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Nurse practitioner job preference: A discrete choice experiment

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**ABSTRACT**

Background: Nurse practitioners play a critical role in improving the access to care and in meeting the needs for health care. However, prior to the COVID-19 pandemic, the average turnover rate of nurse practitioners was 10% with associated total direct cost that ranged from $85,832 to $114,919 for each episode of turnover in the United States. Little is known about the job preference of nurse practitioners and the cost savings to an organization that provides jobs with characteristics attractive to nurse practitioners.

Objective: The aim of this study was to identify the preferred job characteristics that are associated with nurse practitioners’ job choices; and to determine the extent to which nurse practitioners would need to be compensated for practicing without these characteristics.

Design: A two-stage design using a mixed method approach.

Setting(s): The state of Georgia in the United States.

Participants: 2757 nurse practitioners who were actively licensed were invited to participate. Of the 412 participants, 372 actively employed in Georgia were included in the analysis.

Methods: A 2-stage discrete choice experiment was designed. Stage-1 was a qualitative design using a focus group to identify nurse practitioners’ preferred job characteristics. Stage-2 was a quantitative design using survey distribution and analysis. A mixed logit model was used for ranking nurse practitioners’ preferred job characteristics and the extent to which they would need to be compensated.

Results: On average nurse practitioners were 47.4 years of age; the majority were female (90%), white (75.3%), and educated at the master’s level (88.7%). Participants did not value teams that were not very cohesive ($β = -1.50$); administration that was not very responsive and supportive ($β = -1.04$); being supervised by a physician ($β = -0.58$); not having their own panel of patients ($β = -0.42$); and not billing under their own National Provider Identifier ($β = -0.18$). Participants would need an increase in annual income of USD$21,780 for practicing in a not very cohesive team; USD$15,280 for practicing with a not very responsive administration; and USD$21,450 for being supervised by a physician.

Conclusions: A cohesive, responsive, and supportive working environment and being able to practice independently are important characteristics for nurse practitioners when choosing a job. Healthcare managers should provide a workplace culture that reflects these preferred job characteristics to attract and retain nurse practitioners. Policymakers should consider reforming the scope of practice legislation to promote the independent practice of nurse practitioners.

**What is already known**

- Nurse practitioners are a critical component of the healthcare workforce and they have a pivotal role in meeting the needs for healthcare services in the United States.
- Factors associated with the recruitment and retention of nurse practitioners in primary care have been previously identified, but little is known about how these and other job-related characteristics influence nurse practitioners’ job choice.
- The turnover rate of nurse practitioners and associated costs are alarming, but our knowledge of the cost savings to an organization that provides jobs with characteristics attractive to nurse practitioners is limited.

**What this paper adds**

- This study used the discrete choice experiment which is a novel approach to estimate nurse job preference in high-level income countries.
• Findings highlight that nurse practitioners need to be compensated to practice in a practice environment that is not cohesive, supportive, and independent.
• Findings can inform policymakers and healthcare administrators that a cohesive, responsive, supportive, and independent work environment is necessary to recruit and retain nurse practitioners in the workforce, which can also save organizational costs.

1. Background

Nurse practitioners in the United States are typically educated in primary care with specialties such as adult, family, geriatric, pediatric, and women’s health. They are well prepared in providing care management, care collaborative, care coordination, disease prevention, health promotion, and patient education (Bodenheimer and Bauer, 2016). Because of this, nurse practitioners play a pivotal role in supplementing the shortage of healthcare providers and in meeting the needs for healthcare services (Auerbach et al., 2020; Buerhaus, 2018). However, the turnover rate of nurse practitioners and the associated costs are alarming in the United States. Prior to the COVID-19 pandemic, the average NP turnover rate was 10% with associated total direct cost that ranged from $85,832 to $114,919 for each episode of turnover (Hartsell and Noecker, 2020).

Understanding the factors that influence the nurse practitioners’ willingness to stay in the workforce is important to inform workforce planning in terms of the recruitment and retention of nurse practitioners. Previous studies have suggested a few factors that might be associated with nurse practitioner job satisfaction and intention to leave in primary care settings. Some have reported that states with a more restrictive scope of practice legislation have fewer nurse practitioners practicing in primary care (Graves et al., 2015; Spetz et al., 2017; Xue et al., 2018); and that nurse practitioners were more likely to leave if their organization had a more restricted and less supportive environment or a lower salary (Li et al., 2018; Poghosyan et al., 2017a).

