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CONTENTS

The shortage of expert nephrology nurses and patient quality care indicators: A quantitative cross-sectional study

By Karen J. Gaietto and Mirella V. Brooks

ABSTRACT

Nurses in the nephrology setting need time, experience, and education to manage the complexities of the renal patient and the associated patient quality care outcomes. Dialysis providers are challenged to hire and retain experienced nephrology nurses. This quantitative cross-sectional study examined the shortage of expert nephrology nurses and patient quality care indicators in the dialysis setting, and sought to determine if there was a statistically significant relationship related to the shortage of expert nephrology nurses. The study collected data by survey method from 34 Ohio chronic dialysis units on nursing tenure, nephrology experience, education level, certification status, and age. The Centers for Medicare and Medicaid Quality Incentive Program patient data for each unit were compared to the level of nursing experience and the level of education of the nursing staff. Dialysis units with higher level of nursing experience and education were compared to dialysis units with less-experienced and less-educated registered nursing staff to determine if a relationship existed. The analyzed data have three areas of statistical significance: hemoglobin level less than 10.2 g/dl, Kt/V of 1.2 or greater, and facility mortality rate. Units with higher levels of experience had a lower percentage of anemia and a higher percentage of dialysis adequacy levels. Units with higher level of education had lower facility mortality rates. This study noted the need to measure the level of experience and education of the expert nephrology nurse, and how these aspects affect patient quality care indicators for current and future renal patients.

INTRODUCTION

Healthcare is experiencing a shortage of registered nurses, as a natural consequence of aging and attrition by retirement. It is estimated that an additional 1.05 million nurses will be required by 2020 in the United States alone to keep up with the demand caused by this gap and replace the nursing workforce (Rosseter, 2014). The overall shortage in nursing leads into a shortage of expert nephrology nurses. In Benner's novice to expert model, the nurse expert is described as one

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possessing the ability to competently and reliably provide the highest level of quality patient care (Benner, 1984, 2015). Developing nephrology nurse specialists requires extensive time, budgetary investment, and commitment (Ulrich & Kear, 2015). Indeed, nurses spend many years developing expertise in specialty practice (Watson, 1996). Watson's caring science theory looks to the expert nurse using both intrinsic and extrinsic factors to provide holistic patient care (Sitzman & Watson, 2013). In this vein, the expert nephrology nurse provides the caring aspect of nursing in addition to the theoretical and practical knowledge obtained in nursing school and entry into practice (Watson, 1996). The increased complexity of the patients with chronic kidney disease (CKD) amplified by multiple comorbidities requires the expert nephrology nurses' ability to manage multiple tasks and initiatives meant to improve patient outcomes, and promote patient safety (Bednar & Latham, 2014). Specifically, expert nephrology nurses at the bedside place the knowledge where it is needed in managing crucial laboratory values, providing early identification of complications, and reducing adverse occurrences for the patients (Ulrich & Kear, 2015). The shortage of these leaders and experts in renal care significantly impacts quality outcomes for patients with CKD (Hayes, Douglas, & Bonner, 2015), presenting an immense challenge to adequately meet patient needs and provide quality care within the dialysis unit. The present research study on the shortage of expert nephrology nurses, as informed by both Benner's and Watson's respective conceptual framework of what constitutes the expert nurse, investigated the role expert nurses play in relation to patient quality care indicators such as anemia and dialysis adequacy parameters, and mortality rate. This could, in turn, change the approach toward clinical outcomes and support the need to retain expert nephrology nurses.

THEORETICAL FRAMEWORK

Benner and Watson's nursing theories help support the study of expert nurses shortages. The theoretical frameworks from Patricia Benner and Jean Watson were applied to the phenomena of interest, and these were used as the central frameworks for this research. This approach identifies the definition of an expert nurse as skilled and competent both in the art and science of nursing (Benner, 1984; Watson, 1996). The expert is also able to move past foundational knowledge, seeks additional education, and applies those pieces to abstract concepts within the nursing discipline. Watson's and Benner's theories blend to create the ideal nephrology nursing expert to provide patient-centred care.

