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## Research Paper

## The associations among nurse work engagement, job satisfaction, quality of care, and intent to leave: A national survey in the United States

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## ABSTRACT

**Objectives:** Employee work engagement, job satisfaction, quality of care, and intent to leave are critical indicators for healthcare organizational performance. This study aimed to analyze the current state of nurses' work engagement and its factors to examine the associations among nurses' work engagement, job satisfaction, quality of care, and intent to leave in the United States (US).

**Methods:** This is a quantitative descriptive cross-section design. Data were collected online from the US registered nurses from March to September 2022. Measures comprised the Utrecht Work Engagement Scale, the demographics, and questions regarding job satisfaction, perceived quality of care, and intent to leave.

**Results:** Nine hundred nurses participated in the online survey. Among the participants, 79.2% reported holding a specialty certification, 59.4% scored high/very high on job satisfaction, 82.2% expressed high/very high on the perceived quality of nursing care, and 28.4% conveyed likely/very likely to leave in the following year. Nurses' work engagement was positively associated with nurses' job satisfaction and their perceived quality of care but negatively associated with intent to leave. More certified nurses reported high or very high job satisfaction than non-certified nurses. As for demographics, the linear regression analysis showed that nurses who were older, identified as White, and held doctorate degrees reported higher levels of work engagement in comparison to their counterparts.

**Conclusions:** This study shows that nurses' work engagement is associated with their job satisfaction, perceived quality of care, and intent to leave. Nurses' work engagement in this study is lower than in other studies, especially before the COVID-19 pandemic, which may indicate a possible association with the COVID-19 impact. Because nurses' work engagement is significantly associated with job satisfaction, nurse leaders need to find ways to promote nurses' job satisfaction and retention.

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## What is known?

- Nurse work engagement, job satisfaction, quality of care, and intent to leave are indicators of organizational performance.
- Many factors affect nurses' work engagement, job satisfaction, care quality, and retention.

## What is new?

- Nurses with higher work engagement reported higher job satisfaction and quality of care, but lower intent to leave.
- More certified nurses reported high or very high job satisfaction than non-certified nurses.

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## 1. Introduction

Employee work engagement, job satisfaction, perceived quality

of care, and intent to leave are essential indicators of healthcare organizational performance. Research shows these constituents are significant and interrelated factors impacting culture and performance, workplace environments, and overall patient outcomes [1–3]. Employee engagement is a concept that describes the degree of commitment, enthusiasm, and dedication employees feel toward their job [4]. Work engagement represents a positive, satisfying, and fulfilling work-related mental state denoted by three facets – vigor, dedication, and absorption. Vigor refers to high energy levels, resilience, eagerness to be involved at work, and perseverance even when facing difficulties. Dedication is a sense of acceptance, value, enthusiasm, and pride. Absorption means being entirely focused and absorbed in one's work with difficulty separating oneself from work [4].

Engaged employees are involved, committed, and compassionate about their job and believe their efforts are valuable and can make a difference in an organization's performance. These employees tend to integrate their well-being, value, and benefits with the organizations' successes, which are instrumental to both the employees' and the organizations' performance and achievements [4]. A high level of employee engagement is favorable and desirable for organizations because it brings constructive and positive effects. Thus, an organization's priority is cultivating and fostering highly engaged employees.

A closely related concept to work engagement is job satisfaction. Job satisfaction is described as employees' feelings and emotions toward their work and the degree to which employees are content with their jobs [5]. While keeping employees engaged and satisfied has many benefits, it can be a complex undertaking because work engagement and job satisfaction can be affected by many factors. Positive facilitators contain reward, collaboration, and support [6], and negative factors comprise increased stress and workload, difficult work conditions, and lack of resources [7–9]. The favorable outcomes of increased work engagement and job satisfaction include committed employees, and the negative result would be employees' intent to leave.

Nursing has faced unprecedented challenges, affecting nurses' intent to leave and the quality of care. Nurse engagement and joy at work are significant predictors of hospital nurse intent to leave [10] and are positively correlated with the quality of nursing service [11]. According to a report from December 2021 by National Nurses United [12], out of the 4.4 million licensed registered nurses in the United States (US), only 3.2 million are employed, and only 1.8 million are working in hospitals, leading to significant shortages in acute care settings. The COVID-19 pandemic has further exacerbated the nursing workforce and resource shortages; currently, 24% of US hospitals reported critical staffing shortages [13]. The National Nurses United report [12] summarized the research findings, citing those poor working conditions as a significant factor for the decrease in nurse job satisfaction and retention. Nurses reported experiencing high rates of burnout and decreased well-being [14], a significant factor affecting nurses' job satisfaction, intent to leave the position or the profession, and a lower level of work engagement [15].