Although previous studies have identified the above job characteristics important to nurse practitioners, these studies were limited in primary care settings. We know little about nurse practitioners in other practice settings and the extent to which these job characteristics influence the nurse practitioner’s job choice. An individual’s job choice is a complex decision-making process, which often requires making trade-offs among desirable job characteristics. Few studies in the U.S. have examined which job characteristics would attract or retain nurse practitioners, or if nurse practitioners value certain job characteristics. More importantly, little is known about the financial benefit to organizations that prioritize the characteristics valued by nurses. These knowledge gaps prevent healthcare employers from fully understanding nurse practitioners’ job preferences and the policy intervention that could inform future workforce planning to recruit and retain nurse practitioners.

To address this knowledge gap, our study examined nurse practitioners’ job preferences using a discrete choice experiment. A discrete choice experiment is a well-established economic approach based on the random utility theory, consumer theory, experimental design theory, and econometric analyses. It has been extensively used in health economics, specifically in clinical decision-making (e.g., examining patients’ preferences over different types of treatments or medicine). In a discrete choice experiment, participants are provided with a series of hypothetical choices, the options of which are defined by different characteristics with varied levels. The discrete choice experiment allows us to identify the most and least important characteristics that influence the decision-making process, to examine the trade-offs made between these characteristics, and to estimate the benefits/outcomes under different configurations of the characteristics (Papanikolaou and Palfreyman, 2013).

Noticeably, the approach of a discrete choice experiment has not been used in nursing research specially to examine nurses’ job choices. A few studies have examined the job choices of nurses, but those studies were conducted in mid- or low-income level countries that focused on retaining nurses and midwives in rural areas (Berman et al., 2021; Blaauw et al., 2010; Huicho et al., 2012; Kunavikitkul et al., 2015; Liu et al., 2019; Mandeville et al., 2014; Mangham and Hanson, 2008; Rockers et al., 2013; Vujicic et al., 2010). To date only a few studies in high-income countries have used a discrete choice experiment to examine nurses’ job choice (Fields et al., 2018; Scott et al., 2015) and no study, to our knowledge has used this approach to examine nurse practitioners’ job choice.

Using the state of Georgia as a study site, we applied the approach of a discrete choice experiment to examine nurse practitioners’ job preferences. Georgia is a state plagued with 235 designated health professional shortage areas (i.e., the population to provider ratio smaller than 3500 to 1), a number that placed Georgia as the 5th worst state among the 50 states. It has also been reported that about 3 million people live in these health professional shortage areas with 60% of their health care service needs unmet. To address this issue, an additional 627 providers are needed annually to remove all designations of health professional shortage areas in Georgia (Kaiser Family Foundation, 2018). Specifically, the aims of this study were:

Aim 1: to use qualitative methods to identify the job characteristics associated with nurse practitioners’ willingness to stay in the workforce; and

Aim 2: to use a discrete choice experiment to 1) determine the relative importance of job characteristics to nurse practitioners; and 2) to estimate the extent to which nurse practitioners would need to be compensated for practicing without desirable characteristics.

2. Methods

2.1. Study design

This was a two-stage, mixed method study with data collected in 2020. Stage-1 addressed the first aim and was a qualitative design. Using focus groups, 12 nurse practitioners (six working in primary care settings and six working in acute care settings) who were actively practicing in Georgia were interviewed. The focus group interview was used to determine the favorable job characteristics of nurse practitioners’ job choices. Those job characteristics were used in Stage-2, which was a quantitative design that included online survey development, distribution, and analysis. In collaboration with a research firm, we designed a discrete choice experiment to create a fractional factorial survey to further examine nurse practitioners’ job preferences.

2.2. Survey design

In Stage-1, a verbal consent was collected from the participants of the focus group. Participants were asked: 1) why they chose their current job; 2) what job characteristics of the current job are important to them; and 3) what job characteristics would be attractive to them if they were to consider a different position. Thematic analysis resulted in seven favorable job characteristics, including nurse practitioners’ professional relationship with a physician, if a nurse practitioner has his/her own patient panel, the ability to bill under his/her own National Provider Identifier (a unique 10-digit identification number given to health care providers by the Centers for Medicare and Medicaid Services in the U.S.), nurse practitioners’ professional relationship with other professionals, nurse practitioners’ professional relationship with administration, salary, and commute time.

