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Organizational Support for Nurse Practitioners in Primary Care and Workforce Outcomes

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Abstract

Background: Lack of organizational support in healthcare settings has been linked to high levels of clinician stress, burnout, and job dissatisfaction. Little research exists on organizational support for nurse practitioners.

Objective: We investigated the relationship between organizational support and nurse practitioner outcomes, including job satisfaction, intent to leave, and quality of care.

Methods: A cross-sectional survey design was used to collect survey data from nurse practitioners ($n = 398$) in primary care practices in New York State in 2017. Nurse practitioners completed mail surveys with validated measures of organizational support, job satisfaction, intent to leave, and quality of care. Information on participant demographics and work characteristics was also collected. Multilevel regression models assessed the relationship between organizational-level organizational support and resources measure and job satisfaction, intent to leave, and quality of care.

Results: The organizational-level organizational support and resources measure had a mean of 3.31 on a 4-point scale. Twenty-five percent of the participants were either moderately dissatisfied or very dissatisfied with their jobs, and about 11% intended to leave their current jobs within 1 year. The average quality of care rated by participants was 8.51 out of 10—10 being the best quality of care. After adjusting for covariates, higher organizational-level organizational support and resources measure score was associated with higher job satisfaction category, lower odds of intent to leave, and higher quality of care.

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Ethical Conduct of Research: This study received approval from the Institutional Review Board of Columbia University Medical Center (Approval No. AAAQ5708).

Discussion: Nurse practitioners from primary care practices with higher levels of organizational support are more likely to be satisfied with their jobs, have less intent to leave their jobs, and report better quality of care. Thus, in order to promote nurse practitioner job satisfaction, retain them in clinical positions, and improve quality of care, administrators should take actions to promote organizational support for them. Our findings are consistent with existing literature regarding the relationship between organizational support and clinician outcomes.

Keywords

intent to leave; job satisfaction; nurse practitioners; organizational support; primary care; quality of care

Demand for primary care services could soon surpass the supply of primary care providers, which are distributed unevenly across the United States (U.S. Department of Health and Human Services & Health Resources and Services Administration, n.d.). Many stakeholders advocate for primary care delivery redesign using innovative care delivery models and available healthcare workforce resources to address healthcare access, quality, and cost challenges facing the country. One recommendation has been to increase the supply of and access to nurse practitioner (NP) care (Buerhaus, 2018; Institute of Medicine, 2011). The NP workforce is projected to increase by 93% between 2013 and 2025 and will represent a valuable source of primary care providers to help meet the increasing demand for primary care services due to an aging population, growing prevalence of chronic illnesses, and insurance expansion (Patient Protection and Affordable Care Act, 2010; U.S. Department of Health and Human Services, 2016). Approximately 87% of 248,000 NPs in the country are trained to deliver primary care (American Association of Nurse Practitioners, 2019).

Despite the fact that NPs deliver high-quality, cost-effective care to patients (Buerhaus et al., 2018; Perloff, DesRoches, & Buerhaus, 2016), many barriers prevent NPs from fully utilizing their educational preparation to deliver care to patients. For example, one barrier that has received major attention in recent years is the variability of the NP scope of practice regulations across the country (Buerhaus, 2018). Currently, 23 states allow NPs to practice to the fullest extent of their education and training, whereas the rest of the states require NPs to have supervisory or collaborative relationships with physicians to deliver care, prescribe medications, or refer patients to further care and evaluations (American Association of Nurse Practitioners, 2018). Such restrictions prevent NPs from delivering timely, high-quality care, and researchers have consistently produced evidence demonstrating the negative effect of NP scope of practice restrictions on primary care capacity (Xue, Ye, Brewer, & Spetz, 2016).

