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Relationships among nurse managers' job design, work environment, and nurse and patient outcomes

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Abstract

The importance of nurse managers' practice environments in affecting outcomes for direct care nurses and patients has been well-researched. Nonetheless, much remains to be learned about the determinants of the nurse manager practice environment. In this study, 541 US nurse managers' survey responses were matched to unit-level aggregate data of their subordinates' responses on the National Database of Nursing Quality Indicators. A model relating job design and experience to the nurse manager's practice environment and direct care nurse (i.e., job satisfaction, intent to stay, and joy and meaning in work) and patient outcomes (i.e., nurse-reported quality of care and missed nursing care) was evaluated through multilevel path analysis. Nurse manager span of control, support staff, and experience influence nurse managers' perceptions of their practice environment and nurse and patient outcomes. Although support staff can offset some negative effects of wide spans of control, it does not fully compensate for wide spans. Thus, nurse manager job design factors and experience relate to nurse manager practice environments and valued downstream outcomes. The present research emphasizes the importance of a positive nurse manager practice environment and provides guidance for nurse manager hiring and job design decisions.

KEYWORDS

competency, hospital, nurse manager, nursing staff, patient care, span of control

1 | INTRODUCTION

Rapid nurse turnover and workforce shortages are among the most critical problems facing the nursing profession and healthcare industry globally (Buchan et al., 2022). Mounting evidence demonstrates the role nurse managers play in driving direct care nurses' engagement, organizational commitment, job satisfaction, burnout, and turnover intentions (Ballard et al., 2016; Cziraki et al., 2020; Lake et al., 2019; Manojlovich & Laschinger, 2007; Nurmeksela et al., 2021). Efforts to increase nurse retention must consider the critical role of nurse managers; yet, attrition is growing among nurse managers as well. Recent research suggests that issues with job design (i.e., the structure

and characteristics of work tasks and activities; Oldham & Fried, 2016), including wide spans of control and limited support, are associated with greater nurse manager stress and burnout (Labrague et al., 2018; Penconek et al., 2021). Combined, the excessive workload and lack of support negatively impact job satisfaction and retention (Hewko et al., 2015). In addition to job demands, features of the work environment compound the negative impact on the role (Adriaenssens et al., 2017; N. E. Warshawsky et al., 2016).

Creating empowering work environments with supportive professional relationships is a top strategy to reduce stress and improve job satisfaction and retention for nurse managers (El Haddad et al., 2019; Van Bogaert et al., 2014). Compelling evidence suggests

that relational, supportive leadership by nurse managers is a principal predictor of valued nurse and patient outcomes (Cummings et al., 2018; Keith et al., 2021; Nurmeksela et al., 2021). However, linkages between nurse manager job design and direct care nurse and patient outcomes remain unclear. This article presents findings examining the complex relationships among nurse managers' job design, their perceptions of their work environment, and the direct and indirect effects on important nurse and patient outcomes.

1.1 | Background

Span of control (SOC) is typically defined as the number of employees who report to a specific manager (D. Cathcart et al., 2004). Some researchers prefer to operationalize SOC as the complexity of the department overseen by the manager but, importantly, these two factors are positively correlated (Merrill et al., 2013; Morash et al., 2005; C. Wong et al., 2014). The average nurse manager SOC has increased dramatically since the 1990s (Omery et al., 2019). Research suggests that roughly half of nurse managers now have overly wide SOCs (Simpson et al., 2017; C. Wong et al., 2014; C. A. Wong et al., 2015). Although spans vary widely and few formal recommendations exist, past research suggests that nurse managers whose spans exceed approximately 50 subordinates report poorer quality practice environments (N. E. Warshawsky, 2016).

Wide spans of control have been shown to relate negatively to outcomes for nurse managers, their direct reports, and patients. For example, wide SOCs are negatively associated with organizational commitment in novice nurse leaders (Havaei et al., 2015) and relate positively to nurse managers' feelings of role overload and negatively to work control and job satisfaction (C. A. Wong et al., 2015). Nurse managers have reported that wide SOCs limit the extent to which they can develop supportive relationships with their direct care nurses (N. E. Warshawsky, Lake, et al., 2013; C. Wong et al., 2014). Given the importance of relational leadership in creating healthy work environments (Cummings et al., 2018; Lewis & Cunningham, 2016), this limitation may have broader effects. For example, as the number of staff reporting to a manager increased, employee engagement decreased (D. Cathcart et al., 2004). Understanding the influence of wide SOC on patient outcomes has been more challenging and findings supporting the relationship between nurse manager SOC and patient outcomes are less robust. C. A. Wong et al. (2015) found that a wide SOC was positively associated with nurse managers' reports of the frequency of adverse patient outcomes. More research is needed to understand the influences of nurse managers' SOC on direct care nurse and patient outcomes.

The addition of support positions is a strategy thought to alleviate the burdens associated with wide SOC (Shirey et al., 2010; C. Wong et al., 2014). Support positions are unit or organizational roles that facilitate the work of nurse managers through clinical or administrative assistance (C. Wong et al., 2014). Based on their qualitative study of nurse managers, Shirey et al. (2010) emphasized the importance of support, advocating for a comanager model.