Clinical Expertise

The nursing theorist, Patricia Benner (2015), described the nursing expert as one with the ability to competently and reliably provide the highest level of quality patient care. Benner's definition of the expert nurse guides this study to identify nurses working in specialty practice a minimum of 10 years, exhibit advanced skill and understanding of patient conditions, and manage the complexity of nursing care with little or no difficulty (Benner, 1984). Jean Watson's caring science theory looks to the expert nurse using both intrinsic and extrinsic factors to provide holistic care to the patient (Sitzman & Watson, 2013). Watson (1996) identifies that the nurse spends many years developing expertise in specialty practice. The expert nephrology nurse provides the caring aspect of nursing in addition to the theoretical and practical knowledge obtained in nursing school and entry into practice.

Clinical expertise is continuously being examined and redefined as the nursing profession grows. Lyneham, Parkinson, and Denholm's (2008) study placed Benner's expert stage into three distinct phases: cognitive intuition, transitional intuition, and embodied intuition. Mannix, Wilkes, and Jackson's (2013) study identified the ideal expert nurse as a combination of clinical expert, clinical leader, and clinical scholar. Expert nurses are often viewed as using insights or intuition as the basis for decision making in the care of patients (Lyneham et al., 2008). Lyneham, Parkinson, and Denholm (2009) explained the need to expose new nurses and students to a multitude of environments, thus promoting growth toward the intuitive practice of clinical experts.

Expert nephrology nurses are more important than ever given the diversity of skill mix and non-nursing personnel that have been introduced over the years. Nursing units often staff with varying levels of nursing tenure and abilities. Esparza (2010) explored nurse staffing and skill mix patterns, and found positive effects on patient outcomes with teams with greater experience. A cross-sectional study by Staggs and Dunton (2012) further reviewed the impact of skill mix at the hospital and unit levels, and noted that units with higher skill levels experienced less turnover and greater stability. The positive impact of the expert clinician within the skill mix of the nursing units in both studies noted the importance of having these expert nurses available to improve patient and staff experiences.

A supportive environment was identified by McHugh and Lake (2010), and Benner (1984) as the most frequently cited reason for nursing success in the acquisition of expertise. Carmel and Baker-McClearn (2011) recognize the need for a community and collaboration bolstering the use of expert nurses. In Onishi, Sasaki, Nagata, and Kanda's (2008) study, the administrators acknowledged their role in providing clarification, direction, and support for nurses of expert status level. The nurse expert does not merely emerge one day as the clinical expert, but grows everyday through interactions and human experiences.

The nephrology nursing expert provides significant contributions to the nursing quality, nursing care, and patient quality outcomes by providing clinical supervision and direction

(Ulrich & Kear, 2015). Expertise in this discipline takes years of learning, advancing education, and clinical practice in the field of nephrology care. The Quality and Safety Education for Nurses Project was developed by a national expert panel based on the Institute of Medicine's (IOM) recommendations for establishment of core competencies. The group identified essential core competencies: patient-centred care, teamwork and collaboration, evidenced-based practice, quality improvement, safety, and informatics (Sherwood & Zomorodi, 2014). This relates back to frequently measured data and practice within the nephrology specialty environment.

EXPERT NEPHROLOGY NURSES

Nephrology nurses practise care within their scope and standard of practice from the level of novice through the level of expert. In the United States, these standards are established by the American Nephrology Nursing Association (ANNA) in conjunction with subject matter experts (Gomez, Castner, & Dennison, 2011). The standards are put into place through distribution and integration within policy, procedures, and best demonstrated practices at the unit level.

Expert nephrology nurses readily translate situations and patient conditions based on their vast background of formal and informal education. Bonner (2007) examined nephrology nurses' expertise and noted that recognition of expert status by others was an essential piece. It is a role of growth and development, and is continuously redefined by the nurse expert's thoughts and ideas. Bonner (2007) recognized that nurse experts maintained current nephrology care practices and chose to use evidence-based or best-demonstrated practices.

Specialty certification is considered an outward sign of increased experience and education. Wiseman (2013) discussed the certification in nephrology nursing as the formal recognition of experience, but identified the need for research to recognize any relationship between certification and outcomes. However, at this time, certification is still not pursued by many within the nephrology specialty (ANNA, 2016). Wiseman (2013) theorized that the employer's lack of recognition of certification and its importance within institutions may be a deterrent to pursue specialty certification.