The levels within each job characteristic were further developed based on published literatures and expert opinions. Specifically, the characteristics of “professional relationship with a physician”, “if a nurse practitioner has his/her own patient panel”, and “the ability to bill under his/her own National Provider Identifier” were included because they were indicators of nurses’ independent practice and were suggested to be important factors associated with nurse practitioners’ job satisfaction.
and intention to leave (Athey et al., 2016; Han et al., 2018). The levels within these characteristics were defined based on whether the nurse practitioner can practice independently. That is if they are supervised by a physician or not, if they have their own panel of patients or not, and if they can bill under their own National Provider Identifier or not.

The characteristics of “professional relationship with other professionals” and “professional relationship with administration” were included because these are indicators of nurse practitioners’ practice environment and have been identified as critical factors that contribute to their job satisfaction and intention to leave (Poghosyan et al., 2017a). The levels of these job characteristics were not explicitly defined in this study because these are intended to measure differences that rely on a respondent’s perceptions of a situation rather than concrete features. Employee–supervisor relationships and employee–employee relationships are one of these areas. These relationships are complicated, highly dimensional, and context dependent. Identifying specific, operational drivers of relationship satisfaction is generally not possible especially when respondents have idiosyncratic preferences and situations. This difficulty is compounded with a discrete choice experiment analysis study where the amount of information presented to respondents must be limited (Orme, 2006). This difficulty is also reflected in more specialized scales of employee satisfaction that are not as limited by the respondent processing constraints present in a discrete choice experiment analysis (Hsieh et al., 2019).

The “salary” was included to calculate willingness-to-pay for changes in all other job characteristics. The levels of salary were chosen based on the combination of expert opinions and interview perceptions. The “commute time” was included as it was one of the factors often mentioned by participants, the level of which was determined based on participants’ perception. The “practice settings” of nurse practitioners included primary care, acute care, and other settings. In this study primary care settings included hospital clinic, outpatient, rural health clinic, physician practice, public health clinic, internal medicine clinic. Acute care settings included hospitals; and other settings included retail health, urgent care or emergency, insurance, military treatment facilities, clinical research clinic, med spa, long-term care, telehealth, Federally Qualified Health Center, and academic center. Therefore, a total of eight job characteristics were identified in Stage-1. Levels within each job characteristic are presented in Table 1.

Based on the job characteristics and levels, a discrete choice experiment was used to design the hypothetical job choices using specialized software (Sawtooth Software, 2021). Among the eight characteristics, there were three attributes with two levels, four attributes with three levels, and one attribute with five levels, which generated 3240 scenarios of job choices ($2^3 \times 3^4 \times 5^1$). These scenarios of job choices were designed into 300 different versions, each with 15 choice sets, using the D-efficient with the random method. Each survey participant received a random version with 15 choice sets. For each set of job choice, participants were first forced to answer the question, “which job do you prefer, Job A or Job B?”. Then the participants were forced to indicate if they would seriously consider the job previously chosen. This allowed the survey to analyze only the forced choice section or to consider the uptake rate (Brazell et al., 2006). The final job choice sets can be found in Supplement 1.

The survey also queried nurse practitioners’ demographic, employment, and practice characteristics. These questions include their year of birth, gender, race, ethnicity, highest level of nursing education, employment status, specialty certification, setting, position, professional relationship with a physician, relationship with administration, relationship with other professionals, if they have a panel of patients, if they bill under the National Provider Identifier, pre-tax annual earnings, commute time, job satisfaction, and intention to leave. The survey was pilot-tested with the 12 nurse practitioners who participated in Stage-1 to refine the language and test validity.

### Table 1

| Characteristic                              | Level                                                                 |
|--------------------------------------------|-----------------------------------------------------------------------|
| Professional relationship with a physician | Supervised by a physician; Can prescribe, diagnose, and provide treatment without a physician^4 |
| Patient panel                              | Do not have your own panel of patients; Have your own panel of patients^5 |
| Billing                                    | Billing under a physician name; Billing under your own National Provider Identifier^6 |
| Professional relationship with other professionals | Not very cohesive team with infrequent interaction; Somewhat cohesive team with regular interaction; Very cohesive team with frequent interaction^3 |
| Professional relationship with administration | Not very responsive and supportive administration; Somewhat responsive and supportive administration |
| Salary                                      | 20 % decrease in current salary; 10 % decrease in current salary; Current salary; 10 % increase in current salary; 20 % increase in current salary; 15-minute commute time; 30-minute commute time; 45-minute commute time^4 |
| Setting                                     | Primary care; Acute care; Other |

^ Reference level; “salary” does not have a reference level as it was treated as a continuous variable.

