

Validation of the professional practice environment scale in nurse educators in hospitals

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Abstract

Aim To report an assessment of the psychometric properties of the Professional Practice Environment (PPE) scale in a sample of Australian nurse educators in acute care hospitals.

Background Although nurse educators are important in an enabling work environment, there has been no reported exploration of their satisfaction with work in acute care hospitals.

Discussion The factor structure and internal consistency of the PPE scale were consistent with Erickson's eight-factor model of the items, indicating the appropriateness of the scale as an assessment tool to measure the PPE of nurse educators.

Conclusion The PPE scale is useful for monitoring the work environment of nurse educators in clinical practice and the environmental effects influencing their recruitment, retention and job satisfaction.

Implications for practice This work may inform the development of integrated professional practice environments where the professional practice and workplace satisfaction of nurse educators are optimised, influencing safe, quality patient care.

Keywords nurse educator, practice, reliability, validity professional practice environment, psychometric testing, principal component analysis, instrument development

Introduction

NURSE EDUCATION is increasingly a global focus of attention as student numbers increase to address workforce shortages (Benner *et al* 2010). Student diversity, gaps between theory and practice, simulation and interdisciplinary learning opportunities in formal education settings and hospitals challenge nurse educators to provide transformative learning experiences (Del Mar and Dwyer 2006, Benner *et al* 2010, Yoder-Wise 2010).

Education does not cease on graduation as the development of skills and expertise is heightened in clinical practice and is central to the work of nurse educators. The quality of nursing care and patient outcomes is directly related to education, competence and adherence to evidence-based practice (Benner *et al* 2010). Nurse educators are fundamental to creating an enabling work environment in clinical practice. Despite this, there

is limited discussion of the professional practice environment (PPE) in which nurse educators work (Cash *et al* 2009). Therefore, assessing their work environments is timely.

Acute care hospitals have experienced unprecedented change, including restructuring and redesign of services (Erickson *et al* 2004). The nursing profession has responded to these changes, with new roles emerging and others expanding in response to the needs of service, policy and patients (Lockhart 2005). The role of nurse educators in hospitals in Australia, Canada, Europe and the United States has undergone significant change, following the transfer of nurse education to universities and the creation of new nursing roles with responsibility for education as well (Sayers and DiGiacomo 2010). These changes have affected role definitions and the scope of practice of nurse educators in acute care hospitals. It is important to understand how

nurse educators address the education needs of nurses and the broader health workforce to provide competent, safe healthcare solutions.

To inform future workforce development, it is important to measure and describe interprofessional and environmental factors influencing the recruitment and retention of nurse educators. In Australia, the focus of the nurse educator is more at the level of the unit or organisation, whereas discussion of the PPE has previously focused on the relationships of individual clinicians with the broader environment. This difference in focus does not alter the importance of assessing the organisational milieu in which nurses work and the need for empirical assessment to inform clinical practice, policy and research (Middleton *et al* 2008).

Professional Practice Environment scale

The PPE scale comprises 38 items that identify the characteristics of the working environment that promote recruitment and retention and are aligned with favourable patient outcomes (Erickson *et al* 2004). It assesses eight subscales: handling disagreement and conflict; internal work motivation; control over practice; leadership and autonomy in clinical practice; staff relationships with physicians; teamwork; cultural sensitivity; and communication with patients. A four-point Likert scale from 'strongly disagree' (1) to 'strongly agree' (4) is used for scoring criteria.

The scale was developed and validated by nurses in US acute care magnet hospitals (Erickson *et al* 2009), which have a renowned capacity to recruit and retain their nursing staff (Erickson *et al* 2004). Accordingly, a reasonable assumption would be that comparisons could be made between factors influencing professional practice for nurse educators working in acute care in Australia (Erickson *et al* 2004). Validity was established for Erickson's scale in the acute care setting in the United States using principal component analysis with Varimax rotation. It resulted in an eight-factor solution accounting for 61% of explained variance. Internal consistency reliability was determined using Cronbach's alpha coefficients, which ranged from .78 to .88. A modified PPE scale has also been validated with general practice nurses in Australia, with an eight-factor solution accounting for 71.6% of variance; Cronbach's alpha ranged between 0.71 and 0.94 (Halcomb *et al* 2010).