In addition to state regulations affecting the NP full scope of practice, evidence is clear that healthcare organizations employing NPs also play a critical role in either expanding or limiting the NP role in patient care and ability to practice to the fullest extent of their education and training (Poghosyan et al., 2015). Despite the fact healthcare organizations increasingly rely on the NP workforce (Barnes, Richards, McHugh, & Martsof, 2018), studies consistently demonstrate that NP practice is often not supported within their organizations. For instance, even though NPs often have similar primary care provider roles

within the practices as primary care physicians, organizational support and resources are not often shared with NPs to help them with care delivery (Poghosyan, Nannini, Stone, & Smaldone, 2013). Physicians may have a dedicated medical assistant assigned to help them in delivering patient care, whereas NPs lack such staff support, thereby taking on tasks typically delegated to medical assistants or registered nurses (RNs). NPs also may not have access to other necessary organizational resources, such as exam rooms for patient visits or help in ordering lab work (Bryant-Lukosius, DiCenso, Browne, & Pinelli, 2004; Poghosyan, Nannini, Stone, & Smaldone, 2013). Research on NP workforce to date has mostly focused on the effect of state regulatory restrictions (Park, Athey, Pericak, Pulcini, & Greene, 2016), with comparatively little research on the organizations employing NPs. Isolated investigations—focusing only on state-level barriers without considering the support organizations employing NPs offer—give limited views about how to develop concrete and feasible organizational-level interventions to support NP practice and assure high-quality care delivery. Our study addresses the weaknesses of this existing work.

Organizational support theory guided our study. According to this theory (Eisenberger, Huntington, Hutchison, & Sowa, 1986), employees develop beliefs about the extent to which their organizations value their contributions, rewards them for work efforts, and reassures them that help will be available from the organization when the employee needs to carry out work tasks or deal with stressful situations. Organizational support for NPs in primary care practices may include availability of personnel support, task assistance, resources for patient care, time, and access to information (Poghosyan, Nannini, Stone, & Smaldone, 2013). Organizational support is critical for promoting optimal employee performance and outcomes, including improving job satisfaction and reducing turnover (Rhoades & Eisenberger, 2002). In healthcare organizations, lack of organizational support has been linked to high levels of clinician stress, burnout, and job dissatisfaction, in addition to poor patient care and outcomes (Aiken et al., 2011; McHugh, Kutney-Lee, Cimiotti, Sloane, & Aiken, 2011), and lack of such support for NPs is concerning. Organizational support may affect their outcomes. In this study, for the first time, we investigated the relationship between organizational support and NP job satisfaction, intent to leave their jobs, and quality of care within their practices. We hypothesized that there was a relationship between organizational support and NP job satisfaction, intent to leave, and quality of care even after controlling for demographic and work characteristics shown to affect this relationship. Studying and understanding organizational support for NPs is critically important as lack of organizational support may increase NP job dissatisfaction and turnover and prevent NPs from delivering high-quality care to patients.

METHODS

Study Design

We used a cross-sectional survey design to collect data from primary care NPs in New York State in 2017. This study received approval from the institutional review board of first author's institution.

Sample and Data Collection

We identified primary care NPs from the 2017 SK&A database (DesRoches et al., 2015), which contains information on ambulatory-based providers in the United States, including providers' names, specialty, and practice address, which enables identification of each provider within each practice. In this study, we only extracted information on NPs delivering care in primary care practices in New York State. To identify primary care practices, we used the specialties of physicians within the practice as physician specialty most likely determines the practice type, and the SK&A database contains information only on NPs who practice with physicians within the same practice location. It does not contain information on NPs practicing in settings without physicians, such as nursemanaged centers. We used the following physician specialties to identify primary care practices: family medicine, general practice, internal medicine, internal medicine/pediatrics, internal medicine/preventive medicine, general preventive medicine, and geriatrics. For practices with a mix of both primary care and specialty physicians, we designated a practice as primary care if most of the physicians within the practices were primary care physicians. This approach has been used by researchers (Barnes et al., 2018).