Health systems need to better understand these phenomena to mitigate these issues and promote nurses' job performance and patient care quality. The findings could help establish a new baseline, a benchmark for future studies in the related areas. This study aimed to analyze the current state of nurses' work engagement and its factors to identify the associations among nurses' work engagement, job satisfaction, quality of care, and intent to leave in the US. The research questions were:

- (1) What is the current state of nurses' work engagement and its associated factors?

- (2) What are the relationships among nurses' work engagement, job satisfaction, perceived quality of care, and intent to leave?

## 2. Theoretical framework

This study was guided by the Convergent Care Theory [16]. This theory includes four concepts and six major facilitators: all-inclusive organizational care, interprofessional collaborative care, person-centered precision care, and providers' and patients' self-care. The six facilitators include competence, compassion, accountability, trusting, sharing, and engaging [16]. The theory emphasizes the multifaceted features of healthcare and proposes the factors that could influence nurse work engagement and job satisfaction. When organizational culture, collaboration, and support are promoted, nurses may have higher job satisfaction associated with higher work engagement and improved quality of care. Otherwise, negative outcomes, such as lower quality of care and intent to leave, may occur. This study proposed a conceptual model based on the theory and the literature discussed in the introduction section (Fig. 1). This model comprised four major constructs, Work Engagement, Job Satisfaction, Quality of Care, and Intent to Leave. The demographic context included nurses' age, race, education, work experience, and specialty certification status. The relationships were examined among these major constructs.

## 3. Methods

### 3.1. Study design and sample

This quantitative descriptive correlational design utilizes a cross-sectional national survey of registered nurses in the US.

The University of Louisville Institutional Review Board approved this study (IRB # 21.0844). All participants consented to participate in the study before answering the survey.

The study survey took place online across the US from March 2022 to September 2022. To be eligible to take part in the study, the participant had to be a registered nurse in the US, with or without specialty certifications. Nurses not practicing in the US or unwilling to share their experiences were excluded.

### 3.2. Measurements

#### 3.2.1. Demographics

Demographic data were collected, including participants' gender, race, ethnicity, education degrees, work settings, facility types, current job roles, specialty certification status, and types of certifications.

#### 3.2.2. Nurses' job satisfaction, perceived quality of care, and intent to leave

Nurses' job satisfaction, perceived quality of care, and intent to leave were collected via the following survey items: 1) How would you rate your job satisfaction in the last three months? (Rated as very high, high, moderate, little, and not at all), 2) How would you rate the unit's nursing care quality in the last three months? (Rated as very high, high, low, and very low), and 3) Do you plan to leave the unit in the next year? (Rated as very likely, likely, undecided, no, and other).

#### 3.2.3. Utrecht Work Engagement Scale-17 (UWES-17)

The English version of UWES-17 [17,18] was used to measure participants' levels of work engagement. The scale comprises three dimensions: Vigor (six items like "At my work, I feel bursting with

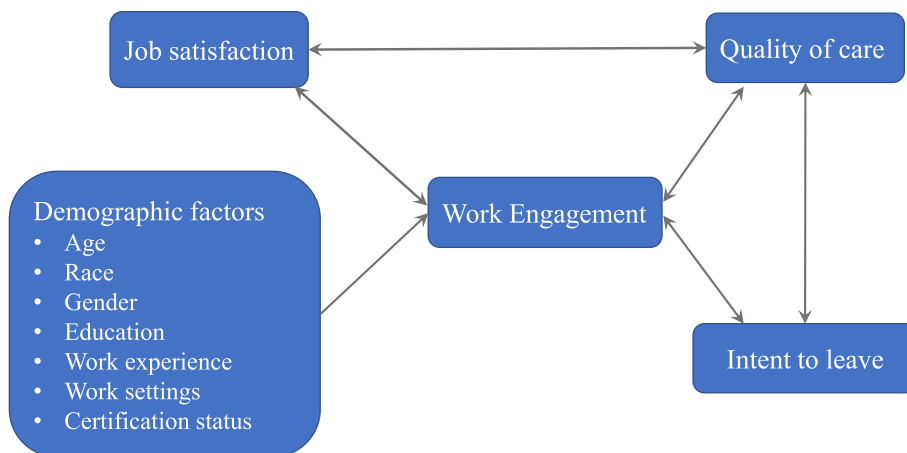


Fig. 1. Theoretical model.

