Published in final edited form as:

Am J Hosp Palliat Care. 2017 July ; 34(6): 577–583. doi:10.1177/1049909116649415.

Nurse knowledge, work environment, and turnover in highly specialized pediatric end-of-life care

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Abstract

Objective—To examine the relationship between nurse knowledge and work environment and Registered Nurse (RN) turnover in perinatal hospice and palliative care organizations.

Methods—Using nurse intellectual capital theory, a multivariate analysis was conducted with 2007 National Home and Hospice Care Survey data.

Results—Perinatal hospice and palliative care organizations experienced a 5% turnover rate. The professional experience of advanced practice nurses (APNs) was significantly related to turnover among RNs ($\beta = -0.032$, $P < 0.05$). Compared to organizations with no APNs professional experience, clinical nurse specialists and nurse practitioners significantly reduced RN turnover by 3-percentage points. No other nurse knowledge or work environment variables were associated with RN turnover. Several of the control variables were also associated with RN turnover in the study: organizations serving micropolitan ($\beta = -0.041$, $P < 0.05$) and rural areas ($\beta = -0.037$, $P < 0.05$) had lower RN turnover, compared to urban areas. Organizations with a technology climate where nurses used electronic medical records had a higher turnover rate than those without ($\beta = 0.036$, $P < 0.05$).

Conclusions—The findings revealed that advanced professional experience in the form of APNs were associated with reductions in RN turnover. This suggests that having a clinical nurse specialist or nurse practitioner on staff may provide knowledge and experience to other RNs, creating stability within the organization.

Nursing turnover is a major issue negatively impacting health care in the United States. The average national turnover rate for registered nurses (RN) is approximately 14% with pediatric specialty area currently experiencing a turnover rate of 13.3%.^{1,2} Although a recent United States Department of Health and Human Services report projects that the RN supply is expected to outpace the demand for RNs in the near future,³ uncertainties—such as the size of the demand for nurses under the Affordable Care Act, uneven geographic distribution

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Financial Disclosure: The authors have no financial relationships relevant to this article to disclose.

Conflict of Interest: The authors have no potential conflicts of interest to disclose.

of the RN workforce, and the lingering effects of the recession—suggest the future of the nursing workforce is by no means secure.^{4,5} Despite this uncertain environment, specialized end-of-life care organizations, such those providing perinatal hospice and palliative care with its need for trained pediatric and labor and delivery nurses, have been particularly hard hit by the shortage of qualified nurses.^{4,6}

Recent studies have shown that nurse knowledge and work environment are associated with positive patient outcomes, fewer medical errors, and fewer adverse patient events such as falls, pressure ulcers, and venous needle disconnection.^{7–9} In addition, organizational factors, such as RN job satisfaction, team-member exchange, and lower intention to leave, have been reportedly related to the nurse work environment.^{10,11} There is also evidence that nurse knowledge and work environment might be directly related to RN turnover.^{12–15} Nurse turnover in perinatal hospice and palliative care organizations is a concern that particularly needs to be addressed to help ensure quality outcomes for mothers, babies, and families at end of life.

Despite a growing literature on nurse knowledge, work environment, and turnover within hospitals and long-term elderly care, no studies to date have examined the relationship of these factors within the context of perinatal hospice and palliative care. RNs within this specialty are different from others because they need special skills across pediatrics, labor and delivery, as well as palliative care.¹⁶ In addition, these RNs act as part of an interdisciplinary hospice and palliative care team consisting of physicians, social service workers, counselors, and chaplains.¹⁶ Understanding turnover in this context is intensified by current estimates suggesting that there are over 100,000 open RN positions with almost a quarter of those within long-term care organizations.³ Although data on the depth of the shortage for perinatal hospice and palliative care nurses are very limited, the magnitude of the problem has been acknowledged by organizations such as the Hospice and Palliative Nurses Association.¹⁷ In the face of today's uncertain and rapidly changing health care landscape, it is important for nursing leaders and clinicians to understand the influence of nurse knowledge and work environment on RNs' decisions to leave their organization voluntarily or involuntarily.