SK&A provided us with practice addresses of 1,590 NPs who delivered care in about 1,400 primary care practices in New York State. On average, the number of NPs in practices was 1.3, which is comparable to the number of NPs in practices reported by others (Barnes et al., 2018). The maximum number of NPs per practice was 15. Practice addresses of all primary care NPs were extracted, and mail surveys were sent to these NPs. A letter and consent form accompanied the survey, which described the study, its voluntary nature, and the confidentiality of responses. NPs completed the survey and returned it to the research team in an enclosed prepaid envelope. Using a modified Dillman, Smyth, and Christian (2009) approach for mailed surveys to encourage maximum response rate, a postcard reminder was sent to nonrespondents 2 weeks after the initial mailing, and then a second mail survey was sent to nonrespondents. As an incentive, NPs who completed the survey were offered an opportunity to participate in a lottery drawing to win one of 30 FitBit Zips. Upon receiving each completed survey, data were entered into SPSS 24 (IBM Corp., 2016). In total, 398 NPs completed and returned the surveys, and 115 surveys were returned as undelivered, which yielded a response rate of 27%. However, in another study using SK&A databases in six states (New York not included), we conducted a phone survey of nonresponders. We selected a random sample of 600 NPs and called their practices. We called each practice only once and found that 24% of NPs either did not work there, never worked there, or had inaccurate contact information, which did not allow our survey to reach them. Thus, we estimated 382 individuals (24% of NPs) were unreachable in this study as well. By excluding undelivered mail and the estimated number of unreachable NPs, we achieved a response rate of 36%.

Survey Tool

The survey tool contained validated measures of organizational support, NP outcomes, and demographic and work characteristics. The tool has been used in the past surveys of NPs (Poghosyan, Liu, Shang, & D'Aunno, 2017).

Organizational Support—Organizational support was measured by the Organizational Support and Resources (OSR) subscale of the Nurse Practitioner Primary Care Organizational Climate Questionnaire (Poghosyan, Nannini, Finkelstein, Mason, & Shaffer, 2013). The items on this subscale asked NPs to report their perceptions on organizational support within their practices on a 4-point scale, ranging from 1 = *strongly disagree* to 4 = *strongly agree*, such as, “In my practice setting, I have enough resources to provide patient care.” Other questions from the OSR subscale asked NPs to report if there was enough ancillary staff to help NPs prepare patients for their visits, whether NPs and physicians had similar support for care management, or if NPs had colleagues to ask for help within their practices. The OSR subscale has strong psychometric properties (Poghosyan, Nannini, Finkelstein, et al., 2013).

NP Outcomes—The survey contained measures of NP job satisfaction, intent to leave, and quality of care. NPs reported their job satisfaction on a 4-point scale ranging from “*very dissatisfied*” to “*very satisfied*.” Researchers have demonstrated that global measures of job satisfaction are as effective in measuring job satisfaction as scales with multiple items (Wanous, Reichers, & Hudy, 1997). This item has been widely used to measure job satisfaction of nurses and NPs (Aiken et al., 2011; Poghosyan et al., 2017). Intent to leave current job was measured using a dichotomous item asking NPs whether they intended to leave their positions within the next year (*yes/no*), which has also been used with NPs in past research. One item was included in the survey, which asked NPs to rate the quality of care within their practices on an 11-point scale (“0” as “*worst care possible*” to “10” as “*best care possible*”). Previous research has documented the high predictive validity of clinician self-reported quality of care measures (McHugh & Stimpfel, 2012).

NP Demographic and Work Characteristics—The survey tool also collected demographic information from NPs, including age, gender, race, and education. In addition, NPs completed measures of other work-related characteristics such as number of years in current position, work hours in past week, practice setting type, number of NPs in the practice, and whether they had their own patient panel to whom they deliver ongoing continuous care.

Data Analysis

Prior to the data analysis, we tested if the survey responders practiced in different geographical locations in the state than nonresponders. From the SK&A data, we extracted the zip codes of all NPs who were sent mail surveys. We linked these zip codes to the Rural Urban Commuting Area codes to classify each primary care practice zip code as urban or rural (WWAMI Rural Health Research Center, n.d.). We calculated the number of NPs from urban and rural practices who responded or did not respond to our survey.