2.3. Survey sample and method

In Stage-2, we invited 2757 nurse practitioners to participate, who represented 25 % of the actively licensed nurse practitioner population in Georgia. Our sample of nurse practitioners was randomly selected from a roster of licensees provided by the Georgia Board of Nursing. Using a modified Dillman technique (Dillman, 2007), a series of postcards and reminder postcards were mailed between April 2021 and August 2021 to improve survey response. Completion and submission of the survey was the consent to participate.

In total, 413 participants submitted a completed survey, for a response rate of 15 %. Of these participants 373 of them were currently at least 23 years old and had at least an associate degree. The participants were compared with the nurse practitioner population in Georgia using the 2020 1-year data estimates of the American Community Survey. As the largest ongoing household survey of the United States, the American Community Survey samples 3.5 million households nationwide annually and provides individual and household-level data on demographics, jobs and occupations, level of education, veterans, housing, and other socio-economic characteristics. The American Community Survey also includes an exceptionally large sample of nurses that allowed us to analyze nurse workforce trends with a high degree of accuracy. Data were retrieved from the
Public Use Microdata Sample files for all individuals residing in Georgia and working as a nurse practitioner.

2.4. Data analysis

Descriptive statistics were used to describe the study sample. To address aim 1, a mixed logit model was used to identify the preferred job characteristics associated with nurse practitioners’ job choices, which estimates the participant’s part-worth parameters for the different job characteristics tested (i.e., the partial value of each job characteristic) (Hole, 2007). All the characteristics except salary were treated as random coefficients, because it is not reasonable to assume that all individuals have the same marginal utility of income (Meijer and Rouwendal, 2006). All characteristics were measured as a categorical variable with the first level taken as the reference level, except that the salary characteristic was analyzed as a continuous variable. The mixed logit model allowed for the capture of preference heterogeneity that can occur via either job preferences or demographics. This model was also separately examined for two subgroups – nurse practitioners working in primary care and nurse practitioners working in either acute care or other settings, since the practice pattern of nurse practitioners is different across the types of settings and they may value different job characteristics.

To address aim 2, the “willingness to pay” was used to determine if nurse practitioners would need to be compensated or reduce their salary for a specific job characteristic. The estimates of willingness to pay assign a numerical value to each job characteristic for understanding nurse practitioners’ preference. This study used the percentage change from the current salary, calculated as the coefficient for the level of each job characteristic divided by the coefficient for the salary, to estimate nurse practitioners’ willingness to pay for a certain job characteristic. A positive estimate means that nurse practitioners would need to be compensated for that job characteristic, while a negative estimate means that nurse practitioners would sacrifice their salary for a certain job characteristic. We also further converted the percentage change from the current salary into gross annual income. This was achieved by multiplying the percentage change from the current salary by participants’ median pre-tax annual earnings for their primary position (i.e., USD$100,000). All analyses were conducted using Stata SE version 17 with significance at 0.05. This study was approved by the Institutional Review Board of Emory University (IRB00107110).

3. Results

3.1. Sample description

On average participants were 47.4 years of age; the majority were female (90%), white (75.3%), and educated at the master’s level (88.7%) (Table 2). About half (51.1%) worked in a primary care setting, 27.7% in an acute care setting, and 21.2% in other settings. The median pre-tax annual earnings for the primary nursing position was $100,000. The median commute time to the primary nursing position was 25 min. The majority of participants were employed full-time (75.3%) as a nurse practitioner (97.9%), satisfied or very satisfied with their job (87.1%), and had not specified the intention to leave their primary position (67.1%).

When compared to the population of nurse practitioners in Georgia, the study sample of nurse practitioners on average were older (47.4 vs. 41.2), less racially diverse (75.3% vs. 66.6% of white), and more educated than the overall population (88.7% vs. 72.7% holding a master’s degree) but were similar on gender (90.0% vs. 92.0% of female), employed in primary care (51.1% vs. 56.0%), annual earnings ($100,000 vs. $97,591), and commute time (25 vs. 27 min).