Our study fills an important gap within the nursing turnover literature by examining the association between nurse knowledge, work environment, and turnover within the highly specialized pediatric end-of-life care of perinatal hospice and palliative care organizations. Understanding these associations is vital to helping nurse leaders and administrators make certain that qualified nurses are retained at the bedside to care for this vulnerable patient population and their families.

Conceptual Framework

To examine the associations between nurse knowledge, work environment, and turnover in perinatal hospice and palliative care this study was guided by a modified version of Covell's theory of nurse intellectual capital (Figure 1).¹⁸ Derived from intellectual capital theory,¹⁹ Covell's theory conceptualizes the relationship between nurse knowledge, work environment, and organizational outcomes.

Nurse knowledge is posited to reside in nurse human and structural capital that impacts organizational outcomes. Nurse human capital is made up of nurse knowledge, skills, and experiences. The human capital of nurses may influence RN turnover by supporting RNs and enabling them to work to the full extent of their practice authority, thereby improving job satisfaction.²⁰ Nurse structural capital is the informational structures or practice guidelines that nurses can use to assist their clinical decision-making and care planning. Structural capital such as information structures that nurses can use to assist their clinical decision-making and care planning are nurse structural capital. Organizations with nursing structural capital may reduce their turnover by having guidelines, care maps, or protocols that provide relevant information to nurses caring for patients.²⁰

The theory also suggests that two work environment factors (i.e., nurse staffing and employer support for career development) influence organizational outcomes. Nurse staffing is conceptualized as a stable base of nurses with capabilities and expertise to provide requisite care for patients. Organizations with adequate nurse staffing (as measured by RN-to-patient ratio and RN proportion) may reduce RN turnover by enabling nurses to effectively care for their patients.²¹ Finally, employer support for nurse career development is the investment by the organization in the knowledge and skill development of nurses. Organizations with strong career development support (e.g., defined RN career ladder) may minimize turnover by their display of organizational commitment to employees.²¹ Thus, the research question posed by this study was whether nurse knowledge and work environment influence RN turnover in perinatal hospice and palliative care organizations.

Methods

Design and Data Source

This study was a cross-sectional correlational analysis of 2007 National Home and Hospice Care Survey (NHHCS) data collected by the Centers for Disease Control and Prevention (CDC) from hospice and home health organizations.²² NHHCS is one of a series of nationally representative surveys of US home health and hospice organizations and is designed to provide descriptive information on hospices' and home health organizations' staff, services, and patients. Organization directors or their designated staff members were interviewed in-person and no families or patients were contacted. Organizations that provided only homemaker services, housekeeping services, assistance with instrumental activities of daily living, or durable medical equipment and supplies were excluded from the survey. Quality standards for the data are maintained by the CDC.²¹ NHHCS is the only national databases to include information on perinatal hospice and palliative care in the community-setting.

Sample

A sample was drawn from the 1,036 organizations that participated in the NHHCS. To participate in the survey, hospices were either certified by Medicare or Medicaid or were licensed by a state to provide services to hospice or home health care patients. For this study, organizations were included if they provided perinatal hospice and palliative care and had RNs on staff. Home health care only organizations and those with missing data were

excluded. The final sample was 226 highly specialized pediatric end-of-life care organizations. The Institutional Review Board of the University of Tennessee, Knoxville, approved this study.

Measures

Dependent Variable—As an organizational outcome, the rate of *RN turnover* was calculated as the total number of RN employees who ended their employment (voluntarily or involuntarily) during the study period divided by the total number of RN employees on staff at the organization for the same period.²⁰ The RN turnover rate was transformed to a natural log form because the variable did not have a normal distribution, which violated an assumption of regression analysis.