energy”), Dedication (five items like “My job inspires me”), and Absorption (six items like “I feel happy when I am working intensely”). The items were scored on a 7-point scale from 0 (never) to 6 (always). The average scores of the subscale items were computed by adding the item scores and then dividing them by the number of the subscale items, with higher scores indicating higher levels of engagement. The scale has well-established, strong psychometric properties, with the Cronbach’s  $\alpha$  coefficient ranging from 0.70 to 0.90 [17,19,20]. In this study population, the Cronbach’s  $\alpha$  coefficient is 0.927.

### 3.3. Data collection

A convenience sampling method was used to recruit participants. A survey link was established and shared via emails through nursing professional organizations, such as the Competency and Credentialing Institute, healthcare organizations, various hospitals, and individual nurses across the US. Because the survey was sent via multiple professional and healthcare organizations, it would be impossible to report the response rate. We used nursing professional organizations to send the survey link instead of massive social media to ensure that data were collected from nursing participants. Our study included all responded nurses from healthcare organizations and healthcare institutions. All participating nurses have met the inclusion criteria of having a minimum work experience of three months. The survey link was open from March to September 2022. The online survey was designed to limit submissions based on IP addresses throughout the entire survey period to prevent multiple responses.

### 3.4. Data analysis

The statistical analyses were performed using IBM SPSS Statistics for Windows (Version 28.0. Armonk, NY: IBM Corp [21] and SAS 9.4. Descriptive information was reported on the UWES-17 subscales (vigor, dedication, and absorption) for the entire sample and different groups based on gender, age, work setting, race, degree, and certification status. The independent two-sample *t*-test was used to determine the association between the UWES-17 subscales and gender, certification, job satisfaction, quality of care, and intent to leave. One-way ANOVA tests were conducted to assess the variances of the UWES-17 subscales among different races (white, black, and other), age groups (below 40, 40–60, and above 60), degree levels (Registered Nurses [RN] Diploma/Associate, Baccalaureate, Master’s, and Doctorate), and work settings. Chi-square

analysis was employed to explore the associations between perceived job satisfaction, quality of nursing care, intent to leave, and certification. Simple and multiple linear regression analysis was performed to investigate the relationships between Work Engagement and variables such as gender, race, working years as an RN, education, job satisfaction, quality of nursing care, and intent to leave. A probability value of less than 0.05 was considered statistically significant, and all reported *P* values were two-tailed.

## 4. Results

### 4.1. Participants’ characteristics

Nine hundred nurses participated in the study. The socio-demographic and clinical characteristics of the participants are presented in Table 1.

### 4.2. Work engagement: descriptive statistics and demographic comparisons

The UWES-17 comprises three domains: Vigor, Dedication, and Absorption. Descriptive statistics of UWES-17 are presented in Table 2. A total of 806 nurses complete the UWES-17. The descriptive comparisons of UWES-17 between demographic groups were summarized in Table 3. The sample size for each group varied due to missing data. Female nurses exhibited significantly higher Vigor, Dedication, and Absorption compared to male nurses (all  $P < 0.05$ ). Nurses above the age of 60 demonstrated significantly higher levels of Vigor, Dedication, and Absorption when compared to younger nurses (all  $P < 0.05$ ). Additionally, White nurses achieved significantly higher scores than Black and other nurses on Vigor, Dedication, and Absorption (all  $P < 0.05$ ). Finally, nurses working in medical and surgical departments displayed significantly lower levels of Vigor ( $P = 0.025$ ) and Dedication ( $P = 0.014$ ) compared to those working in ambulatory and outpatient clinics, according to post hoc comparisons.