Descriptive statistics on NP demographic and work characteristics variables and on the OSR items and subscale were computed. The internal consistency of the OSR subscale at individual level and organizational level and the dependability of the subscale considering the hierarchical nature of the design was validated. Factorial validity of the subscale at organizational level was also assessed. After assessing reliability, dependability, and validity

of the subscale, we first created the individual OSR score at the NP level by computing the mean on the items comprising the subscale. Then, we aggregated the scores of all NPs from each practice and computed organizational-level OSR mean score for each practice. We also categorized the organizational-level OSR score for each practice as having a poor (lower quartile), mixed (middle 50%), or good (upper quartile) OSR measure. We then calculated descriptive statistics on the outcome measures, job satisfaction, intent to leave, and quality of care for all NPs and by NPs from each category of OSR measure. To make full use of the OSR measure, we used the organizational-level, continuous OSR score to assess its effects on each outcome separately, controlling for potential covariates.

We used proportional odds, cumulative logit model—a type of ordered logistic regression—for job satisfaction, binary logistic regression model for intent to leave, and linear regression model to estimate the relationship between OSR and the quality of care. Cumulative odds ratio (COR) for job satisfaction, odds ratio (*OR*) for intent to leave, and regression coefficient for quality of care, as well as 95% confidence intervals (CIs), were reported to assess the size and direction of the effects. First, we estimated unadjusted effects using simple regression models, which included the organizational-level OSR score as the only predictor variable. We then estimated the adjusted effects using multivariable regression models controlling for the following covariates: NP age, gender, race, number of years in current position, work hours in the past week, practice type, number of NPs in the practice, and status of having a panel of patients that the NP manages on an ongoing basis. Multicollinearity of all predictors was checked. For each of the multivariable regression models of each outcome, mixed-effect models were used to account for the hierarchical design of the data, where 398 NPs (Level 1) were nested in 378 practices (Level 2). Covariates measuring NP demographics and work characteristics were entered as Level 1 measures; the main predictor in the models were the organizational-level (Level 2) OSR subscale score. Data analysis was conducted in Version 9.4 of the SAS System for Windows software (SAS Institute, 2013). As a sensitivity analysis, we developed the same models using the categorized OSR measure as well.

RESULTS

Sample Characteristics

A total of 398 NPs from 378 unique primary care practices completed and returned the survey. We found no difference in the response rate between NPs from urban (24%) and rural (28%) practices ($p > .05$). The demographic and work characteristics of the participants and the outcome measures are presented in Table 1. The average age of NPs was nearly 51 years. Most participants were female and White. Most of the participants worked 20–40 hours a week in their primary position and worked in physician practices.

Organizational-Level OSR Score and NP Outcomes

The descriptive statistics and the reliability coefficients on the OSR items and subscale are presented in Table 2. All items on the OSR had a full range. The organizational-level OSR had a mean of 3.31 on a 4-point scale ($SD = 0.51$). The internal consistency of this subscale is acceptable as both its individual-level and organizational-level Cronbach's α s are .75.

In addition, by taking into account the hierarchical design of the data (e.g., NPs nested in practices), we calculated absolute G coefficient, which was 0.72, demonstrating acceptable dependability of the subscale. Furthermore, results from confirmatory factor analysis at the organizational level (Chen, Mathieu, & Bliese, 2005) reveals that OSR subscale items loaded substantially on the subscale and the model fit is good (adjusted goodness of fit > 0.90 and comparative fit index > 0.90; Hooper, Coughlan, & Mullen, 2008).

Table 3 presents the descriptive statistics of the three outcome measures for all NPs and NPs by practices rated as having poor, mixed, and good OSR measure, separately. Overall, 75% NPs were moderately or very satisfied with their jobs, and the lowest proportion of satisfied NPs (66%) were from practices with a poor OSR measure. Eleven percent of NPs intended to leave their current jobs within 1 year, and participants from practices with a poor OSR measure were most likely to leave (25%).