Similarly, managers in C. Wong et al. (2014) sample expounded the need for roles providing administrative and clerical support, human resources functions, clinical education, and more.

Importantly, research has supported the efficacy of support positions. When administrative assistant support and additional training were provided to nurse managers with the largest SOCs, nurse manager job satisfaction and transformational leadership competence improved (Simpson et al., 2017). Jones et al. (2015) identified three tiers of SOC within a sample of nurse managers and allocated clerical assistance accordingly. After 1 year, the nurse manager turnover rate decreased by 58% (Jones et al., 2015). Havaei et al. (2015) found that stronger perceptions of organizational support reduced the negative effects of wide SOCs on organizational commitment among 69 Canadian nurse leaders. Most recently, El Haddad et al. (2019) demonstrated that the addition of administrative support positions allowed 18 Australian nurse managers to focus more intently on clinical and strategic leadership. Omery et al. (2019) recommended providing adequate clerical and clinical support to nurse managers with wide SOCs to offset negative repercussions. Thus, the addition of administrative support seems to reduce the demands associated with wide SOCs and improves outcomes for nurse managers. However, the literature currently provides little guidance on how support positions may relate to outcomes for direct care nurses or patients.

Experience is critical for developing competence as a nurse manager (N. E. Warshawsky et al., 2022) and may buffer the negative effects of difficult workplace experiences (E. B. Cathcart & Greenspan, 2013; E. B. Cathcart et al., 2010). The importance of experience is further underscored as nurse managers report it takes an average of 7 years to become proficient in their positions (E. B. Cathcart & Greenspan, 2013; E. B. Cathcart et al., 2010; N. Warshawsky & Cramer, 2019). Beyond developing competence, nurse manager tenure has also been linked to increased self-efficacy (Cziraki et al., 2020) and perceptions of work control (C. A. Wong et al., 2015). Shirey et al. (2010) found that more experienced nurse managers utilized more effective coping strategies, resulting in fewer negative health-related outcomes from workplace stress. Further, in a study of U.S. nurse managers, nurse manager competence had indirect effects on missed nursing care and nurse-reported quality of care (N. E. Warshawsky et al., 2022). While the link between nurse manager experience and direct care nurse and patient outcomes is rarely examined, such a relationship seems likely given nurse managers' far-reaching influence.

1.2 | Conceptual framework

Recent research established meaningful links between nurse managers' performance and direct care nurse and patient outcomes (Ballard et al., 2016; Cziraki et al., 2020; Lake et al., 2019; Manojlovich & Laschinger, 2007; Nurmeksela et al., 2021). Further, the nurse manager practice environment was identified as a critical driver of performance (Mackoff & Triolo, 2008; Shirey et al., 2010;

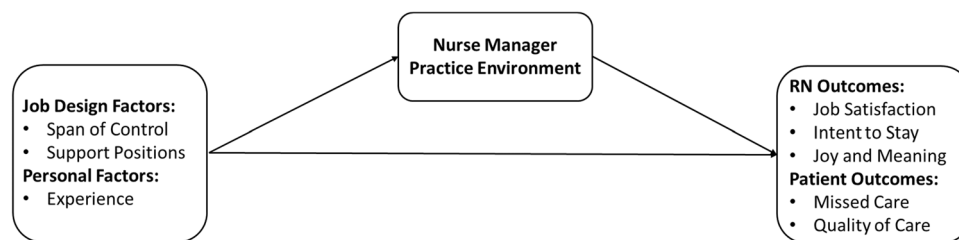


FIGURE 1 Conceptual model.

N. E. Warshawsky, Lake, et al., 2013). In line with current theory, we propose that nurse managers' perceptions of their practice environments are influenced by their SOC, available support positions, and experience (N. E. Warshawsky, 2020). In conjunction with these personal and job design factors, the nurse manager's practice environment influences outcomes for direct care nurses, including job satisfaction, intent to stay, and joy and meaning in work. These factors also impact patient outcomes, including missed care activities and quality of care. In summary, job demands, job resources, and the nurse manager practice environment are instrumental in determining the performance outcomes of nurse managers. Figure 1 illustrates the conceptual linkages among the key variables.

2 | METHODS

2.1 | Design and participants

Nurse managers were recruited from Press Ganey organizations that participated in the 2017 National Database of Nursing Quality Indicators® (NDNQI®) annual registered nurse (RN) survey. Each participating organization was provided with unique survey links to match nurse manager survey data to NDNQI registry data. We provided materials to recruited hospitals to encourage nurse managers to participate in the survey. We collected information on the unit(s) participating nurse managers oversaw, but nurse managers were asked to provide no other identifying data.

The survey was completed by 647 nurse managers across 53 US hospitals. Nurse managers who reported managing more than 200 full-time equivalents (FTEs) were excluded from analyses as this SOC was suggestive of a fundamentally different role than a typical nurse manager. Nurse managers who reported an interim status and those who were responsible for patient care units that did not participate in the 2017 NDNQI RN survey were also excluded from analyses. The final sample consisted of 541 nurse managers across 47 hospitals.