### 4.3. Job satisfaction, perceived quality of nursing care, intention to leave, and certification: descriptions and associations

Of the 900 participating nurses, 534 (59.4%) reported high or very high levels of job satisfaction within the last three months; 740 (82.2%) perceived the quality of nursing care on the unit as very high or high during the previous three months. Moreover, 255 (28.4%) indicated a likelihood or substantial likelihood of leaving

**Table 1**  
Characteristics of participants (n = 900).

| Variable  | n (%)   |            |
|---|---|------------|
| Age, years  | Below 40  | 601 (66.8) |
|   | 40–60   | 167 (18.6) |
|   | Above 60  | 33 (3.7)   |
| Gender  | Incomplete  | 99 (11.0)  |
|   | Male  | 213 (23.7) |
|   | Female  | 613 (68.1) |
| Race and ethnicity  | Unknown/Other   | 46 (5.1)   |
|   | Incomplete  | 28 (3.1)   |
|   | Asian   | 40 (4.4)   |
|   | American Indian, Alaska, Hawaiian Native, or Other Pacific Islander | 103 (11.5) |
|   | Black or African-American   | 173 (19.2) |
|   | Hispanics of any race   | 45 (5.0)   |
|   | White   | 489 (54.3) |
| Highest degree  | Two or more mixed races/Other                                       | 29 (3.2)   |
|   | Incomplete  | 21 (2.3)   |
|   | RN Diploma  | 147 (16.3) |
|   | Associate Degree  | 144 (16.0) |
|   | Baccalaureate Degree  | 377 (41.9) |
|   | Master's Degree   | 171 (19.0) |
| Hold any certifications   | Doctorate Degree  | 40 (4.4)   |
|   | Incomplete  | 21 (2.3)   |
|   | Yes   | 713 (79.2) |
|   | No  | 156 (17.3) |
| Work setting  | Incomplete  | 31 (3.4)   |
|   | Operating Room (OR)/Post-Anesthesia Care Unit (PACU)                | 205 (22.8) |
|   | Medical/Surgical  | 316 (35.1) |
|   | Pediatrics  | 180 (20.0) |
|   | Labor Delivery/Gynecology/Obstetrics                                | 109 (12.1) |
|   | Ambulatory/Outpatient Clinics                                       | 83 (9.2)   |
| Facility type   | Incomplete  | 7 (0.8)    |
|   | Academic/University hospital/Medical center                         | 473 (52.6) |
|   | Long-term care  | 201 (22.3) |
|   | Clinics   | 143 (15.9) |
| Current job classification  | Other   | 43 (4.8)   |
|   | Incomplete  | 40 (4.4)   |
|   | Staff Nurse   | 420 (46.7) |
|   | Supervisory   | 288 (32)   |
|   | Educators   | 99 (11)    |
| How would you rate your job satisfaction in the last three months?                              | Other (including Quality Assurance)                                 | 71 (7.9)   |
|   | Incomplete  | 22 (2.4)   |
|   | Very high   | 178 (19.8) |
|   | High  | 356 (39.6) |
|   | Moderate  | 262 (29.1) |
| How would you rate the quality of nursing care on the unit in general in the last three months? | Little  | 68 (7.6)   |
|   | Not at all  | 15 (1.7)   |
|   | Incomplete  | 21 (2.3)   |
|   | Very high   | 226 (25.1) |
|   | High  | 514 (57.1) |

(continued on next page)

**Table 1** (continued)

| Variable  | n (%)            |                      |
|---|------------------|----------------------|
| Do you plan to leave the unit in the next year? | Low              | 111<br>(12.3)        |
|   | Very low         | 22 (2.4)             |
|   | Incomplete       | 27 (3)               |
|   | Very likely      | 69 (7.7)             |
|   | Likely           | 186<br>(20.7)        |
|   | Undecided        | 229<br>(25.4)        |
|   | No               | 374<br>(41.6)        |
|   | Other incomplete | 13 (1.4)<br>29 (3.2) |

Note: RN = Registered Nurses.

**Table 2**

Total and dimension scores of work engagement (UWES-17 score) among participants (n = 806).

| Dimension   | Mean ± SD   | Min–Max   |
|-------------|-------------|-----------|
| Total score | 3.68 ± 1.05 | 0.94–6.00 |
| Vigor       | 3.70 ± 1.11 | 0.83–6.00 |
| Dedication  | 3.84 ± 1.21 | 0–6.00    |
| Absorption  | 3.53 ± 1.08 | 0.17–6.00 |

their unit in the following year (Table 1). The descriptions and associations among job satisfaction, quality of nursing care, intention to leave, and certification were presented in Table 4. Notably, the proportion of certified nurses with very high or high job satisfaction (63.0%) was significantly higher (P < 0.001) compared to non-certified nurses (48.1%). Regarding the quality of nursing care and intent to leave, no substantial differences between certified and non-certified nurses.