Independent Variables—To operationalize the theory of nurse intellectual capital within the data sample, variables were created to represent nurse knowledge and work environment.^{24,25} For nurse knowledge, we created a set of variables for human capital (academic preparation, specialty certification, advanced practice experience) and structural capital (practice guidelines). *Academic preparation* was measured as whether a baccalaureate in nursing was the highest degree in the organization. *Specialty certification* was whether RNs had any medical specialty certification. *Advanced professional experience* was defined as whether there were advanced practice nurses (APNs) such as a clinical nurse specialist or nurse practitioner on staff. We created a variable for *practice guidelines* that was measured by whether the organization had policies in place requiring influenza vaccination among staff. Having a policy of influenza represents an appropriate proxy variable because it likely has a close correlation to other patient-focused guideline that assist nurses in clinical decision-making and planning.

For work environment, we created a set of variables for nurse staffing (RN-to-patient ratio, concentration of RNs) and employer support for career development (career ladder). Nurse staffing was defined through *RN-to-patient ratio*, which was measured as the number of full-time equivalent (FTE) RNs on staff per patient. *Concentration of RNs* was calculated as the number of RN FTEs divided by the total number of RNs and licensed practical nurses. Employer support for career development was defined by *career ladder*, which was measured as whether the organization offered a career ladder positions for RNs.

Control Variables—Several organizational variables were included in the model as covariates.²⁵ These included *affiliation*, *service area*, *organization size*, *organization age*, *ownership*, *teaching status*, *accreditation*, *leadership*, *patient acuity*, and *technology climate*. *Affiliation* was a variable that was defined by whether or not a hospice was a freestanding organization. This variable along with the others described in this section were measured by creating either dummy or categorical variables. Service area was defined by three categories (*Metropolitan*, *Micropolitan*, or *Rural*) representing the Metropolitan Statistical Area (MSA) definition of the area in which the perinatal hospice and palliative care delivered care. Each variable was created with a one representing a particular area of service and a zero, otherwise. *Metropolitan* was the omitted to serve as the base category for comparison within the regression models. *Organization size* defined hospices as small if they had less than or

equal to 100 patients per day and large if they had over 100 patients per day. *Organizational age* represented the total number of years a hospice was licensed. The type of status (for-profit, other not-for-profit, or government) a hospice reported defines its type of *ownership*. *Teaching status* signifies hospices used as a clinical training site for students, while *Accreditation* measured whether the organization was given certification by the Joint Commission for Accreditation of Healthcare Organizations. *RN leadership* denotes whether the organization director had a nursing degree, while *patient acuity* was defined by whether nurses cared for patients receiving continuous home care. *Technology climate* is defined by whether the hospice was using an electronic medical records (EMR) system.

Data Analysis

The primary question of interest was whether there was an association between nurse knowledge, work environment, and turnover in perinatal hospice and palliative care organizations. All analyses accounted for the complex sampling design of the survey using sampling weights. Descriptive statistics using means and proportions were calculated for all study variables. An ordinary least squares (OLS) regression model was used to estimate the relationship between nurse knowledge, environment, and turnover, while controlling for organizational characteristics. This method of analysis was appropriate because of the continuous and transformed nature of the dependent variable. Regression results are presented as unstandardized coefficients with Huber-White standard errors (SE). Analyses are conducted using Stata 11.0 software (Statcorp LP, College Station Texas).

Results

Summary statistics for the variables included in the analytical model are presented in Table 1. Perinatal hospice and palliative care organizations in the sample experienced a 5% turnover rate during the study period. The proportion of RNs on staff to total nursing staff was high with most having a baccalaureate degree (89.42%) and certification in a medical specialty (65.52%). Almost a quarter (23.35%) of the hospices had the professional experience of APNs on staff. These hospices had practice guidelines for influenza (94.64%). There was a high RN-to-patient ratio (mean=0.71) and concentration of RNs (mean=0.87). However, few organizations offered a career ladder for nurses (22.12%).

A majority of organizations were affiliated with other health care organizations (56.18%) and generally served metropolitan (43.55%) and micropolitan (31.18%) areas. Organizations tended to be small (87.77%) with, on average, just over 16 years in operation. Well over half were non-profit (82.97%) and were a clinical training site (87.09%). Approximately a third (35.30%) were accredited by the Joint Commission. It was common for organizations to have RN leadership in the form of a director with a nursing degree (70.33%). Organizations generally had low patient acuity (14.29%), while operating in a technology climate (63.74%).