The nurse manager survey tool included measures of SOC, support positions, nurse manager experience, and the work environment of nurse managers. The nurse-reported outcome measures are from the NDNQI RN Survey. Data from the nurse manager survey were matched to existing NDNQI RN survey data. The NDNQI RN Survey is conducted annually at the nursing unit level. For full details on the survey methods see Warshawsky et al. (2021).

2.2 | Nurse manager survey measures

2.2.1 | SOC

SOC was operationalized as the number of FTEs managed by nurse managers.

2.2.2 | Support positions

The total number of personnel available to support nurse managers in their role (e.g., administrative assistants, business operations managers, and clinical nurse leaders).

2.2.3 | Experience

The total number of years nurse managers worked at their current organization or any other organization as a nurse manager.

2.2.4 | Nurse manager practice environment

The NMPES, developed and validated by N. E. Warshawsky, Rayens et al. (2013), encompasses eight domains: patient safety culture, culture of generativity, culture of meaning, NM-Director Relations, NM-Physician Relations, NM-Staff Relations, Adequate Budgeted Resources, and Workload. Responses indicate whether an item is present in the organization and were provided on a scale from 1 = Strongly Disagree to 6 = Strongly Agree. An aggregate score was used to represent an overall NMPES score that demonstrates acceptable reliability ($\omega = 0.86$).

2.3 | NDNQI RN survey measures

2.3.1 | Job satisfaction

Direct care nurses' responses to the 7-item job satisfaction scale (Brayfield & Rothe, 1951) were drawn from NDNQI data. A sample item is "We find real enjoyment in our work on our unit." Responses were provided on a scale from 1 = Strongly Disagree to 6 = Strongly Agree and has demonstrated good reliability ($\omega = 0.91$).

2.3.2 | Intent to stay

The percentage of direct care nurses in each unit who reported that they intended to stay in their current position for at least 1 year.

2.3.3 | Joy and meaning

Direct care nurses' joy and meaning in their work was measured with a 3-item scale (Lucian Leape Institute, 2013) that demonstrates acceptable reliability ($\omega = 0.92$). An example item reads, "In my job, I am treated with dignity and respect by everyone." Responses were provided on a scale from 1 = Never to 5 = Every day.

2.3.4 | Nurse-Reported missed care

The number of activities nurses reported were left undone was averaged at the unit-level. Direct care nurses were prompted to "Think about the last shift that you worked" and then asked "Which of the following activities were necessary but left undone because of time constraints?" Participants were instructed to check all applicable items from a list. Response options included: adequate patient surveillance, comfort/talk with patients, adequately document nursing care, administer medications on time, and so forth.

2.3.5 | Nurse-Reported quality of care

Quality of care reflects the unit-level average of direct care nurses' perceived quality of patient care. Nurses responded to the following question: "In general, how would you describe the quality of nursing care delivered to patients on your unit?" (Aiken et al., 2002). Responses were provided on a scale from 1 = Poor to 4 = Excellent.

2.3.6 | Hospital characteristics

Hospital bed size, teaching status, and American nurses credentialing center (ANCC) accreditation (Magnet[®] or Pathway to Excellence[®] designation) were used to describe the sample of hospitals in the study. Teaching status and bed size were used as hospital-level covariates in the analysis. Teaching status is a categorical variable that categorizes nonteaching hospitals (no training for interns or residents) and teaching hospitals (intern and residency programs) or academic medical centers (primary clinical site for a school of medicine, including intern and residency programs). Bed size was reported in six categories, ranging from less than 100 beds to more than 500 beds.

2.4 | Analysis

Descriptive statistics were used to examine organizational characteristics (e.g., bed size, teaching status, and Magnet[®] or Pathway to

Excellence[®] certifications) and nurse manager characteristics (e.g., age and tenure as nurse manager). Multilevel path analysis was used to assess the direct and indirect effects of nurse manager SOC, support, and tenure on both RN (job satisfaction, intent to stay, joy and meaning in work) and patient (nurse-reported missed care and quality of care) outcomes, as mediated by nurse manager practice environment. Multilevel models are necessary when data are nested (e.g., in this study nurse managers are nested within hospitals), to examine the effects of between- and within-level variables on within-level outcomes (Zhang et al., 2009). In the current study, the predictors, intervening variables (i.e., mediators), and outcome variables are all measured at the nurse manager level. A random-intercept model using hospital-level covariates was used to account for the variance within the outcome variables attributable to organizational effects. The intraclass correlations (ICCs) for the RN outcomes are 0.152 for job satisfaction, 0.081 for intent to stay, and 0.207 for joy and meaning in work. The ICCs for patient outcomes are 0.098 for nurse-reported missed care and 0.110 for nurse-reported quality of care. These ICCs indicate that approximately 8%–21% of the variance among observations is attributable to the hospital level, providing justification for the multilevel modeling framework (Hox et al., 2017).