The plan to obtain expert nephrology nurse status is not consistent or clear. There is agreement on the strong need to develop the next generation of renal nurses, provide structure for success, and expand the appreciation for the nursing specialty (Harwood, Downing, & Ridley, 2013). These researchers proposed use of the Renal Nursing Professional Practice Model previously developed and instituted at their dialysis units in Canada (Harwood et al., 2013). The practice model was found to be useful in consistent training, education, and advancement of skill in the units. Having a consistent approach has the potential to bolster the transition of a novice nurse towards the expert nurse status in the nephrology setting. This consistency allows the novice to take previous knowledge and apply it to new situations in the nephrology setting, and improves self-confidence in the nurse.

METHOD

This quantitative cross-sectional study focused on the shortage (lack of qualified nurses) of the expert nephrology nurse. The quantitative cross-sectional design was chosen because it is a descriptive approach that is useful to review past or current data and allowed for the collection of measurable data from the surveyed units. The purpose of this research study was to identify a relationship between the shortage of the expert nurse and patient quality indicators. Prior to conducting the study, approval from the institutional review board (IRB) was obtained. Research ethics board (REB) approval was not required due to the use of aggregate data. Publicly reported data available through the Centers for Medicaid and Medicare Quality Incentive Program were used as the measurement for patient quality indicators.

The literature review search and focus began with the expert nephrology nurse with a total of 65 articles meeting researcher's criteria. The following key terms were used in the Boolean search: (a) *expert nurse*, (b) *nephrology expert*, (c) *nursing shortage*, (d) *nursing retention*, (e) *older nurses*, (f) *experience in nursing*, (g) *education*, (h) *patient quality indicators/measurements*, (i) *patient outcomes*, (j) *older workers and safety,* and (k) *skill acquisition*. The four computerized databases used included EBSCOhost, ProQuest, CINAHLComplete, and Nursing@Ovid.

Information regarding expert nephrology nursing was obtained through a direct survey of chronic dialysis administrators in the state of Ohio. The nurse demographic survey sent to the dialysis unit administrator requested identification of the dialysis unit for comparison purposes. The target population of chronic dialysis units was chosen to maintain consistent patient quality measurements. The survey was voluntary with participant identification and confidentiality maintained throughout the survey set up and process. These units were selected to provide similar educational standards, same scope and standard of practice, and same regulatory laws as required by the state.

The units were assessed for nurses' skill mix by identifying: (a) differing experience levels as a registered nurse, (b) experience as a nephrology nurse, (c) education, (d) certification status, and (e) age (50 years or older). These five measurable items were chosen after the literature review was completed and for ability to be quantified. The survey questions were adapted from the United States Demographics Survey, the Department Performance Survey, and Team Performance Survey templates located on Survey Monkey's website within the tools section. The publicly reported data on patient outcomes were retrieved on the ESRD Quality Incentive Program (QIP) Centers for Medicare and Medicaid Services website (Centers for Medicare and Medicaid Services [CMS], 2016). During the analysis phase, unit names were removed to maintain anonymity of the participating facilities and administrators. The data were used to conduct a regression analysis and placed in table form to provide visualization of relationships between data.

Data Collection

The use of a Nursing Demographic Survey was the first instrument used to collect data on the nurses employed within the chronic dialysis units. The experience and expertise of the nephrology nurse within the chronic dialysis units in the state of Ohio was the focus. The independent variables measured included: (a) years of nursing experience, (b) years in nephrology nursing, (c) educational level, (d) certification in nephrology nursing, and (e) age of 50 years or older. The administrators at chronic dialysis unit were notified via email through a nursing specialty organization.

The second instrument was the Centers for Medicare and Medicaid Quality Incentive Program (2015) used to report patient quality indicators. The dependent variables measured included areas of: (a) anemia, (b) dialysis adequacy, (c) vascular access type, (d) calcium, (e) phosphorus, (f) mortality, and (f) readmission rate listed through the publicly reported data. CMS uses these measurements due to their relevance in morbidity and mortality reports. Anemia causes shortness of breath, fatigue, and impacts patients overall health (CMS, 2015). Patients not receiving adequate dialysis experience high levels of uremia, phosphorus, calcium and potassium and may cause cardiac events (CMS, 2015). Patients with a central venous catheter (CVC) have a higher rate of infections and higher rate of hospitalization; thus, the goal is to have a permanent vascular access (arteriovenous fistula [AVF] or graft [AVG]) in place (CMS, 2015). A comparison of units with a higher percentage of nephrology nursing experts versus those with a lower percentage ensued. Key survey items, such as years in nursing, years in nephrology, and level of education, were paired with reported patient quality indicators with some statistically significant relationships noted.