As psychometric evaluation of survey properties is an ongoing, iterative process, the aim of this investigation was to assess the psychometric properties of the PPE scale in acute care hospitals with Australian nurse educators.

Method

Survey tool The survey was conducted as part of a broader mixed-methods study evaluating the role of the nurse educator (Sayers *et al* 2015). It comprised data items for the PPE as well as questions pertaining to socio-demographic and educational preparation; reporting and performance; competencies; career intentions; workplace issues; self-appraisal of performance; and role enactment. It was assessed by a group of experienced nurse educators and nurse researchers for face validity.

Data collection The survey was hosted by a commercial web service, SurveyMonkey. Nurse educators were alerted to the survey through notices in nursing journals and nursing organisations' websites. Interested educators registered to participate in the survey by emailing the researcher (JMS), who sent them a hard copy of it if they could not access SurveyMonkey or a link to the SurveyMonkey survey. This survey invite was further disseminated through snowball sampling. Those clicking the link in the email automatically accessed the study information page. This was followed by a page on which they were asked to consent to participate. If they consented, the respondents could then view the questions and proceed with the survey.

The survey was conducted over a three-month period. As part of the larger survey, we administered the PPE scale and undertook assessment of psychometric properties, including face validity, internal consistency and discriminant validity.

Sample As there is no register of nurse educators in Australia, potential participants alerted to the study were included if they worked as nurse educators in an acute care hospital; otherwise, they were excluded.

Ethical considerations The survey was implemented following ethics approval from the university ethics committee.

Data analysis

Downloaded data were transferred to SPSS for Windows Version 18 and analysed. In total, 425 participants completed all items of the survey (95% completion rate); of these, 46 completed the hard copy version of the survey. Descriptive statistics (frequencies, mean, standard deviation and range) were calculated.

Psychometric testing was used to analyse the PPE data. This enables a researcher to determine the suitability of a particular instrument for measuring specific constructs (Tabachnick and Fidell 2007).

Table 1 Respondent characteristics

Characteristics		<i>n</i>	%
Sex	Male	51	12
	Female	374	88
Age group	<30	36	8.5
	31-40	127	29.9
	41-50	161	37.9
	51-60	91	21.5
	>60	10	2.4
Masters degree or above		88	20.7
Meets manager regularly		310	72.9
Appraisal in past year		274	64.5
Professional development needs		263	61.9

In this study, the construct measured was the PPE of nurse educators. After deciding the construct, we needed to determine the reliability and validity of the PPE scale for use with nurse educators. A reliable instrument measures a construct with repeated consistency (Tabachnick and Fidell 2007). One measure of reliability is internal consistency or how well each item in the instrument fits with other items. The Cronbach's alpha coefficient is used to measure internal consistency and ranges between 0 and 1.0: the nearer it is to 1.0, the greater the consistency between scale items (Tabachnick and Fidell 2007). The construct validity - how well the instrument applied to the group being studied - was determined using a statistical test called principal component analysis (PCA) that calculated whether the assumptions of the constructs were reflected in the measures applied (Kleinbaum *et al* 2008).

Using Erickson's extraction procedure (Erickson *et al* 2004), PCA was undertaken with Varimax rotation. Component loadings of 0.3 or more were considered to belong to the corresponding component. To assess for reliability, Cronbach's alpha coefficient was computed for the whole of the PPE scale as well as for the subscales, with 0.7 or more the acceptable reliability coefficient cut-off (Nunnally and Bernstein 1994).

Using the Kolmogorov-Smirnov test, distribution of the total PPE score was found to be normally

distributed. To explain the variance of this score, linear multiple regression analysis was used with stepwise entry using the following five variables: gender, type of employment, public or private health setting, regular meeting with line manager, and professional development. A threshold of statistical significance was set at $p < 0.05$.