The Bayesian estimator with default non-informative priors and Markov chain Monte Carlo estimation with 10,000 iterations was used to estimate the multilevel path model in Mplus version 8.6. Following recommendations for modern mediation analysis (Preacher & Kelley, 2011; Yuan & MacKinnon, 2009), the total indirect effects were calculated as the product of path coefficients and evaluated using Bayesian credible intervals. Although the Bayesian estimator does not provide the conventional model fit statistics researchers may be familiar with, Depaoli (2013) noted that Bayesian methods produce more accurate parameter estimates. Model convergence was evaluated using parameter trace plots and evidence of convergence remained after doubling the number of iterations, as suggested by Depaoli and Van de Schoot (2017).

3 | RESULTS

3.1 | Sample description

The average nurse manager in the sample was 45.2 (SD = 10.0) years of age with approximately 4.3 (SD = 5.3) years of experience in their current position. Many nurse managers had an advanced degree; fewer than 5% held less than a bachelor of science in nursing. Approximately half of the hospitals included in this study have over 200 beds, over two thirds were either teaching hospitals or academic medical centers, and nearly half had ANCC accreditation. Table 1 includes the hospital and nurse manager characteristics.

On average, direct care nurses rated their overall job satisfaction as 4.2 (SD = 0.6). The average NMPES total score was 4.8 (SD = 0.6). Direct care RNs reported an average of 1.8 (SD = 1.2) missed care events on their last shift and rated the overall quality of care between

TABLE 1 Sample characteristics.

Characteristic	Frequency	Percentage (%)
<i>Hospital characteristics (n = 47)</i>		
Bed size		
<100	5	9.4
100-199	18	34.0
200-299	13	24.5
300-399	5	9.4
400-499	4	7.6
≥500	8	15.1
Teaching hospital status		
Academic Medical Center	9	19.2
Teaching	23	48.9
Nonteaching	15	31.9
ANCC accreditation		
No	26	55.3
Yes	21	44.7
<i>Nurse manager characteristics (n = 541)</i>		
Highest nursing degree		
Diploma	4	0.7
ADN	22	4.1
BSN	336	62.3
MSN	168	31.2
DNP	9	1.7
Advanced degree (any field)		
No	326	60.3
Yes	215	39.7
Characteristic	Mean (years)	SD
Tenure as nurse manager	6.7	7.0
Tenure in current position	4.3	5.3
Age	45.2	10.0

Abbreviations: ADN, associate's degree in nursing; BSN, bachelor of science in nursing; DNP, doctor of nursing practice; MSN, master of science in nursing; SD, standard deviation.

“good” and “excellent” ($M = 3.5$, $SD = 0.3$; see Table 2 for means and standard deviations for all model variables).

3.2 | Model results—RN outcomes

The unstandardized (B) and standardized (β) effects of all hypothesized direct and indirect effects along with credible intervals (CrI) can be found in Tables 3 and 4. Credible intervals that excluded zero are interpreted as meaningful and described below.

TABLE 2 Descriptives.

Model variable	Mean	SD
Support positions	2.1	1.4
NM practice environment scale total score	4.8	0.6
Job satisfaction	4.2	0.5
Intent to stay	79.3	14.0
Joy and meaning	4.0	0.3
Quality of care rating	3.5	0.3
Missed care activities	1.8	1.2

Abbreviation: SD, standard deviation.

3.2.1 | Direct effects

Wider SOC was negatively related ($\beta = -0.214$) to the NM practice environment, although number of support positions had a positive ($\beta = 0.210$) association. Nurse manager tenure was positively associated with RN job satisfaction ($\beta = 0.093$) but was not a meaningful predictor of the intervening variable or other RN outcomes. The direct effects of the NM practice environment on all three nurse outcomes (RN job satisfaction [$\beta = 0.204$], intent to stay [$\beta = 0.094$], and joy and meaning [$\beta = 0.198$]) were positive (see Figure 2).

SOC and number of support positions both had negative relationships with RN intent to stay, job satisfaction, and joy and meaning (see Table 3 for unstandardized estimates and credible intervals), indicating that the number of FTEs reporting to the NM and having more support personnel were related to lower levels of job satisfaction, reports of being less likely to stay in current position for another year, and lower levels of joy and meaning in work.

3.2.2 | Indirect effects

Wide SOC had a small negative indirect effect on intent to stay via NM practice environment ($B = -0.008$, CrI = -0.019 to -0.001). There were meaningful positive indirect effects of support positions on job satisfaction ($B = 0.016$, CrI = 0.008 to 0.027), intent to stay ($B = 0.188$, CrI = 0.013 to 0.427), and joy and meaning ($B = 0.008$, CrI = 0.004 to 0.014) via NM practice environment.