4.4. The relationships between nurses' work engagement and their job satisfaction, perceived quality of care, and intent to leave

The relationships between the UWES-17 and nurses' job satisfaction, perceived quality of nursing care, and intent to leave were measured by an independent two-sample t-test and summarized in Table 5. For facility analysis, the five-scale job satisfaction and four-scale perceived quality of nursing care were recoded into two

**Table 3**

Comparison of nurses' work engagement (UWES-17 score) among nurses with different characteristics.

| Variable      | Total score                              | t/F         | P     | Vigor  | t/F         | P     | Dedication | t/F         | P     | Absorption | t/F         | P     |        |
|---------------|--|-------------|-------|--------|-------------|-------|------------|-------------|-------|------------|-------------|-------|--------|
| Gender        | Female                                   | 3.79 ± 1.08 | 3.31  | <0.001 | 3.80 ± 1.12 | 3.28  | 0.001      | 4.02 ± 1.20 | 4.91  | <0.001     | 3.62 ± 1.11 | 2.39  | 0.017  |
|               | Male                                     | 3.50 ± 0.99 |       |        | 3.50 ± 1.08 |       |            | 3.54 ± 1.15 |       |            | 3.41 ± 1.00 |       |        |
| Age group     | Below 40                                 | 3.60 ± 1.11 | 19.93 | <0.001 | 3.63 ± 1.17 | 16.65 | <0.001     | 3.71 ± 1.22 | 40.00 | <0.001     | 3.51 ± 1.13 | 5.59  | 0.004  |
|               | 40–60                                    | 4.11 ± 0.78 |       |        | 4.11 ± 0.82 |       |            | 4.51 ± 0.91 |       |            | 3.81 ± 0.94 |       |        |
|               | Above 60                                 | 4.35 ± 0.82 |       |        | 4.31 ± 1.04 |       |            | 4.76 ± 0.92 |       |            | 3.83 ± 0.96 |       |        |
| Race          | White                                    | 3.93 ± 1.05 | 30.85 | <0.001 | 3.94 ± 1.09 | 27.68 | <0.001     | 4.19 ± 1.15 | 48.64 | <0.001     | 3.71 ± 1.10 | 14.57 | <0.001 |
|               | Black                                    | 3.34 ± 0.84 |       |        | 3.35 ± 0.95 |       |            | 3.33 ± 1.03 |       |            | 3.35 ± 0.85 |       |        |
|               | Other                                    | 3.39 ± 1.06 |       |        | 3.42 ± 1.12 |       |            | 3.49 ± 1.25 |       |            | 3.30 ± 1.12 |       |        |
| Degree        | RN Diploma/Associate Degree              | 3.61 ± 1.07 | 1.918 | 0.125  | 3.64 ± 1.12 | 2.437 | 0.063      | 3.69 ± 1.21 | 2.599 | 0.051      | 3.55 ± 1.11 | 2.471 | 0.061  |
|               | Baccalaureate Degree                     | 3.65 ± 1.08 |       |        | 3.66 ± 1.13 |       |            | 3.88 ± 1.24 |       |            | 3.44 ± 1.12 |       |        |
|               | Master's Degree                          | 3.77 ± 0.96 |       |        | 3.77 ± 1.04 |       |            | 3.96 ± 1.10 |       |            | 3.65 ± 0.96 |       |        |
|               | Doctorate Degree                         | 3.98 ± 0.97 |       |        | 4.11 ± 0.98 |       |            | 4.07 ± 1.40 |       |            | 3.81 ± 0.95 |       |        |
| Work settings | Operating Room/Post-anesthesia Care Unit | 3.69 ± 0.99 | 2.40  | 0.067  | 3.78 ± 1.04 | 3.12  | 0.025      | 3.85 ± 1.18 | 3.58  | 0.014      | 3.46 ± 1.06 | 1.86  | 0.136  |
|               | Medical/Surgical                         | 3.56 ± 1.17 |       |        | 3.56 ± 1.23 |       |            | 3.68 ± 1.31 |       |            | 3.48 ± 1.18 |       |        |
|               | Pediatrics/Gynecology/Obstetrics         | 3.73 ± 0.92 |       |        | 3.71 ± 0.99 |       |            | 3.95 ± 1.09 |       |            | 3.59 ± 0.97 |       |        |
|               | Ambulatory/Outpatient Clinics            | 3.89 ± 1.09 |       |        | 3.93 ± 1.13 |       |            | 4.06 ± 1.27 |       |            | 3.75 ± 1.07 |       |        |
| Certification | Yes                                      | 3.68 ± 1.05 | -0.09 | 0.927  | 3.69 ± 1.11 | -0.45 | 0.653      | 3.82 ± 1.22 | -1.33 | 0.183      | 3.56 ± 1.07 | 1.10  | 0.273  |
|               | No                                       | 3.69 ± 1.00 |       |        | 3.73 ± 1.08 |       |            | 3.97 ± 1.15 |       |            | 3.45 ± 1.09 |       |        |