Data Analysis

Data analysis consisted of using reported level of experience and education levels of the chronic dialysis units and identified key areas (i.e., anemia, dialysis adequacy, vascular access type, calcium, phosphorus, mortality, and readmission rate) from the Centers for Medicare and Medicaid Quality Incentive Program data. Statistical Package for the Social Sciences (SPSS) version 24 and Microsoft Excel were used for data synthesis. Reliabilities were calculated using Cronbach's alpha resulting in a positive (or direct) reliability coefficient of .012. A simple linear regression analysis was conducted on the patient quality indicators and was used to predict outcomes on the shortage of nursing experts on the collected convenience sample. The chronic dialysis units were split into two categories by using the mean nephrology nursing experience of 9.968 years. Units with average years in nephrology nursing less than 9.9, were compared to those with 9.9 or more. The 12 identified patient quality care indicators were run for comparison.

RESULTS

The Nursing Demographic Survey was sent to 121 Ohio chronic dialysis unit administrators (participants) through the nursing specialty organization email distribution list. A total of 34 administrators from the chronic dialysis units completed the survey. Information regarding a total of 128

registered nurses currently working at the 34 Ohio chronic dialysis units was collected. The Centers for Medicare and Medicaid patient quality care indicators from these units were obtained for review. The June 2017 data were used for the purpose of comparison.

Experience Level

Experience level within the dialysis units was noted to have a vast difference in years as a registered nurse (Table 1) and years in the nephrology specialty (Table 2). The years of nursing experience ranged from one year up to 43 years in nursing. The mean was 14.945 with a standard deviation (SD) of .67. The reported experience level in nephrology nursing range was 0 to 30 years of experience. The mean was 9.968 with a standard deviation (SD) of 0.15.

Table 1. Years of Registered Nurses' Experience Within Participating Chronic Units

n	Mean	Median	Mode	SD	Range (years)
128	14.94	13.00	7.0	.67	1–43

Table 2. Years of Nephrology Experience of Nurses within Participating Chronic Dialysis Units

n	Mean	Median	Mode	SD	Range (years)
128	9.96	7.00	5.00	.15	0–30

Education Level

Educational level within the chronic dialysis units was varied (Table 3). The registered nurses possessing an associate degree (AD) in nursing constituted the largest group at 57% (n=73). Those registered nurses with a bachelor's degree comprised 32% (n=41). This grouping included Bachelor of Science, Bachelor of Science in Nursing, and Bachelor of Arts in the Nursing Demographic Survey. Registered nurses with a diploma in nursing comprised 7% (n=9). The remaining 3.9%, or a mere five nurses, held a master's degree. These five nurses listed Master of Nursing Science, Master of Hospital Administration, and Master in Business, as their degree foci. The noted lack of master-level degree within the sample units was an unexpected finding and a potential source of concern due to the importance of advancing education within the nursing discipline.

Table 3. Highest Educational Degree of Nurses within Participating Chronic Dialysis Units

Educational degree	n	Percent
Associate	73	57
Bachelor	41	32
Master	5	3.9
Diploma	9	7.0

Age

The next question on the survey was to identify those aged 50 years or older based on the average age of registered nurses at 50 years or older (Rosseter, 2014). Nurses in this age category are closer to retirement and are often considered experts in their respective nursing specialty practice. This information had the ability to identify units at risk (i.e., if a high number of the nurses were over age 50) to experiencing a shortage of expert nephrology nurses within 10 to 15 years. The reported number of nurses at 50 years or older within these surveys was 36 (28.1%), which was lower than expected based on the average age of the registered nurses being 50 years or older (Table 4).