3.3 | Model results—patient outcomes

3.3.1 | Direct effects

Wide SOC was also negatively related ($\beta = -0.219$) to the NM practice environment, although number of support positions had a positive ($\beta = 0.217$) association. Tenure was positively associated with nurse-reported quality of care ($\beta = 0.132$) and negatively associated with nurse-reported missed care ($\beta = -0.135$) but was not a meaningful predictor of NM practice environment. The direct effect

TABLE 3 Direct care nurse (RN) outcomes.

Parameter	Estimate	Std estimate ^a	Post-SD	Cr LL ^b	Cr UL ^b
Within-level effects					
Direct effects					
NM practice environment					
FTEs	-0.004	-0.209	0.001	-0.006	-0.002*
Support positions	0.086	0.219	0.018	0.051	0.122*
Years experience	0.004	0.050	0.003	-0.002	0.010
RN intention to stay					
NM practice environment	2.261	0.094	1.093	0.164	4.46*
FTEs	-0.073	-0.165	0.021	-0.115	-0.032*
Support positions	-0.299	-0.031	0.473	-1.206	0.641
Years experience	0.138	0.072	0.085	-0.030	0.306
RN job satisfaction					
NM practice environment	0.187	0.204	0.04	0.109	0.266*
FTEs	-0.003	-0.187	0.001	-0.005	-0.002*
Support positions	-0.032	-0.088	0.017	-0.065	0.002
Years experience	0.007	0.093	0.003	0.001	0.013*
Joy in work					
NM practice environment	0.098	0.198	0.021	0.057	0.140*
FTEs	-0.002	-0.222	0.000	-0.003	-0.001*
Support positions	-0.022	-0.115	0.009	-0.041	-0.004*
Years experience	0.004	0.090	0.002	0.000	0.007
Total indirect effects					
FTEs to intent to stay	-0.008	-0.001	0.005	-0.019	-0.001*
Support to intent to stay	0.188	0.013	0.105	0.013	0.427*
Experience to intent to stay	0.007	0.001	0.009	-0.006	0.031
FTEs to job satisfaction	-0.001	-0.002	0.000	-0.001	0.000
Support to job satisfaction	0.016	0.029	0.005	0.008	0.027*
Experience to job satisfaction	0.001	0.002	0.001	0.000	0.002
FTEs to joy in work	0.000	0.000	0.000	-0.001	0.000
Support to joy in work	0.008	0.026	0.003	0.004	0.014*
Experience to joy in work	0.000	0.000	0.000	0.000	0.001
Hospital-level covariates					
NM practice environment					
Bed size	0.033	0.247	0.028	-0.023	0.086
Teaching status	0.191	0.645	0.061	0.071	0.313*
Magnet status	0.032	0.076	0.072	-0.115	0.173
RN Intent to stay					
Bed size	-0.729	-0.221	0.733	-2.193	0.729
Teaching status	0.408	0.056	1.755	-3.094	3.851
Magnet status	2.256	0.217	2.018	-1.633	6.293

(Continues)

TABLE 3 (Continued)

Parameter	Estimate	Std estimate ^a	Post-SD	Cr LL ^b	Cr UL ^b
RN job satisfaction					
Bed size	-0.018	-0.112	0.031	-0.078	0.046
Teaching status	0.049	0.143	0.074	-0.095	0.199
Magnet status	0.152	0.31	0.086	-0.015	0.319
Joy in work					
Bed size	0.017	0.174	0.018	-0.018	0.053
Teaching status	0.085	0.392	0.042	0.002	0.171*
Magnet status	0.110	0.357	0.049	0.013	0.205*
Bed size with					
Teaching status	-0.744	-0.582	0.235	-1.312	-0.393*
Magnet status	0.020	0.023	0.146	-0.266	0.321
Teaching with Magnet status	0.000	0.001	0.065	-0.127	0.128

Note: Asterisks (*) are used to denote credible intervals that exclude 0.

Abbreviations: FTEs, full-time equivalents; RN, registered nurse; SD, standard deviation.

^aStandardized estimates are fully standardized using variances of continuous latent variables, control variables and outcome variables. Effect size calculation is a partially standardized effect size from Preacher & Kelley, 2011.

^b“LL” denotes lower level and “UL” denotes upper level.

of the NM practice environment on nurse-reported missed care was negative ($\beta = -0.096$) and on nurse-reported quality of care was positive ($\beta = 0.142$). Wide SOC had a negative relationship with nurse-reported quality of care ($\beta = -0.183$) and a positive relationship with nurse-reported missed care ($\beta = 0.131$), indicating that higher FTEs were related to lower levels of quality of care and higher levels of missed care (see Figure 3).

3.3.2 | Indirect effects

Number of support positions had a small positive indirect effect on nurse-reported missed care ($B = 0.006$, CrI = 0.002–0.010) and had a negative indirect effect on nurse-reported quality of care ($B = -0.017$, CrI = -0.036 to -0.001). All other indirect effects were not meaningful (see Table 4 for estimates and credible intervals).