Note: Data are Mean ± SD. RN = Registered Nurses.

levels, namely high and low.

Compared to nurses with lower perceived job satisfaction, those with high perceived job satisfaction demonstrated significantly higher scores on total score and dimension scores of Work Engagement (P < 0.001). Similarly, nurses who reported perceived high-quality nursing care exhibited significantly higher scores on total score and dimension scores of Work Engagement (P < 0.001) compared to nurses who perceived low quality of care. Nurses with high intention to leave displayed significantly lower scores in Work Engagement (P < 0.001) compared to nurses with low intent to leave.

4.5. The associated factors of work engagement

Single and multiple stepwise linear regression analysis was used to analyze the relationship between Work Engagement and gender, race, working years as an RN, education, job satisfaction, quality of nursing care, and intent to leave. The results are summarized in Table 6. Certification, gender, working years as an RN, and quality of nursing care were excluded from the stepwise multiple linear regression model due to lack of significance.

5. Discussion

This study collected data from 900 US nurses and examined the relationships among nurses' work engagement, job satisfaction, perceived quality of care, and intent to leave. Among the participants, 79.2% reported holding a specialty certification, 59.4% scored

**Table 4**  
Nurses' job satisfaction, quality of care, and intent to leave between nurses with and without specialty certifications.

| Items   | Certified nurses |                         | Non-Certified nurses |                         | $\chi^2$ | P      |
|---|------------------|-------------------------|----------------------|-------------------------|----------|--------|
| How would you rate your job satisfaction in the last three months?                              |                  |                         |                      |                         |          |        |
| Very high   | 142 (20.0)       | 447 (63.0) <sup>a</sup> | 29 (18.6)            | 75 (48.1) <sup>a</sup>  | 11.974   | <0.001 |
| High  | 305 (43.0)       |                         | 46 (29.5)            |                         |          |        |
| Moderate  | 203 (28.6)       | 262 (37.0) <sup>a</sup> | 57 (36.5)            | 81 (51.9) <sup>a</sup>  |          |        |
| Little  | 48 (6.8)         |                         | 20 (12.8)            |                         |          |        |
| Not at all  | 11 (1.6)         |                         | 4 (2.6)              |                         |          |        |
| How would you rate the quality of nursing care on the unit in general in the last three months? |                  |                         |                      |                         | 1.770    | 0.183  |
| Very high   | 183 (25.9)       | 604 (85.4) <sup>a</sup> | 38 (24.7)            | 125 (81.2) <sup>a</sup> |          |        |
| High  | 421 (59.5)       |                         | 87 (56.5)            |                         |          |        |
| Low   | 85 (12.0)        | 103 (14.6) <sup>a</sup> | 26 (16.9)            | 29 (18.8) <sup>a</sup>  |          |        |
| Very low  | 18 (2.5)         |                         | 3 (1.9)              |                         |          |        |
| Do you plan to leave the unit in the next year?   |                  |                         |                      |                         | 0.001    | 0.975  |
| Very likely   | 55 (7.8)         | 207 (29.4) <sup>a</sup> | 14 (9.0)             | 46 (29.5) <sup>a</sup>  |          |        |
| Likely  | 152 (21.6)       |                         | 32 (20.5)            |                         |          |        |
| Undecided   | 185 (26.2)       | 498 (70.6) <sup>a</sup> | 39 (25.0)            | 110 (70.5) <sup>a</sup> |          |        |
| No  | 304 (43.1)       |                         | 67 (42.9)            |                         |          |        |
| Other   | 9 (1.3)          |                         | 4 (2.6)              |                         |          |        |

Note: Data are n (%). The sample size is different for each question due to participants did not respond to some of the questions. <sup>a</sup> The data were combined into two categories for responses to each question to conduct chi-square test.