Table 4. Nurses' Age Groups Within Participating Chronic Dialysis Units

Age	n	Percent
50 years or older	36	28.1
Under 50 years	92	71.9

Certification

The certification status for registered nurses within the participating chronic dialysis units was noted to be low (Table 5). Out of 128 registered nurses within the 34 chronic dialysis units, only 14 possessed certification in nephrology. This translates into 10.9% of the nurses who pursued and passed the certification test. This was considered lower than expected with current nursing standards moving toward advancing degrees, certification, and clinical ladder promotion within the nursing specialty practice.

Table 5. Certification Status of Nurses within Participating Chronic Dialysis Units

Certification	n	Percent
Certified	14	10.9
Not Certified	114	89.1

Comparison of Data

Linear regression analysis was used to predict the potential relationship between the shortage of nephrology nursing experts at the chronic dialysis units and the patient quality care indicators. The chronic dialysis units were divided into two groups based on nursing experience. The more experienced chronic dialysis unit group was composed of nurses who had equal to or more than 14.945 years of nursing experience, and equal to or more than 9.968 years of nephrology nursing experience. The less-experienced chronic dialysis units had nurses with less than 14.945 years of nursing experience and less than 9.968 years of nephrology nursing experience. This distinction was based on Benner's definition of expert nurses and guided the study to determine whether most nurses would reach expert nephrology nursing status in 10 years.

The chronic dialysis units were also divided into two groups based on educational level of the registered nurses. Units identified as having a higher level of education comprised at least one registered nurse with a bachelor or master degree. Units identified as having a lower level of education employed nurses with either an associate degree or diploma degree. This was based on the collected Demographic Nursing Survey data.

The dependent variables (i.e., patient quality indicator targets), were systematically compared with the years of nursing experience and years in nephrology nursing. These variables included: (a) hemoglobin less than 10.2 g/dl (102 g/L); (b) Kt/V greater than 1.2; (c) AVF in use; (d) central venous catheter (CVC) longer than 90 days; (e) calcium over 10.2 mg/dl (2.54 mmol/L); (f) phosphorus less than 3.5mg/dl (1.13 mmol/L); (g) phosphorus 3.5–4.5 mg/dl (1.13–1.45 mmol/L); (h) phosphorus 4.6–5.5 mg/dl (1.48–1.77 mmol/L); (i) phosphorus 5.6–7.0 mg/dl (1.8–2.26 mmol/L); (j) phosphorus over 7.0 mg/dl (2.26 mmol/L); (k) mortality rate; and (l) readmission rate, which is defined as unplanned readmission to the hospital setting within 30 days (Table 6).

There were three areas of patient quality indicators that were statistically significant. The first two indicators, the hemoglobin level of 10.2 g/dl (102 g/L) or less, and adequacy (Kt/V) of 1.2 or greater, were statistically significant with the experience level of the nurses. The third area, mortality rate for the facility, was statistically significant for the education level of the nurses. Hemoglobin less than 10.2 g/dl (102 g/L) was used as the dependent variable with nursing experience (years of nursing and years of nephrology nursing), and educational level served as the independent variables. Table 7 presents the results of this analysis. Nursing experience *(beta = .659; t = 4.466; 95% C. I. = -8.634–9.157; p = .00)* was significant, indicating that nursing experience was associated with low percentage of patients with hemoglobin levels less than 10.2 g/dl (102 g/L). Education level *(beta = .081; t = .416; 95% C. I. = -5.946–8.962; p = .681)* was found not significant as an independent variable when looking at the hemoglobin 10.2 or greater in the sample group.

The management of adequacy (Kt/V greater than 1.2) was used as the dependent variable with nursing experience (years of nursing and years of nephrology nursing),

Table 6. Patient Quality Care Indicators for Participating Chronic Dialysis Units