4 | DISCUSSION

Our findings lend support for our conceptual model. SOC had a negative and support positions a positive effect on nurse managers' perceptions of their practice environment. Wider spans were also negatively associated with direct care nurses' job satisfaction, joy and meaning, and intent to stay. These critical measures of job satisfaction are important precursors to actual nurse turnover (Cummings et al., 2018; Lewis & Cunningham, 2016). The evidence is clear that direct care nurses prefer nurse managers with relational leadership styles (Boamah et al., 2018; Cziraki et al., 2020; Jankelová

& Joniaková, 2021; Nurmeksela et al., 2021; Zaghini et al., 2020). Relationships are built through consistent interactions and connections over time and nurse managers with wide spans of control are less likely to create meaningful relationships with their direct care nurses. Relationships between nurse managers and direct care nurses are particularly important during the current nursing shortage as nurses seek to align their career choices with personal needs.

Patients on units where nurse managers had wider spans were more likely to have important nursing care activities omitted. Missed nursing care activities are naturally related to lower ratings of patient care quality. Relational nurse managers with strong communication skills can cultivate the collaborative conditions necessary for ensuring patient safety (Cziraki et al., 2020; Jankelová & Joniaková, 2021). The data for this study were collected in 2017, 3 years before the pandemic exacerbated the negative effects of high nurse retirement. Considering the increased severity of the nursing shortage, serious attention must be paid to any opportunity to reduce the negative effects of short staffing. As staffing shortages become increasingly commonplace, missed nursing care activities will likely increase and quality of care decrease.

To offset the burdens of wide nurse manager spans of control, organizational leaders might consider adding support positions to nurse managers. Indeed, adding administrative support improved nurse manager job satisfaction and productivity in other studies (El Haddad et al., 2019; Havaei et al., 2015; Jones et al., 2015; Simpson et al., 2017). Our findings add important nuance to these conclusions. More support positions were associated with improved nurse manager perceptions of their practice environments. However, additional support positions had negative direct effects on direct care

TABLE 4 Patient outcomes.

Parameter	Estimate	Std estimate ^a	Post-SD	Cr LL ^b	Cr UL ^b
Within-level effects					
Direct effects					
NM practice environment					
FTEs	-0.004	-0.219	0.001	-0.006	-0.002*
Support positions	0.086	0.217	0.018	0.051	0.121*
Years experience	0.004	0.050	0.003	-0.002	0.011
Quality of care					
NM practice environment	0.069	0.142	0.021	0.027	0.111*
FTEs	-0.002	-0.183	0.000	-0.002	-0.001*
Support positions	-0.017	-0.086	0.009	-0.035	0.001
Years experience	0.005	0.132	0.002	0.002	0.008*
Missed care					
NM practice environment	-0.204	-0.096	0.096	-0.390	-0.019*
FTEs	0.005	0.131	0.002	0.001	0.009*
Support positions	0.060	0.071	0.040	-0.020	0.138
Years experience	-0.023	-0.135	0.007	-0.038	-0.009*
Total indirect effects					
FTEs to missed care	0.000	0.000	0.000	0.000	0.000
Support to missed care	0.006	0.005	0.002	0.002	0.010*
Experience to missed care	0.000	0.000	0.000	0.000	0.001
FTEs to quality of care	0.001	0.003	0.000	0.000	0.002
Support to quality of care	-0.017	-0.059	0.009	-0.036	-0.001*
Experience to quality of care	-0.001	-0.003	0.001	-0.003	0.001
Hospital-level covariates					
NM practice environment					
Bed size	0.030	0.241	0.026	-0.022	0.081
Teaching status	0.183	0.647	0.057	0.069	0.295*
Magnet status	0.035	0.09	0.067	-0.098	0.167
Missed care					
Bed size	0.117	0.423	0.061	-0.004	0.234
Teaching status	0.076	0.124	0.141	-0.206	0.353
Magnet status	-0.242	-0.279	0.163	-0.56	0.082
Quality of care					
Bed size	0.011	0.146	0.015	-0.019	0.042
Teaching status	0.049	0.299	0.036	-0.019	0.121
Magnet status	0.089	0.380	0.041	0.007	0.169*
Bed size with					
Teaching status	-0.741	-0.580	0.237	-1.253	-0.351*

(Continues)

TABLE 4 (Continued)

Parameter	Estimate	Std estimate ^a	Post-SD	Cr LL ^b	Cr UL ^b
Magnet status	0.021	0.023	0.143	-0.266	0.303
Teaching with magnet status	0.000	0.001	0.065	-0.128	0.130

Note: Asterisks (*) are used to denote credible intervals that exclude 0.

Abbreviations: FTEs, full-time equivalents; SD, standard deviation.

^aStandardized estimates are fully standardized using variances of continuous latent variables, control variables and outcome variables. Effect size calculation is a partially standardized effect size from Preacher & Kelley, 2011.

^b“LL” denotes lower level and “UL” denotes upper level.