Unadjusted and adjusted effects of the organizational-level OSR score on the outcomes—after controlling for covariates—are presented in Table 4. After adjusting for covariates, the organizational-level OSR score was associated with a higher job satisfaction category (COR = 2.50, 95% CI [1.47, 4.25], $p < .05$); with every 1-unit increase in the organizational-level OSR score, the odds of higher job satisfaction category increased to 2.5-fold. Controlling for confounders, higher organizational-level OSR score was also associated with lower odds of intent to leave current job ($OR = 0.29$, 95% CI [0.10, 0.80], $p < .05$); with every 1-unit increase in the organizational-level OSR score, the odds of intent to leave decreased by 71%.

There was also a relationship between organizational-level OSR and reported quality of care. Controlling for covariates, a higher organizational-level OSR score was associated with a higher reported quality of care score ($b = 0.91$, 95% CI [0.59, 1.23], $p < .001$); with every 1-unit increase in the OSR score, the quality of care increased by 0.91 units. We also performed sensitivity analyses by analyzing the adjusted effects of the categorized organizational-level OSR measure on all outcomes (see Table 5). The results were similar: The higher categories of the OSR measure were associated with higher job satisfaction categories, lower intent to leave, and higher quality of care.

DISCUSSION

We investigated job satisfaction, intent to leave, and reports of quality of care among primary care NPs in New York State and assessed how organizational support within primary care practices is associated with these NP outcomes. A substantial proportion (roughly one quarter) of NPs are dissatisfied with their jobs, and nearly 1 in 10 NPs have intentions to leave their jobs within a year. In general, NPs favorably rate the quality of care delivered within their practices. We found that organizational support for NPs is associated with their job satisfaction, intent to leave, and reports of quality of care. NPs practicing within primary care practices with high levels of organizational support are more likely to be satisfied with their jobs and intent to stay in their clinical positions. The relationship between organizational support and NP outcomes is further supported by the lack of significance associated with other demographic and work characteristic factors in the mixed-effect models for job satisfaction and intent to leave. Also, NPs who perceive higher

levels of organizational support are more likely to report better quality of care delivered within their practices. Our findings are consistent with existing literature regarding the relationship between organizational support and clinician outcomes.

Understanding clinician job satisfaction and turnover intentions are critical for optimal workforce development and management. Job satisfaction contributes to actual turnover, and intent to leave the current job has been shown to be an antecedent for actual turnover among employees (Tett & Meyer, 1993). Although some turnover may encourage innovation within organizations, it is very costly for the organizations to hire and train employees, especially when their supply is limited. For primary care practices, clinician job satisfaction and turnover intentions are especially concerning because they may deplete practices from much needed primary care providers and further exacerbate the perpetual struggle practices face in finding providers to meet the care demand. It is projected that, even with the increase of NPs and physician assistants, the overall primary care workforce will fall short of the demand by 2025 (Streeter, Zangaro, & Chattopadhyay, 2017).

In addition, the widespread dissatisfaction among healthcare providers led to renewed national interest in bringing joy back into practice and promoting job satisfaction (Linzer et al., 2015; Sinsky et al., 2013). National Academy of Medicine's recent Action Collaborative on Clinician Well-Being and Resilience suggests that poor clinician outcomes are a function of the environment in which clinicians work (Brigham et al., 2018). The findings of our study provide insights about organizational support in NP environments and may guide future actions to promote NP environment. Organizational support is modifiable by practice administrators; thus, it is a key opportunity for intervention. However, studies show that practice administrators and managers are often not familiar with the NP role or how to support it, leading to a disparity in organizational support for NPs. For example, offering NPs RN support is viewed as "nurses helping nurses," despite the fact that NPs and RNs have different scopes of practice (Poghosyan, Nannini, Smaldone, et al., 2013). Therefore, increasing awareness about the NP role and competencies within their organizations may lead to more organizational support for NPs. NPs need help from their organizations to implement their care tasks, and healthcare organizations should become more responsive to NP needs to retain these clinicians in their practices. In the competitive labor market, other healthcare sectors provide more appealing financial benefits and environments in which NPs can adopt multifarious roles. As a result, NP workforce may be drawn to these areas analogously to the way the physician workforce is drawn to pursue practice in specialty fields instead of primary care (Jeffe, Whelan, & Andriole, 2010). Thus, it is important that practice managers promote organizational support within primary care practices to provide NPs with necessary resources and retain them in primary care.