Quality Indicator	*n*	Mean	Median	Mode	SD
Hgb less than 10.2 g/dl (102 g/L)	28	18.64	17.00	23.00	9.22
Kt/V greater than 1.2	32	95.50	96.00	96.00	2.78
AVF in use	32	67.93	71.50	45.00	12.32
CVC longer than 90 days	32	8.81	7.00	7.00	5.20
Hypercalcemia over 10.2 mg/dl (2.54 mmol/L)	32	.75	1.00	0.0	.84
Phosphorus less than 3.5mg/dl (1.13 mmol/L)	32	7.50	7.50	5.00	3.03
Phosphorus 3.5–4.5 mg/dl (1.13–1.45 mmol/L)	32	25.53	24.50	22.00	4.45
Phosphorus 4.6–5.5 mg/dl (1.48–1.77 mmol/L)	32	32.75	30.00	30.00	5.47
Phosphorus 5.6–7.0 mg/dl (1.8–2.26 mmol/L)	32	12.71	12.50	11.00	5.49
Phosphorus over 7.0 mg/dl (2.26 mmol/L)	32	12.71	12.50	11.00	4.66
Mortality rate	29	17.48	17.70	11.90	4.58
Readmission rate	30	21.60	23.55	14.60	6.77

Table 7. Management of Patient Quality Care Indicator Hemoglobin less than 10.2 g/dl

Variable	Under standardized B	Coefficients S.E.	Std. Coefficients Beta	t	Sig	95% CI Lower Bound	For B Upper Bound
Nursing experience	11.969	2.680	.659	4.466	.00	-8.634	9.157
Education level	1.508	3.626	.081	.416	.681	-5.946	8.962

and educational level served as the independent variables. Table 8 presents the results of this analysis. Nursing experience (beta = -.337; t = -1.960; 95% C. I. = -3.836–.079; p = .050) was borderline significant indicating that nursing experience was mildly associated with a higher adequacy (Kt/V) for the hemodialysis treatment in the sample group. Educational level (beta = .267; t = .258; 95% C. I. = -1.840–2.374; p = .798) was not a predictor for adequacy of Kt/V of 1.2 or greater.

The mortality rate indicator was used as a dependent variable with nursing experience (years of nursing and years of nephrology nursing), and educational level served as independent variables. Table 9 presents the results of this analysis. The nursing experience level (beta = -249; t = -1.451; 95% C. I. = -5.464–.942; p = .159) statistically showed no significance between the experience level of the nursing staff and the mortality rate of the patients within the chronic dialysis unit. The education level (beta = -.410; t = -2.384; C.I. = -7.090–.525; p = .025) was found to be a significant predictor of mortality rate within the sample population.

DISCUSSION

The study found three areas where the experience or education level of the registered nurse correlated with the improved patient outcomes in the Ohio chronic dialysis unit setting. The hemoglobin of 10.2 g/dl (102 g/L) or less was the first patient quality indicator with statistical relevance. The renal patient is often anemic and is managed through the physician's orders and protocols managed by the registered nursing team. There is a strong need to manage care to keep patients' anemia levels above 10.2 g/dl (102 g/L), thus maintaining a low percentage of chronic unit dialysis patients with low hemoglobin levels. The advantage to having adequate hemoglobin is improvement in patients' ability to carry out activities of daily living, potential for improved quality of life, and decreased mortality. The surveillance and monitoring of the anemia level

requires nephrology nurses to develop expertise through education, training, and understanding of the complexities of patients with CKD.

The second patient quality indicator with noted statistical relevance was adequacy (Kt/V of 1.2 or greater). The skilled nursing team works with patients to enable meeting this essential patient quality indicator. The adequacy measurement is an objective way to ensure that the dialysis treatment is removing enough of the toxins within the patient's blood. The patient's dialysis needs can change over time, requiring vigilance for laboratory values, patient condition, and patient assessment. Experience aids the registered nurse to identify trends and conditions sooner, thus reducing the risk to the patient of poor adequacy lab results. An effective treatment translates into decreased mortality and improved quality of life for the patient on dialysis.

The third patient quality indicator with statistical significance was the mortality rate in the chronic dialysis unit. An increased level of education among the registered nurses was associated with a lower rate of mortality in the unit. This could be due to the increased level of understanding regarding patient conditions, disease process, or improved ability to manage the multiple aspects of complex patient care. Those choosing to start dialysis desire quality and quantity for their lives. The nephrology professionals work toward assisting these individuals to reach these goals (Bonner, 2006).

The promotion and encouragement of advanced education requires understanding and focus. In this research study, only five nurses held a master's level degree. This was only 3.9% of the nurses caring for patients in the 34 Ohio chronic dialysis units. This is an alarmingly low percentage of registered nurses within the nephrology nursing specialty. The complexities of renal failure, the management of multiple comorbidities, and advanced understanding of care and management requires advanced education and skills.