The results of the regression analysis estimating the association between nurse knowledge, work environment, and turnover are shown in Table 2. The professional experience of APNs was significantly related to turnover among RNs ($\beta = -0.032$, $P < 0.05$). Compared to organizations with no APNs professional experience, clinical nurse specialists and nurse

practitioners significantly reduced RN turnover by 3-percentage points. No other nurse knowledge or work environment variables were associated with RN turnover.

Several of the control variables were also associated with RN turnover in the study. Organizations serving micropolitan ($\beta = -0.041$, $P < 0.05$) and rural areas ($\beta = -0.037$, $P < 0.05$) had lower RN turnover, compared to urban areas. Organizations with a technology climate where nurses used electronic medical records had a higher turnover rate than those without ($\beta = 0.036$, $P < 0.05$). No other covariate variables were related to RN turnover.

Discussion

This study was the first to assess whether nurse knowledge and work environment directly influenced RN turnover in perinatal hospice and palliative care organizations. Nurse human capital in the form of the professional experience of APNs had a significant association with less RN turnover. No other measures of nurse knowledge or environment were directly related to turnover.

The findings from the study suggest that having a clinical nurse specialist or nurse practitioner on staff provides support and clinical advice to other RNs. The result is consistent with Rondeau, Williams, & Wagar,²⁶ who found that in addition to knowledge nursing human capital experience was modestly associated with lower levels of voluntary turnover of nurses in hospitals and long-term care facilities. It is also consistent with findings from the broader literature on intellectual capital, which reports that higher human capital in the form of education and skills within an organization is associated with better performance.²⁷ One potential reason is that highly specialized end-of-life care requires highly specialized nurse knowledge. For example, in perinatal hospice care RNs must provide care to the maternal-fetal dyad during pregnancy, when a life-limiting diagnosis is confirmed.^{28,16} Specialized nursing care focuses on relieving pain and uncomfortable symptoms in neonates with a terminal illness and providing emotional and spiritual support to family members.^{16,29} Thus, having access to the professional clinical experience of APNs might reduce RNs' stress and anxiety in providing this type of clinical care to this special patient population. APNs possibly act as a stabilizing effect on the RNs within the organization, thereby reducing turnover in an emotionally demanding environment of specialized end-of-life care. Additional research is needed to examine the exact pathways through which APNs influence RN turnover.

The regression analysis revealed that organizations operating in non-metropolitan areas had reduced RN turnover. Organizations in micropolitan and rural areas were associated with significantly reduced RN turnover, compared to metropolitan areas. These findings are not consistent with other studies that have explored the influence of rural/urban location on RN turnover.³⁰ In the Baernholdt and Mark study,³⁰ researchers found that rural/urban location had no effect on RN turnover among 194 nursing units in 97 United States hospitals from 2003 to 2004. A reason for the inconsistent findings may be the measurement of service area. In this study, three measures of service area were created that included metropolitan, micropolitan, and rural. However, Baernholdt and Mark had two measures: urban and rural,

and did not capture the micropolitan area. This lack of measurement specificity might explain the difference in study findings.

In our sample, over 63% of hospices had an EMR, which was higher than national average reported at 16% among all United States hospices.³¹ In an environment that often requires coordination between obstetricians, inpatient labor and delivery, and hospice, this finding is not surprising. We also found that a technology climate, where nurses use EMR, was associated with an increase in RN turnover. Since use of EMR creates a skill bias that benefits higher-skilled nurses,³² adoption of this technology may influence RN turnover by pushing lower skilled nurses or those with outdated computer skills out of the workforce. According to Budden, Zhong, Moulton, and Cimiotti,³³ over half of the RN workforce is age 50 or older and an even larger percentage of these older nurses are concentrated within hospice care. Senior RNs within a hospice organization may struggle more with EMR adoption because they must learn new technology and systems that they are unfamiliar with while delivering a high level of care to patients and their families. Future research should concentrate on investigating the specific channel through which EMR affects RN turnover within specialized pediatric hospice care, so that nurse leaders and managers can address these potential issues.