The findings on practice characteristics show that the majority of the participants collaborated with a physician (53.2%), had a very cohesive team with frequent interaction with other professionals (65.9%), had a very responsive and supportive administration (51.1%), had their own panel of patients (63.2%), their own National Provider Identifier (73.7%), were satisfied or very satisfied with their job (87.1%), did not plan to leave their primary position (51.0%), had a median pre-tax annual earnings of $100,000, and a 25 minute commute time (Table 3).

In the forced choice question, Job A was chosen 49.91% of the time and Job B was chosen 50.09% of the time. Since Job A and Job B were randomly constructed this indicates no bias in the design of the experiment and was as expected. When participants were asked if they would actually take the job chosen in the forced choice, 56.97% indicated that they would.

3.2. Mixed logit model results

Table 4 shows the results from the mixed logit models of “which job is preferred”. The results suggested that all eight job characteristics were significantly associated with nurse practitioner job preference. Significant coefficients were reported for all of the levels within each characteristic, except participants’ practice setting. When compared to a primary care setting, nurse practitioners were significantly less likely to choose to practice in acute care (β = −0.32), and no significant difference was found between a primary care and other care settings (β = 0.08).

Based on the strength of participant preference, these job characteristics were ranked as: 1) professional relationship with other professionals; 2) commute time; 3) professional relationship with administration; 4) professional relationship with a physician; 5) own panel of patients; 6) billing under their own National Provider Identifier; and 7) salary. More specifically, nurse practitioners did not value professional relationships or teams that were somewhat (β = −0.51) or not very cohesive (β = −1.49), and they did not value a job with a 30-minute (β = −0.51) or 45-minute (β = −1.47) commute time. Nurse practitioners did not value professional relationships with administration that were somewhat (β = −0.33) or not very responsive and supportive (β = −1.05) and they did not value physician collaboration and supervision (β = −0.56). In addition, nurse practitioners did not value having their own panel of patients (β = −0.41) or billing with their own National Provider Identifier (β = −0.19).
3.3. Estimates of willingness to pay

nurse practitioners working in primary care settings did not.

However, nurse practitioners working in patients, lower salary, and longer commute time were less valued (results shown in Supplement 1). However, nurse practitioners working in primary care settings to an acute care setting, corresponding to USD$4720.

4. Discussion

To our knowledge, this is the first discrete choice experiment conducted in the United States to examine nurse practitioners’ job preferences. The results from this study suggested that participants highly valued their practice environment, and they need to be compensated for working in an undesirable practice environment. Participants valued a practice environment with a cohesive team, a responsive and supportive administration, a shorter commute time, being able to practice independently, being able to bill under their own National Provider Identifier and having their own panel of patients. These results are consistent with previous studies that have reported that an independent and supportive practice environment is associated with more nurse practitioners in primary care (Faraz, 2017; Xue et al., 2018), job satisfaction (Cimiotti et al., 2019; Poghosyan et al., 2015; Spetz et al., 2016; Steinke et al., 2018); and nurses would be willing to give up salary for independent practice (Scott et al., 2015).

Job choice is a complex decision-making process. One’s job choice is influenced by multiple factors and limited by resources (e.g., time, knowledge, budget, geography), which requires trade-offs with the aim of achieving the optimal benefit. The discrete choice experiment allows us to identify the strength of factors that influence the decision-making process and to examine the trade-offs made between these factors. Given that few studies have applied this approach in nursing research both nationally and globally, our study contributes knowledge to both the international and the U.S. literature in terms of examining nurse practitioners’ job preference. Moreover, compared with previous studies that only examined the factors associated with nurse practitioners’ job satisfaction and turnover, our study adds to the literature by highlighting the strength of each job characteristics valued by nurse practitioners and to what extent nurse practitioners would be willing to make the trade-offs among those characteristics.

Job choice is a trade-off process among preferred job characteristics as no single factor drives the decision-making process. In this study we did not find that the type of practice setting alone drives nurse practitioner job choice. Instead, nurse practitioners in primary care and non-primary care settings both valued the same set of job characteristics – a cohesive, supportive, and independent practice environment – more than the type of setting. This is consistent with our previous work, which suggested that in both primary care and acute care settings, a supportive, cohesive, and independent practice environment was associated with lower levels of burnout, turnover and a higher level of job satisfaction (Cimiotti et al., 2019). The reason that the practice setting was not highly valued by nurse practitioners could be due to the unobserved factors that were not available in this current study, such as the practice patterns of primary care and acute care settings.