Table 8. Management of Patient Quality Care Indicator Kt/V greater than 1.2

Variable	Under standardized B	Coefficients S.E.	Std. Coefficients Beta	t	Sig	95% CI Lower Bound	For B Upper Bound
Nursing experience	-1.879	.959	-.337	-1.960	.050	-3.836	.079
Education level	.267	1.032	.047	.258	.798	-1.840	2.374

Table 9. Management of Patient Quality Care Indicator Mortality Rate

Variable	Under standardized B	Coefficients S.E.	Std. Coefficients Beta	t	Sig	95% CI Lower Bound	For B Upper Bound
Nursing Experience	-2.261	1.558	-.249	-1.451	.159	-5.464	.942
Education level	-3.807	1.597	-.410	-2.384	.025	-7.090	-.525

An investigation into the reasons why these chronic dialysis units had such a low number of master's-prepared nurses could provide insight into the problem.

Nephrology nursing certification is another aspect of promotion and support for advancing practice within this nursing specialty. The registered nurses working within the surveyed units reported 10.9% or a mere 14 individuals certified in the nephrology specialty. Pursuit of certification is an outward sign of the nurse's knowledge in the nephrology nursing practice. Understanding what moves a nurse to pursue certification, knowing the barriers, and promotion of certification by employers may improve the percentage of certified nephrology nurses.

LIMITATIONS OF FINDINGS

Program patient quality data were limited in measurement for all aspects of patient care. The 34 participating chronic dialysis units were reporting the required metrics. However, there were data missing for some units. The overall missing data occurred in only two units, yet this did limit knowing exactly the consequences or outcomes for those two specific units on every aspect of patient quality care indicators. The use of one month's reported data limited any potential for chronic dialysis unit trending.

The use of only Ohio chronic dialysis units limits applicability of findings to other states or types of dialysis units. Also, chronic dialysis units were not asked for information regarding retention, turnover, or years of employment at the facility. Units with higher retention would potentially be viewed as more stable and provide improved consistency in patient care (Carmel & Baker-McClearn, 2011). Retaining experienced nurses, maintaining a stable work environment, and improving satisfaction may be associated with leadership style, physician interaction, and team dynamics. The unit that is stable may influence patients who view the chronic dialysis unit staff as an extension of their lives. For better or worse, the dialysis staff see patients more often than patients' families and often build a lasting connection.

The composition and skill mix of the interdisciplinary team for the chronic dialysis units was also not provided. The chronic dialysis unit has multiple disciplines working to provide optimum care to the renal patient. The social worker provides support and direction to the team and patient through counselling and resources. The dietitian provides guidance and essential information on the renal dietary needs for each patient. The nephrologists and nurse practitioners responsible to provide orders and direct medical care must be active participants in the renal care team. Their presence, support, and temperament drive the best practices and essential care of the medically complex individual. Together an effective team manages patient care; the ineffective team struggles to complete the simplest of tasks.

The chronic dialysis units were divided into two convenience groups for comparison with one group consisting of higher level of experience and the other group with a lower level of experience. If the units were divided into multiple levels for units, based on years of experience, a different statistical analysis may have occurred. Dividing units by

educational level (i.e., diploma; associate, bachelor, and master degrees) may have yielded altered statistical information. Although this particular sample was small, there was a high percentage of registered nurses with associate's and bachelor's degrees noted. Understanding the low percentage of registered nurses with master's degrees and certification could be investigated in future research. Data were not collected on the reason for a specified level of education or the choice to pursue certification.

STRENGTHS OF THE STUDY

The study did identify a statistically significant relationship between the expert nephrology nurse and patient quality indicators in three key areas. This could promote further studies of nephrology nurses' education, experience, and certification in conjunction with the dialysis units' patient quality care indicators. This research study has additional transferability for other specialty practice areas within nursing. Institutions collect and maintain patient care metrics in nearly every setting. The potential to take this information and compare it to the current staff model within each unit could identify properly the mix of expert nurses for optimal patient outcomes. It may also identify the relevance or support for current hiring practices within the units. Managers may exhibit preferences for certain educational or experience levels, or promotion of certification within the units. The opportunity to understand how current staffing skill mix, hiring, and retention practices affect the relationship between expert nurses and patient quality care indicators, may be beneficial in addressing future healthcare needs.