Results

Demographic data are summarised in Table 1. Table 2 shows the factor analysis results of the PPE scale. Using the PCA extraction procedure with Varimax rotation, the analysis yielded an eight-component solution that explained 63% of the variance. Factor loadings of all 38 items ranged from 0.35 to 0.85, all of which are above the 0.3 factor loading threshold. The Cronbach's alpha coefficient for the PPE scale was 0.92. Table 2 shows that all eight subscale reliabilities ranged from 0.72 to 0.90. The corrected item-total correlations of all 38 items were higher than 0.30. Items with the lowest PCA factor loadings were: factor three - control over practice (7.4/0.82); factor four - leadership and autonomy in clinical practice (7.7/0.78); and factor five - inter-professional relationship, communication about patient care (8.5/0.80).

Discriminant validity was used to differentiate between high and low PPE scores with participant characteristics. Using stepwise entry, two variables emerged as significant and independent predictors of PPE scores: participants who had regular meetings with their line managers ($\beta = 0.21$, $p < 0.001$) and had their professional development and learning needs identified ($\beta = 0.12$, $p = 0.038$) reported significantly higher total PPE scores.

Discussion

Findings The purpose of this investigation was to examine the psychometric properties of the PPE scale in a sample of Australian nurse educators. The study has found that the PPE scale was acceptable to Australian nurse educators in acute care settings and retained the meaning and original intent of the instrument. Some items loaded across more than one factor, possibly because of contextual factors due to the increased organisational focus of the nurse educator in Australia.

Health workforce research demonstrates the link between 'high performing' human resource practices that value employee participation and organisational outcomes including patient care (Rondeau and Wagar 2001, Buchan 2004). As well as determining the reliability and validity of the PPE scale, group differences between the PPE subscales and total scale provided important insights into

Table 2 Professional practice environment 38-item factor loadings (principal component analysis with Varimax rotation, $n=425$)

Factor	Professional practice environment items	1	2	3	4	5	6	7	8
1. Collaborative solution to problem (Variance 8.5%, Cronbach's alpha 0.83)	25	Staff involved don't settle a dispute until all satisfied with decision	0.75						
	24	All staff work hard to arrive at best possible solution	0.70						
	28	Staff involved settle disputes by consensus	0.67						
	23	All points of view are considered to find the best solution to the problem	0.67						
	26	All contribute from their experience and expertise to effect high quality solution	0.66						
2. Internal work motivation (Variance 12%, Cronbach's alpha 0.90)	32	I have challenging work that motivates me to do the best job I can		0.84					
	30	I feel a great sense of personal satisfaction for the work I do		0.78					
	35	Working in this environment increased my sense of self worth		0.77					
	33	Working in this unit gives me the opportunity to gain new knowledge and skills		0.76					
	34	I am motivated to do well because I am empowered by my work environment		0.75					
	31	I feel a high degree of personal responsibility for the work I do		0.65					
	29	My opinion of myself goes up when I work in this unit		0.65					
3. Control over practice (Variance 7.4%, Cronbach's alpha 0.82)	8	Enough staff to provide good quality care			0.83				
	10	Enough staff to get the work done			0.81				
	6	Adequate support services allow me to spend time with patients			0.69				
	7	Enough time and opportunity to discuss patient care problems with other staff			0.61				
	5	Patient care assignments that foster continuity of care			0.61				
4. Leadership and autonomy in clinical practice (Variance 7.7%, Cronbach's alpha 0.82)	9	A manager who is a good manager and leader				0.73			
	1	Leader supportive of staff				0.67			
	12	Manager who backs up staff in making decisions, even in conflict with medical practitioner				0.64			
	3	Freedom to make important patient care and work decisions				0.48			
	11	Opportunity to work in a specialized work environment				0.42			
	2	My discipline (nursing) controls its own practice				0.41			
5. Inter-professional relationship, communication about patient care (Variance 8.5%, Cronbach's alpha 0.80)	16	When a patient's status changes, I get relevant information quickly				0.80			
	15	I get information on a patient's status when I need it				0.80			
	13	Physicians and department or unit staff have good relationships				0.58			
	4	A lot of teamwork between physicians and staff				0.49			
	17	This unit has constructive relationships with other groups in this area				0.48			
	14	Not being placed in a position of having to do things against my professional judgement				0.40			
6. Teamwork (Variance 6.8%, Cronbach's alpha 0.72)	20R	Inadequate working relationships with other clinical areas limit effectiveness of work on this unit					0.79		
	19R	Other healthcare providers seem to have a low opinion of this unit					0.78		
	18R	This unit doesn't get the co-operation it needs from other health units and facilities					0.67		
7. Cultural sensitivity (Variance 5.9%, Cronbach's alpha 0.82)	37	Staff are sensitive to the diverse patient populations they serve						0.85	
	38	Staff are respectful of the need for a diverse, multiprofessional health care team						0.76	
	36	Staff have access to necessary resources to provide culturally competent care						0.68	
8. Handling conflict (Variance 5.6%, Cronbach's alpha 0.77)	22R	Staff withdraw from conflict							0.75
	21R	When staff disagree they ignore the issue, pretending it will go away							0.72
	27R	Disagreements between staff are ignored or avoided							0.61