Promoting organizational support for NPs within their practices may also help with the implementation of new care delivery models, such as patient-centered medical homes, which emphasize delivering primary care in teams to maximize access, quality, and outcomes (National Committee for Quality Assurance, 2018). Team-based care promotes effectiveness and value of primary care, increases its capacity, and improves patient and provider outcomes (Mitchell et al., 2012; Willens, Cripps, Wilson, Wolff, & Rothman, 2011); however, all team members should have access to organizational support and resources.

Increasingly, primary care practices rely on the NP workforce (Barnes et al., 2018). Yet, NPs have disproportionately less access to organizational resources compared to physicians with similar primary care provider roles, which may hinder the development of optimally functioning teams. Scientists show that providing employees with access to organizational resources greatly affects their performances and teamwork (Salanova, Agut, & Peiró, 2005).

We also assessed the relationship between organizational support and quality of care. Asking clinicians who are familiar with patient care can provide reliable evidence about the quality of care as self-reported quality of care measures are associated with patient outcomes (McHugh & Stimpfel, 2012). Favorable organizational support was associated with better reported quality of care. Therefore, to promote quality of care and potentially patient outcomes, it is necessary to support NP practice.

Limitations

The study has several limitations. The study was conducted only in one Northeastern state with a different scope of practice regulation for NPs. The findings might not be generalizable to states in different regions of the country or with different NP scope of practice regulations. The study also relied on the self-reported data from NPs, which are subject to bias. In addition, most NPs practiced in small size primary care practices, and large practices may have more resources and better infrastructure to support clinicians in care delivery. Future research should be conducted in larger and a more diverse set of practices. Although our findings show that the quality of care reported by NPs is better in practices that provide them with organizational support, it is important to investigate and understand how organizational support affects patient outcomes. Future studies could test the relationship between organizational support and patient outcomes. Finally, because research demonstrates that nurse job satisfaction affects patient satisfaction and outcomes (McHugh et al., 2011), future studies should investigate how NP job satisfaction and turnover intentions affect patient care and outcomes.

Conclusion

We investigated organizational support of NPs in primary care practices and how it affects NP job satisfaction, intent to leave, and reported quality of care. We found that NPs from practices with higher levels of organizational support are more likely to be satisfied with their jobs, have less intent to leave, and report better quality of care delivery within their practices. Practice managers should take actions to promote organizational support for NPs to keep NPs in their clinical positions and improve the quality of primary care.

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TABLE 1.

Demographic and Work Characteristics of Study Participants

Demographic characteristics	<i>M(SD)</i>
Age	50.9 (11.5)
	% (<i>n</i>)
Gender	
Female	92 (366)
Race	
White	89 (348)
Length of time in current primary position	
3 years	24 (97)
4–9 years	31 (124)
10 years	44 (176)
Education	
Master's degree	90 (358)
Doctor of nursing practice	7 (27)
Work characteristics	
Hours/week worked over last month at primary position	
Less than 20 hours	8 (32)
20–40 hours	56 (222)
40+ hours	36 (141)
Managed own patient panel	53 (211)
Number of NPs working in organization	
1 NP	24 (94)
2–6 NPs	67 (265)
7 NPs	9 (35)
Practice setting	
Physician office	56 (221)
Hospital practice	18 (72)
Community health clinic	9 (34)
Other	17 (69)

Note. *n* = 398. NP = nurse practitioner.

TABLE 2.