Table 3

| Characteristic | n (%) |
|---------------|-------|
| Employment status |       |
| Full-time | 280 (75.3 %) |
| Part-time | 70 (18.8 %) |
| Other | 22 (5.9 %) |
| Employment setting |       |
| Primary care | 190 (51.1 %) |
| Acute care | 103 (27.7 %) |
| Other | 79 (21.24 %) |
| Employment position |       |
| Nurse practitioner | 364 (97.9 %) |
| Other (i.e., Nurse Researcher/manager/clinical instructor/professor) | 8 (2.1 %) |
| Professional relationship with a physician |       |
| No physician on site/independence | 23 (6.2 %) |
| Collaborate with a physician | 198 (53.2 %) |
| Being supervised by a physician | 135 (36.3 %) |
| Professional relationship with other professionals |       |
| Very responsive and supportive | 190 (51.1 %) |
| Not very responsive and supportive | 31 (8.3 %) |
| Not applicable | 17 (4.6 %) |
| Have my own panel of patients |       |
| Yes | 235 (63.2 %) |
| No | 137 (36.8 %) |
| Bill under own National Provider Identifier number |       |
| Yes | 274 (73.7 %) |
| No | 81 (21.8 %) |
| Not applicable | 17 (4.6 %) |
| Job satisfaction |       |
| Very dissatisfied | 17 (4.6 %) |
| Dissatisfied | 34 (9.1 %) |
| Satisfied | 182 (48.9 %) |
| Very satisfied | 142 (38.2 %) |
| Plan to leave the primary position |       |
| No or not sure | 249 (67.1 %) |
| Less than one year from now | 43 (11.6 %) |
| 1-3 years from now | 49 (15.9 %) |
| More than 3 years from now | 21 (5.7 %) |

The stratification of findings by nurse practitioner practice setting showed similarities in the strength of job preferences regardless of the practice setting, where a less cohesive patient care team with frequent interaction, less responsive and supportive administration, collaborating or being supervised by a physician, not having their own panel of patients, lower salary, and longer commute time were less valued (results shown in Supplement 1). However, nurse practitioners working in acute care or other settings significant valued the job characteristic of “being able to bill under their own National Provider Identifier”, but nurse practitioners working in primary care settings did not.

3.3. Estimates of willingness to pay

Table 5 shows how much gross annual income a nurse practitioner would need to be compensated with or would reduce for a certain job characteristic. In terms of “professional relationship with other professionals”, participants would need a 7.51 % increase in their gross annual income for a “somewhat cohesive team” and a 21.87 % increase for “a team that was not very cohesive”, corresponding to an average of USD$7510 and USD$21,870, respectively. For their “commute time”, participants would need a 7.55 % increase in their gross annual income for a “30-minute” and a 21.45 % increase for a “45-minute” commute time, converting to an average of USD$7550 and USD$21,450, respectively.

For “professional relationship with administration”, participants would need a 4.91 % increase in their gross annual income for an “administration that was only somewhat responsive” and a 15.28 % increase for an “administration that was not very responsive”, corresponding to an average of USD$4910 and USD$15,280, respectively. As for “professional relationship with a physician”, participants would need an 8.52 % increase in their gross annual income for “collaborating with or being supervised by a physician” – that is, an average of USD$8520. Participants reported the need of a 6.18 % increase in their annual gross income for “not having their own panel of patients” and a 2.68 % increase for “not being able to bill under their own National Provider Identifier”, corresponding to an average of USD$6180 and USD$2680, respectively. As for the practice setting, on average participants would need more than a 4.72 % increase in gross annual income to change their job from a primary care setting to an acute care setting, corresponding to USD$4720.
The evidence generated from a discrete choice experiment is more beneficial for developing specific policy strategies, when compared to the traditional rating and ranking approach. Most of the job characteristics valued by nurse practitioners in this study are modifiable and can be incorporated into policy strategies to improve resource allocation to advance nurse practitioners’ practice. The state of Georgia is one of 11 states with restricted practice law for nurse practitioners (American Association of Nurse Practitioner, 2021). A few states temporarily loosened the scope of practice laws for nurse practitioners in response to the workforce shortage during the pandemic of COVID (except the state of Georgia), but permanent solutions are still necessary to address nurse practitioners’ independent practice to improve the access to care (Poghosyan et al., 2022). At the organizational level, nurse practitioners’ practice may also be restricted by organizational policies that require additional supervision, even in states where nurse practitioners can practice to the full extent of their education and training (Chapman et al., 2019). The findings of this study suggested that it is costly to maintain nurse practitioners to practice in an undesirable environment that is not cohesive, supportive, and independent. Thus, healthcare managers should create a practice environment with cohesive teams and