nurse educators' performance and satisfaction. Staff who had regular meetings with their line managers and those whose professional development and learning needs were identified reported higher overall satisfaction with their PPE. These findings support the assertion that staff who have identified career opportunities and focus on professional development perceive that their contribution to the organisation they work for is valued (Buchan 2004).

Performance review provides the opportunity for staff to receive feedback regarding their performance and to clarify and negotiate performance goals and career development strategies (Prowse and Prowse 2009). It also helps to motivate employees, an important factor particularly in times of change and health reform where staff may be challenged by change (Prowse and Prowse 2009). Nurse educators need to have the opportunity to engage in performance appraisal including feedback regarding their performance, the achievement of performance indicators and development of a professional development plan. Performance reviews that include these measures recognise the valuable contribution of nurse educators to the education and professional development of staff, and to clinical practice.

Lower scoring items for factor three ('control over practice') may reflect the diversity of educator practice and recognition that the role does not include a patient load. Factor four ('leadership and autonomy in clinical practice') had lower scores relating to opportunities to work in a specialised environment, again reflecting the diversity of practice across units and hospitals. Within factor five ('inter-professional relationship, communication about patient care'), scores highlight the need to improve interdisciplinary teamwork and communication and the need for professional expertise to be acknowledged and valued. Issues regarding teamwork and communication are crucial,

as validated in the literature as important predictors of adverse events (Aiken *et al* 2001).

Monitoring of work performance and goals in a professional development framework appears to be important. Identification of the characteristics of the professional practice environment in which nurse educators are employed may positively influence future recruitment and retention of nurse educators.

Strengths and limitations A strength of this study is the large sample size across a diverse population of nurse educators and the testing of factor structure. The authors acknowledge that the lack of a sampling frame precluded random sampling. However, an exhaustive list of nurse educators was contacted and offered different means of completing the survey. As acute care professionals, they worked in environments conducive to effective relationships, professional development and teamwork. These characteristics may have influenced their responses.

This study has validated a suitable measure of the PPE scale with Australian nurse educators for application in acute care. Further research using the PPE scale with nurse educators in specific, acute-care contexts may identify further issues to be addressed to enhance specialty recruitment, professional credibility and career advancement.

Conclusion

Nursing roles across healthcare systems are being reviewed. Examining nurse educators' perceptions of the practice environment is important in informing research regarding the role in acute care. This study has demonstrated the validity and reliability of the PPE scale with nurse educators in private and public facilities. This work may inform the development of integrated PPEs where the professional practice and workplace satisfaction of nurse educators are optimised, influencing safe, quality patient care.

Online archive

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Conflict of interest

None declared

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