There were several limitations to report. First, the cross-sectional design means that no causal conclusion should be drawn from the results. In addition, the most recently available data on perinatal hospice and palliative care organizations is from 2007, which may not reflect changing trends in the hospice industry due to the 2008 Conditions of Participation rule change. However, due to the detailed nature of the survey questions and their focus on the hospice workforce, this data remains one of the richest sources available to analyze pediatric end of life issues because more recent survey data collection has been discontinued. One other limitation is that the data set lacks measures of contextual variables that capture the rapid expansion within the hospice care industry taking place at this time.³⁴ This rapid growth may exacerbate turnover as nurses continually pursue better alternatives within the labor market.

The study's findings have important implications for perinatal hospice and palliative care organizations. First, organizations delivering specialized pediatric end-of-life care can potentially reduce RN turnover by ensuring that there is an APN on staff. This investment in nurse human capital may provide stability to the organization through the knowledge and experience these nurses pass on to their co-workers. In addition, nurses working in demanding specialized environments such as perinatal end-of-life care may need more support in learning and working with EMR systems to reduce turnover.

This study is the first to provide an evaluation of the association between nurse knowledge, work environment, and turnover within pediatric end-of-life specialty care. The findings revealed that increases in nurse human capital in the form of APNs were associated with reductions in RN turnover. This suggests that having a clinical nurse specialist or nurse practitioner on staff provides knowledge and experience to other RNs, creating stability within the organization.

Acknowledgments

Funding Source: This publication was made possible by Grant Number K01NR014490 from the National Institute of Nursing Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institute of Nursing Research or National Institutes of Health.

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Figure 1.
Modified Model of Nurse Intellectual Capital Theory

Table 1Descriptive Statistics of Study Variables, Weighted ($N=728$)

Variables	Percentage/Mean	Standard Deviation
Dependent Variable		
RN turnover, mean	0.05	(0.01)
Independent Variables		
Academic preparation (%)	89.42	
Specialty certification (%)	65.52	
Advanced professional experience (%)	23.35	
Practice guideline (%)	94.64	
RN-to-patient ratio, mean	0.71	(0.09)
Concentration of RNs, mean	0.87	(0.01)
Career ladder (%)	22.12	
Control Variables		
Affiliation		
Freestanding (%)	43.82	
Non-Freestanding (%)	56.18	
Service Area		
Metropolitan (%)	43.55	
Micropolitan (%)	31.18	
Rural (%)	25.27	
Organization size		
Small (%)	87.77	
Large (%)	12.23	
Organization age, mean	16.06	(0.91)
Ownership		
For-profit (%)	17.03	
Non-profit/government (%)	82.97	
Teaching status (%)	87.09	
Accreditation (%)	35.30	
Leadership (%)	70.33	
Patient acuity (%)	14.29	
Technology climate (%)	63.74	

Note: RN, Registered Nurse. SD, Standard Deviation

Table 2Results of Regression Analysis for RN Turnover, Weighted ($N=728$)

Variables	Coefficient	(SE)	
Independent Variables			
Academic preparation	−0.026	(0.02)	
Specialty certification	−0.011	(0.02)	
Advanced professional experience	−0.032	(0.01)	*
Practice guideline	−0.031	(0.03)	
RN-to-patient ratio	−0.001	(0.01)	
Concentration of RNs	−0.038	(0.04)	
Career ladder	0.011	(0.02)	
Control Variables			
Freestanding	0.004	(0.01)	
Micropolitan	−0.041	(0.02)	**
Rural	−0.037	(0.02)	*
Large	−0.012	(0.02)	
Organization age	−0.001	(0.01)	
For-profit	0.013	(0.02)	
Teaching status	0.006	(0.02)	
Accreditation	−0.006	(0.01)	
Leadership	−0.002	(0.01)	
Patient acuity	0.007	(0.01)	
Technology climate	0.036	(0.01)	**

*
 $p < 0.05$,**
 $p < 0.01$,***
 $p < 0.001$

Note: RN, registered nurse; APN, Advanced practice nurse; SE, Standard error