### Table 4
Estimates of the preferred job characteristics of nurse practitioners (n = 372).

| Job characteristic                                      | Coefficient (standard error) | 95% confidence interval          | p-Value |
|---------------------------------------------------------|------------------------------|---------------------------------|---------|
| Professional relationship with other professionals      |                              |                                 |         |
| Very cohesive team with frequent interaction            | Ref.                         | –                               | –       |
| Somewhat cohesive team with regular interaction         | –0.52 (0.07)                 | (–0.66, –0.37)                  | 0.000   |
| Not very cohesive team with infrequent interaction      | –1.50 (0.10)                 | (–1.69, –1.31)                  | 0.000   |
| Professional relationship with administration            |                              |                                 |         |
| Very responsive and supportive administration            | Ref.                         | –                               | –       |
| Somewhat responsive and supportive administration       | –0.34 (0.07)                 | (–0.48, –0.20)                  | 0.000   |
| Not very responsive and supportive administration       | –1.04 (0.08)                 | (–1.21, –0.88)                  | 0.000   |
| Commute time                                            |                              |                                 |         |
| 15 min                                                  | Ref.                         | –                               | –       |
| 30 min                                                  | –0.51 (0.07)                 | (–0.65, –0.38)                  | 0.000   |
| 45 min                                                  | –1.47 (0.09)                 | (–1.64, –1.30)                  | 0.000   |
| Professional relationship with a physician              |                              |                                 |         |
| No physician on site/Independence                       | Ref.                         | –                               | –       |
| Collaborate with or being supervised by a physician     | –0.58 (0.07)                 | (–0.73, –0.44)                  | 0.000   |
| Have own panel of patients                              |                              |                                 |         |
| Yes                                                     | Ref.                         | –                               | –       |
| No                                                      | –0.42 (0.06)                 | (–0.55, –0.30)                  | 0.000   |
| Billing under own National Provider Identifier          |                              |                                 |         |
| Yes                                                     | Ref.                         | –                               | –       |
| No                                                      | –0.18 (0.06)                 | (–0.30, –0.07)                  | 0.002   |
| Salary                                                  | 0.07 (0.00)                  | (0.06, 0.07)                    | 0.000   |
| Setting                                                 |                              |                                 |         |
| Primary care setting                                     | Ref.                         | –                               | –       |
| Acute care setting                                      | –0.32 (0.10)                 | (–0.53, –0.12)                  | 0.002   |
| Other setting                                           | 0.08 (0.08)                  | (–0.07, 0.22)                   | 0.319   |

### Table 5
Estimates of salary compensation or sacrifice by job characteristics reported by nurse practitioners (n = 372).

