brief set of instructions that asks them to think about the unit on which they usually work and circle the letter on the 4-point response scale that best indicates the degree to which that item applies. It takes approximately 15 minutes to provide answers on the PCA-WES.

The PCA-WES is scored so that high scores represent high amounts of the construct being measured. Scoring takes place as follows:

1. Compute descriptive statistics on all scale items and examine for missing data. If a case has more than 10% of missing data across the 35 items in the PCA-WES, the case should be dropped from further analysis. For those cases with less than 10% missing data, the item mean or median may be substituted for missing data.
2. Because there are unequal numbers of items defining each PCA-WES subscale, average scores should be used so that all subscale scores have equal weighting. All mean subscale scores are formed by adding the subscale items together and then dividing that sum by the number of items in the subscale.

- Mean Staff Attitude Toward the PCA Role subscale is formed by adding items 9, 11, 13, 14, 17, 18, 23, 24, 26, 27, 29, and 31 and dividing by 12.
- Mean PCAs' Attitude Toward Work Subscale is formed by adding items 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 15, 16, and 28 and dividing by 13.
- Mean PCAs' Communication With Nursing Manager/Leader subscale is formed by adding items 19, 20, 21, 22, and 32 and dividing by 5.
- Mean PCAs' Teamwork subscale is formed by adding items 25, 30, and 32 and dividing by 3.
- Mean PCAs' Respect for Patients and Their Families subscale is formed by adding items 34 and 35 and dividing by 2.

Other Use of the PCA-WES

In addition to using derived subscales for research purposes, the PCA-WES can provide data about specific aspects of the 5 components of an agency's PCA practice environment and the extent to which PCA staff agree or disagree with the 35 items. At MGH, PCS management and staff have begun using PCA-WES item data in this way. They have found that the PCA-WES subscale and item scores provide valuable information describing effective PCA practice environments.

If unit or department identifiers are available and linked to PCA respondent data, subscale scores can also be created at the unit or department level by averaging individual scores from the appropriate unit or department staff. However, moving from the individual to the unit or department level changes the unit of analysis, making it much smaller, depending on the number of units/departments in the study sample.

Discussion

Results from this psychometric evaluation of the now 35-item MGH PCA-WES indicated that all 5 subscales are reliable and construct (factorially) valid for use as independent dimensions of the PCAs' work environment in today's acute care setting. The PCA-WES, the 1st instrument of its kind to provide a comprehensive picture of current PCA practice environment, serves as an effective report card of the health of the acute care work environment for PCAs. Such information can help nursing leadership design and/or improve the various components of an individual unit or department practice setting as well as provide evaluative feedback to leadership about whether such changes have made a difference in practice.

The PCA-WES is also an effective tool to measure baseline and ongoing perceptions of PCAs' impressions of their work environment. Through annual

administration of the PCA-WES, a greater understanding of organizational concepts that enhance PCAs' clinical practice can be achieved. Such data help illustrate what support structures are needed to hardwire the Institute of Medicine's 6 aims (patient centeredness, safety, effectiveness, efficiency, timeliness, and equity of care) into PCA practice.⁸

More research is needed using the PCA-WES with PCA groups in other settings to substantiate the findings reported here. As well as being psychometrically sound, the PCA-WES demonstrates substantive coherence and application at both the individual and 1 or more agency levels such as unit or department. Results from this psychometric evaluation represent an initial step toward "hot-spotting" areas of concern in the hospital, related to PCAs' practice environment.

Implications

There are several implications that can be drawn from this psychometric evaluation of the PCA-WES. In addition to serving as an effective report card of the health of the PCAs' work environment, such data can provide a unified PCA voice across practice settings,

identify what is working and what is not working, track PCAs' perceptions over time, furnish key data for strategic and tactical planning, and identify opportunities to benchmark against their own unit and other similar unit data. In this period of increased complexity in the delivery of healthcare in institutions, nursing leadership at all levels would benefit greatly from empirical knowledge related to PCAs' experience of their work environments.

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