Organizational Support and Resource Subscale

Item: NP-level response ^a	M	SD	Min	Max	Item-deleted Cronbach	
					α	α^b
Physicians and NPs have similar support for care management	3.38	0.80	1	4		.70
In my practice setting, I have colleagues who I can ask for help	3.65	0.55	1	4		.74
In my practice setting, I have enough resources to provide patient care	3.38	0.65	1	4		.66
There are enough ancillary staff to prepare my patients for their visit	3.22	0.84	1	4		.67
During visits, I have enough scheduled time with each patient	2.93	0.88	1	4		.72
Overall scale	M	SD	Min	Max		Cronbach's α
Organizational-level Organizational Support and Resources	3.31	0.51	1.4	4		.75

Note. *n* = 398. NP = nurse practitioner.

^aItems reported on a 4-point scale (1 = strongly disagree to 4 = strongly agree).

^bAll values denote α coefficient when item is removed from scale.

TABLE 3.
Descriptive Statistics of Outcome Variables by Categorized Organizational Support and Resources

Outcome variables	Categorized organizational support and resources					
	Poor (n = 92)	Mixed (n = 244)	Good (n = 59)	Total (n = 395)	% (n)	% (n)
Job satisfaction						
Very dissatisfied	7 (6)	14 (34)	24 (14)	14 (54)		
A little dissatisfied	27 (25)	7 (17)	3 (2)	11 (44)		
Moderately satisfied	51 (46)	32 (79)	9 (5)	33 (130)		
Very satisfied	15 (14)	47 (114)	64 (38)	42 (166)		
Intent to leave ^a	25 (20)	7 (16)	7 (4)	11 (40)		
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>		
Quality of care ^b	7.80 (1.51)	8.67 (1.13)	9.03 (1.49)	8.51 (1.36)		

^aDichotomous variable (yes/no)—shows percentage that responded “yes.”

^bMeasured on a 11-point scale (0 = worst care possible to 10 = best care possible).

TABLE 4. Multivariable Mixed-Effects Regression Models Assessing the Effects of Organizational-Level Organizational Support and Resources Score on Nurse Practitioner (NP) Outcomes

Predictor	Job satisfaction		Intent to leave		Quality of care	
	Cumulative odds ratio (95% CI)		Odds ratio (95% CI)		Regression (95% CI)	
Unadjusted effects: Simple regression models						
Organizational-level OSR score ^a	2.48** (1.47, 4.20)		0.32** (0.15, 0.68)		0.96* (0.70, 1.22)	
Adjusted effects: Multivariable mixed-effects regression models						
Organizational-level OSR score	2.50** (1.47, 4.25)		0.29** (0.10, 0.80)		0.91* (0.59, 1.23)	
Age	1.00 (0.97, 1.03)		1.01 (0.95, 1.07)		0.003 (-0.01, 0.02)	
Non-White	1.97 (0.73, 5.36)		1.00 (0.20, 5.14)		-0.19 (-0.77, 0.38)	
Non-DNP	0.79 (0.34, 1.84)		3.16 (0.17, 57.22)		0.18 (-0.33, 0.69)	
No panel	0.56 (0.18, 1.67)		1.21 (0.42, 3.52) ^b		0.01 (-0.63, 0.65)	
Male	0.78 (0.46, 1.32)				-0.05 (-0.36, 0.27)	
Practice setting (Ref: physician's office)						
Community health center	0.69 (0.26, 1.81)		2.96 (0.61, 14.46)		-0.60** (-1.19, -0.02)	
Hospital-based clinic	0.94 (0.45, 1.99)		0.87 (0.20, 3.92)		-0.16 (-0.61, 0.29)	
Other	0.97 (0.47, 2.01)		0.55 (0.09, 3.16)		0.002 (-0.44, 0.44)	
Length of time in current primary position (Ref: NPs who have practiced 10 years)						
4–9 years	0.60 (0.31, 1.13)		0.89 (0.22, 3.62)		-0.46** (-0.85, -0.07)	
3 years	0.87 (0.41, 1.85)		1.91 (0.43, 8.52)		-0.23 (-0.69, 0.24)	
Hours/week worked over last month at primary position (Ref: NPs who worked 40 hours)						
20–40 hours	0.98 (0.57, 1.68)		1.05 (0.34, 3.26)		-0.01 (-0.34, 0.32)	
<20 hours	1.14 (0.40, 3.27)		1.67 (0.20, 14.08)		-0.24 (-0.88, 0.40)	
Number of NPs working in organization (Ref: = > 7 NPs)						
1 NP	0.36 (0.12, 1.13)		1.58 (0.12, 20.42)		-0.23 (-0.89, 0.44)	
2–6 NPs	0.36 (0.13, 1.01)		2.47 (0.23, 26.23)		-0.37 (-0.97, 0.23)	