| Job characteristic                                      | Percent of gross annual income (standard error) | 95% confidence interval          | p-Value | Gross annual income (USD$)¹ |
|---------------------------------------------------------|-----------------------------------------------|---------------------------------|---------|-----------------------------|
| Relationship with other professionals                   |                                              |                                 |         |                             |
| Very cohesive team with frequent interaction            | Ref.                                         | –                               | –       |                             |
| Somewhat cohesive team with regular interaction         | 7.51 (1.04)                                  | (5.46, 9.55)                    | 0.000   | $7510                       |
| Not very cohesive team with regular interaction         | 21.87 (1.40)                                 | (19.14, 24.60)                  | 0.000   | $21,870                     |
| Relationship with administration                        |                                              |                                 |         |                             |
| Very responsive and supportive administration            | Ref.                                         | –                               | –       |                             |
| Somewhat responsive and supportive administration       | 4.91 (1.02)                                  | (2.91, 6.92)                    | 0.000   | $4910                       |
| Not very responsive and supportive administration       | 15.28 (1.23)                                 | (12.87, 17.68)                  | 0.000   | $15,280                     |
| Relationship with a physician                           |                                              |                                 |         |                             |
| No physician on site/Independence                       | Ref.                                         | –                               | –       |                             |
| Collaborate with or being supervised by a physician     | 8.52 (1.08)                                  | (6.40, 10.64)                   | 0.000   | $8520                       |
| Commute time                                            |                                              |                                 |         |                             |
| 15 min                                                  | Ref.                                         | –                               | –       |                             |
| 30 min                                                  | 7.55 (1.04)                                  | (5.51, 9.58)                    | 0.000   | $7550                       |
| 45 min                                                  | 21.45 (1.27)                                 | (18.95, 23.94)                  | 0.000   | $21,450                     |
| Have own panel of patients                              |                                              |                                 |         |                             |
| Yes                                                     | Ref.                                         | –                               | –       |                             |
| No                                                      | 6.18 (0.93)                                  | (4.35, 8.00)                    | 0.000   | $6180                       |
| Billing under own National Provider Identifier          |                                              |                                 |         |                             |
| Yes                                                     | Ref.                                         | –                               | –       |                             |
| No                                                      | 2.68 (0.87)                                  | (0.90, 4.38)                    | 0.002   | $2680                       |
| Setting                                                 |                                              |                                 |         |                             |
| Primary care setting                                     | Ref.                                         | –                               | –       |                             |
| Acute care setting                                      | 4.72 (1.50)                                  | (1.78, 7.67)                    | 0.002   | $4720                       |
| Other setting                                           | –1.09 (1.09)                                 | (–3.25, 1.06)                   | 0.319   |                             |

¹ Calculated as the coefficient for the level of each job attribute divided by the coefficient for the salary.

¹ This was computed through multiplying the percent of gross annual income by participants’ median pre-tax annual earnings for their primary position (USD$100,000).
supportive administration not only to retain nurse practitioners but also to save on labor costs. Increasing the knowledge of administrators and other professionals on nurse practitioners’ competencies may also improve nurse practitioners’ relationships with others and enable them to receive the support and resources needed for the delivery of high quality care (Poghosyan et al., 2017b).

This study had a few limitations. First, the sample was small and restricted to nurse practitioners in Georgia, which limits the generalizability of findings. For instance, nurse practitioners in Georgia are required to be supervised by a physician when practicing and thus, they may prefer an independent practice environment more than nurse practitioners in a state that can practice independently. Second, the findings were from a self-report survey, which could generate response bias. Third, the survey provides hypothetical scenarios. Therefore, we could not measure the actual behavior of nurse practitioners. Fourth, the levels of certain job characteristics were not explicitly defined in this study, such as “professional relationship with administration” and “professional relationship with other professionals”. Constructing level definitions can be a delicate balance. This is especially true when attributes are intended to measure differences that rely on a respondent’s perceptions of a situation rather than concrete features. Institutions seeking to improve relationships with employees are encouraged to engage in ongoing research and dialog with their stakeholders to identify situationally appropriate ways that these findings can be operationalized. Fifth, it is possible that other unmeasured job-related factors are equally important to nurse practitioners, specifically to those working in the state of Georgia. Lastly, willingness to pay is primarily useful to ease comparisons and interpretation, but they often overstate the real values that would be required to induce behavioral changes (Allenby et al., 2014). Because of the lack of context in willingness to pay measures, the finding from this study should be interpreted with a degree of caution.

5. Conclusions

The recruitment and retention of nurse practitioners is critical in our efforts to improve access to care and the need of healthcare services. Using the discrete choice experiment, the findings from this study highlight the importance of a cohesive, supportive, and independent practice environment. Policymakers and administrators should take actions to promote favorable practice environments for nurse practitioners if we are to expand the availability of healthcare service and the quality of care. Supplementary data to this article can be found online at https://doi.org/10.1016/j.jiunnrstu.2022.104407.

Data availability

Data cannot be shared based on the confidential agreement between the study participants and research team based on our protocol approved by the Institutional Review Board of our university.

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CRediT authorship contribution statement

Yin Li: Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing, Supervision, Funding acquisition. John R. Howell: Software, Formal analysis, Writing - original draft, Writing - review & editing. Jeannie P. Cimiotti: Conceptualization, Methodology, Investigation, Writing - review & editing.

Declaration of Competing Interest

None.

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