IMPLICATIONS
For Nurses

The nephrology nursing specialty practice needs to look to promotion of further education and certification among its nursing population. The consistent use of a clinical ladder within nephrology nursing would be a valuable step toward uniformity within the specialty. Ideas may intertwine the nurse's individual aspirations with the specialty's need to advance skill and understanding of the complexities of renal patient care. This objective will require extensive collaboration across nephrology nursing, employers, and the healthcare community.

Recruitment of new nurses into the nephrology nursing specialty needs to be a priority. Engaging in current school of nursing activities, training, and clinical experiences should be looked to as opportunities to interact with student nurses. Taking time to speak with fellow nurses, family, and friends, and dispelling any myths are important. Explaining the role of a nephrology nurse and the value of their role is essential to maintain the specialty.

Nephrology nursing specialty is time intensive, requires months of additional training, and involves multiple demands placed on the registered nurses. A review into each unit's current training, education, and retention of nephrology nurses must be completed. Identification of chronic dialysis units struggling to meet patient quality

indicator metrics versus those that are successful need to be viewed from all aspects. The current team skill mix, the level of education, certification status, age (those planning for retirement), and anticipating future demand, play a part of the unit's viability.

Nephrology leaders will also need to assess for competitiveness to recruit the new nurses, experienced nurses, and advanced degree holders into the nephrology nursing specialty. Salary, wage, and compensation packages need to attract these nurses. Employers also need to know how to keep current nephrology nurses in the specialty by offering flexibility in scheduling (where needed), options for cross-training, and for promotion. Opportunity for advancing education, ability to conduct research, and working on special projects may be additional ways to attract and keep nephrology nurses within the specialty practice (Bonner, 2007).

For Future Research

Improved relevance of the study could be accomplished through additional information on not just years of nursing experience and years of nephrology experience, but also inclusion on the number of hours worked by each nurse. Other factors to study include the chronic dialysis unit's size, location (rural, suburban, urban), and patient census. Information about the acuity level of patients in the unit would also benefit overall understanding of patient population needs within the unit's location.

The team mix, including number of dialysis technicians and the ratio of nurses and technicians related to patient census may impact patient outcomes. The number of patients per shift, number of shifts, and overall unit hours of operation provide greater information on the demand on nursing teams. The larger units appear to work more like factories than clinics. These units may see a disconnect between patients and staff. Nurses working in large units may have less time to complete assessments, provide medications, and carry out learning opportunities. The smaller units may struggle to keep staff, lack the ability to manage needed time off, or be able to accommodate specific patient treatment needs or schedules. All of these aspects could negatively influence reported patient quality care indicators and quality of life for the renal patient. Having one or more expert nurse may make the difference in stabilizing various unit types.

Further study is warranted to comprehend the overall need for expert nephrology nurses in all aspects of care for the renal patient. Additional studies should focus on expert nurses, defining what quality care involves, understanding how to retain experienced nurses, and the promotion of cooperation within disciplines. The use of quantitative and qualitative means would continue to add to the overall understanding of Benner's novice to expert and Watson's caring theories as they apply to the expert nephrology nurses.

CONCLUSION

This study demonstrated that there was a statistically significant relationship between the expert nephrology nurse and three patient quality care indicators. Anemia (hemoglobin less than 10.2 g/dl [102 g/L]) and adequacy (Kt/V 1.2 or greater) were associated with the more experienced registered nurses, whereas the lower mortality rate was related to a higher level of nursing education. This study is only the beginning of understanding the relationship between the expert nephrology nurse and patient quality indicators. Additional research is needed to provide understanding on the intricacies of the nephrology nursing specialty. It is a specialty that requires commitment, perseverance, and patience. There is a need for a high level of skill, to work as a team, to communicate to all people, and remember that the patient has a life beyond the dialysis chair. The treatment provides life and the ability for patients to continue with enjoyed activities with family and friends. Those working within nephrology realize and embrace their role as caregiver, friend, and professional for these complex medical patients. Understanding the expert nephrology nurse's impact will improve the experience for the nurse, patient, and the healthcare community.

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