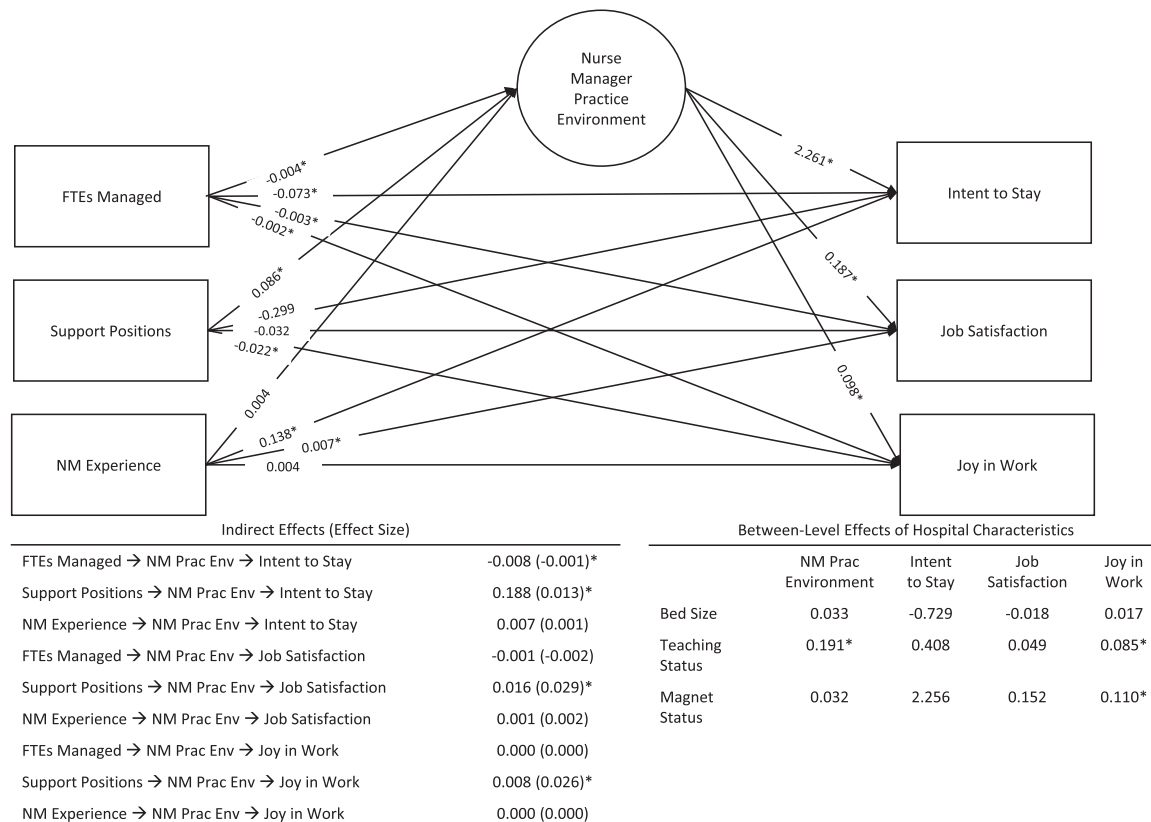


FIGURE 2 Direct and indirect effects on nurse outcomes. FTEs, full-time equivalents.

nurses' job satisfaction and joy and meaning in work. Additional support positions were also associated with more nurse-reported missed care activities and poorer quality patient care. Thus, although additional support positions seem to improve job satisfaction among nurse managers, they appear to be detrimental to direct care nurses' job satisfaction and important patient outcomes. One plausible explanation is that additional layers between nurse managers and direct care staff interferes with the development of critical relationships. However, our findings might also be explained by study design limitations. We asked nurse managers to select their available support positions from a list and calculated a total number per nurse manager. In this case, more might not always be better. Perhaps the best solution is a specific type of support or combination of supports. Although we considered various support positions in our study

design, how these positions function varies from hospital to hospital. Nonetheless, unit-level management models warrant further study.

Lastly, while experience appears to be a critical determinant of nurse managers' development of competency (N. E. Warshawsky et al., 2022), it did not predict nurse managers' perceptions of their practice environments. This finding provides evidence of the theoretical and conceptual distinction between nurse manager competency and the practice environment. While each of these constructs are important, it is clear the practice environment is more strongly impacted by job design factors than personal characteristics. Nonetheless, nurse managers' experience exerted direct effects on higher job satisfaction among direct care nurses, lower nurse-reported missed care, and higher nurse-reported quality of patient care.