Note. n = 398 NPs in 378 practices.

^a Bivariable models only include organizational-level Organizational Support and Resources subscale.

β Not included as a covariate in this model to get stable estimates for the model.

* $p < .001$.

** $p < .05$.

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TABLE 5.

Sensitivity Analyses of Adjusted Effects of Categorized Organizational Support and Resources (OSR) Measure From Multivariable Mixed-Effects Regression Models

Predictor	Job satisfaction		Intent to leave		Quality of care	
	Cumulative odds ratio (95% CI)		Odds ratio (95% CI)		Regression (95% CI)	
OSR category (Ref: poor OSR category)						
Good	3.34** (1.04, 10.74)	0.17** (0.03, 0.94)	1.21* (0.69, 1.74)			
Mixed	2.74** (1.18, 6.33)	0.19* (0.06, 0.58)	0.87** (0.49, 1.25)			
Age	1.00 (0.97, 1.04)	1.01 (0.96, 1.06)	0.0035 (-0.01, 0.02)			
Non-White	0.81 (0.27, 2.45)	1.00 (0.21, 4.74)	0.20 (-0.31, 0.70)			
Non-DNP	0.58 (0.14, 2.47)	2.95 (0.18, 49.27)	0.03 (-0.59, 0.66)			
No panel	0.76 (0.38, 1.51)	1.28 (0.46, 3.57) ^a	-0.08 (-0.39, 0.23)			
Male	1.98 (0.53, 7.45)		-0.19 (-0.75, 0.38)			
Practice setting (Ref: physician's office)						
Community health center	0.65 (0.18, 2.27)	3.24 (0.71, 14.79)	-0.68** (-1.25, -0.11)			
Hospital-based clinic	0.87 (0.33, 2.29)	0.90 (0.21, 3.87)	-0.26 (-0.69, 0.18)			
Other	0.96 (0.37, 2.48)	0.56 (0.10, 3.05)	-0.02 (-0.46, 0.41)			
Length of time in current primary position (Ref: NPs who have practiced 10 years)						
4–9 years	0.61 (0.26, 1.40)	0.88 (0.23, 3.37)	-0.44** (-0.83, -0.06)			
3 years	0.82 (0.30, 2.20)	2.04 (0.49, 8.57)	-0.29 (-0.74, 0.17)			
Hours/week worked over last month at primary position (Ref: NPs who worked 40 hours)						
20–40 hours	0.93 (0.46, 1.91)	1.17 (0.39, 3.50)	-0.06 (-0.38, 0.27)			
<20 hours	1.10 (0.28, 4.40)	1.93 (0.25, 15.15)	-0.25 (-0.88, 0.38)			
Number of NPs working in organization (Ref: 7 NPs)						
1 NP	0.37 (0.08, 1.64)	1.45 (0.13, 16.31)	-0.21 (-0.86, 0.44)			
2–6 NPs	0.36 (0.09, 1.42)	2.26 (0.25, 20.46)	-0.36 (-0.95, 0.23)			

Note. *n* = 398 NPs in 378 practices.

^aNot included as a covariate due to low cell number in this model to get stable estimates for the model.

* *p* < .001.

$p < .05$
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