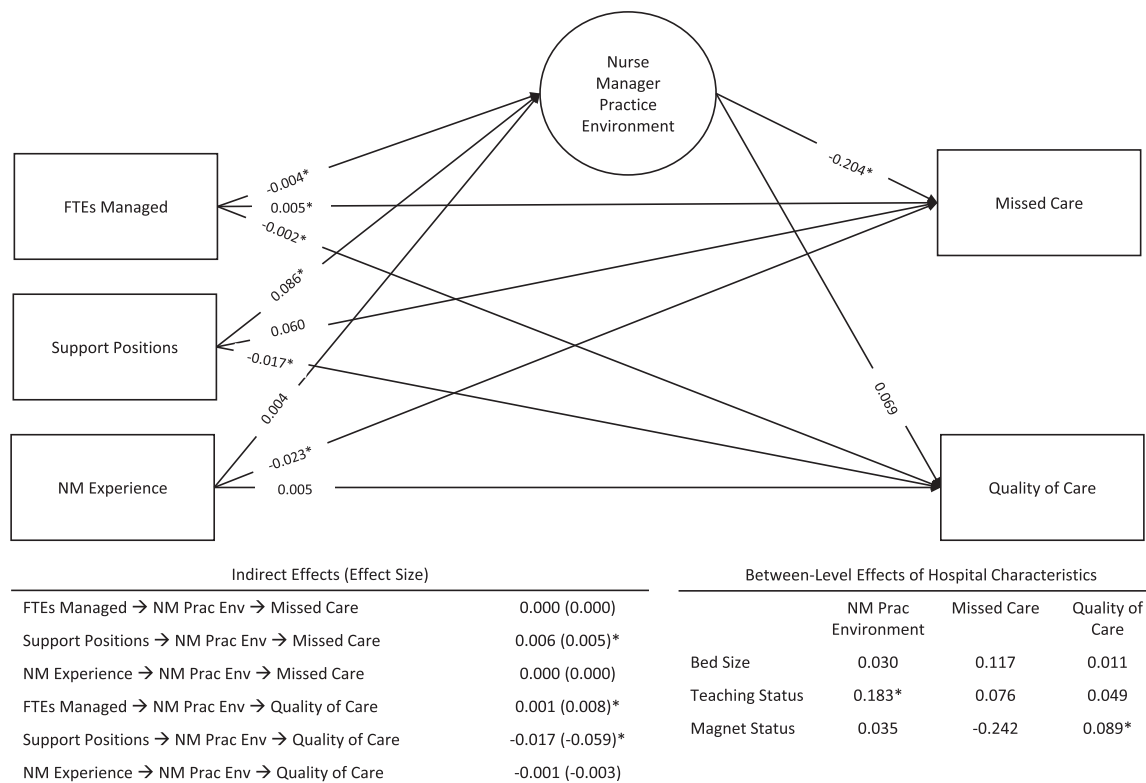


FIGURE 3 Direct and indirect effects on patient outcomes. FTEs, full-time equivalents.

4.1 | Limitations

The size and diversity of our sample addresses limitations associated with recent similar research (Nurmekselä et al., 2021). Although we had a robust sample for nurse manager research, our research included limitations. While our conceptual model is based on theory, causality cannot be assumed with a cross-sectional design. In conjunction with related research (N. E. Warshawsky et al., 2022), these findings provide a robust examination of nurse manager job design and personal characteristics and their impacts on a variety of critical outcomes. Nonetheless, organizations are complex and additional variables may provide greater insight into the examined nurse and patient outcomes. This study provides a strong foundation for future implementation and longitudinal research designs. Similarly, future research should utilize other operationalizations of these variables (e.g., different measures of SOC, patient-reported quality of care) and different populations to provide further evidence of these relationships.

4.2 | Practical implications

While adding more nurse manager positions will increase organizational costs, our findings suggest that costs associated with narrower spans of control for nurse managers may be offset by increased retention of direct care nurses. Furthermore, narrower spans may yield improved patient care experiences. Support positions are not a panacea. In line with past findings, our study suggests the presence of support positions

may improve the experiences of nurse managers with large spans of control. However, support positions may represent a barrier for satisfaction of direct care nurses and quality nursing care for patients. To advance nursing leadership science, new models of unit-level nursing leadership should undergo rigorous evaluation. These considerations are particularly important to the extent that nurse manager roles may have expanded and changed throughout the COVID-19 pandemic.

4.3 | Conclusion

Past research demonstrated that roughly half of nurse managers have overly wide spans of control (Simpson et al., 2017; C. Wong et al., 2014; C. A. Wong et al., 2015). Our findings demonstrate links between nurse manager job design factors and experience and nurse managers' practice environments, direct care nurse outcomes, and patient outcomes. Leadership should reexamine the job design of nurse managers to ensure these critical frontline leaders are set up for success. In situations where SOC exceeds manageable levels and cannot be reduced, support positions can be critical in mitigating some of the negative repercussions of wide spans of control. Thoughtful nurse manager job design is a critical first step in creating a pipeline that retains both nurse managers and direct care nurses.

AUTHOR CONTRIBUTIONS

Elizabeth M. Grandfield: Substantial contribution to the analysis and interpretation of data; drafting and revising the work for intellectual

content, final approval of the published version, and agreement to be accountable for all aspects of the work. **Ann E. Schlotzhauer:** Substantial contribution to the interpretation of findings; drafting and revising the work for intellectual content, final approval of the published version, and agreement to be accountable for all aspects of the work. **Emily Cramer and Nora E. Warshawsky:** Substantial contribution to the conception and design of the work; drafting and revising the work for intellectual content, final approval of the published version, and agreement to be accountable for all aspects of the work.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Both the data and the instruments are covered by third party intellectual property restrictions that prevent the researchers from making the data publicly available.

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