**Table 5**  
Relationships between nurses' work engagement (UWES-17 scores) and perceived job satisfaction, quality of life, and intent to leave.

| UWES-17     | Job satisfaction |               |      |        | Quality of care |               |      |        | Intent to leave |               |       |        |
|-------------|------------------|---------------|------|--------|-----------------|---------------|------|--------|-----------------|---------------|-------|--------|
|             | High (n = 473)   | Low (n = 328) | t    | P      | High (n = 667)  | Low (n = 131) | t    | P      | High (n = 241)  | Low (n = 555) | t     | P      |
| Total score | 3.91 ± 1.10      | 3.34 ± 0.88   | 7.81 | <0.001 | 3.75 ± 1.07     | 3.32 ± 0.82   | 4.42 | <0.001 | 3.30 ± 1.00     | 3.85 ± 1.03   | -6.93 | <0.001 |
| Vigor       | 3.94 ± 1.14      | 3.33 ± 0.96   | 8.39 | <0.001 | 3.77 ± 1.12     | 3.31 ± 0.92   | 5.17 | <0.001 | 3.27 ± 1.06     | 3.88 ± 1.08   | -7.52 | <0.001 |
| Dedication  | 4.12 ± 1.24      | 3.43 ± 1.05   | 8.69 | <0.001 | 3.93 ± 1.22     | 3.40 ± 1.02   | 5.36 | <0.001 | 3.38 ± 1.17     | 4.05 ± 1.18   | -7.55 | <0.001 |
| Absorption  | 3.72 ± 1.12      | 3.25 ± 0.95   | 6.49 | <0.001 | 3.60 ± 1.10     | 3.24 ± 0.89   | 4.06 | <0.001 | 3.23 ± 1.03     | 3.67 ± 1.07   | -5.48 | <0.001 |

Note: Data are Mean ± SD. The sample size is different for each question due to participants did not respond to some of the questions.

**Table 6**  
Simple and stepwise multiple linear regression analysis on associated factors of work engagement (n = 709).

| Variables  | Crude                           |        | Adjusted                        |        |
|--|---------------------------------|--------|---------------------------------|--------|
|  | Regression coefficient (95% CI) | P      | Regression coefficient (95% CI) | P      |
| Age  | 0.447 (0.306, 0.588)            | <0.001 | 0.334 (2.882, 3.430)            | <0.001 |
| Gender (Male as ref.)                              |                                 |        |                                 |        |
| Female   | 0.294 (0.119, 0.468)            | 0.001  | –                               |        |
| Race (White as ref.)                               |                                 |        |                                 |        |
| Black  | -0.587 (-0.766, -0.407)         | <0.001 | -0.316 (-0.507, -0.126)         | 0.001  |
| Others   | -0.541 (-0.712, -0.370)         | <0.001 | -0.183 (-0.380, 0.014)          | 0.069  |
| Education (RN Diploma/Associate Degree as ref.)    |                                 |        |                                 |        |
| Baccalaureate Degree                               | 0.036 (-0.133, 0.205)           | 0.673  | -0.047 (-0.126, 0.122)          | 0.583  |
| Master's Degree                                    | 0.162 (-0.045, 0.370)           | 0.125  | 0.089 (-0.116, 0.294)           | 0.394  |
| Doctorate Degree                                   | 0.365 (0.008, 0.723)            | 0.045  | 0.540 (0.093, 0.986)            | 0.018  |
| Working years as a RN                              | 0.023 (0.015, 0.031)            | 0.004  |                                 |        |
| Job satisfaction in the last three months          | 0.569 (0.426, 0.712)            | <0.001 | 0.566 (0.417, 0.715)            | <0.001 |
| Perceived quality of care in the last three months | 0.437 (0.243, 0.631)            | <0.001 |                                 |        |
| Intent to leave (Low as ref.)                      |                                 |        |                                 |        |
| High   | -0.546 (-0.701, -0.392)         | <0.001 | -0.336 (-0.501, -0.171)         | <0.001 |

high/very high on job satisfaction, 82.2% expressed high/very high on the perceived quality of nursing care, and 28.4% conveyed likely/very likely to leave in the following year. In this study sample, nurses' work engagement levels were significantly impacted by nurses' job satisfaction, perceived quality of care, and intent to leave. Nurses who reported higher job satisfaction, higher quality of care, and lower intent to leave exhibited greater work engagement. As for demographics, the linear regression analysis showed that nurses who were older, identified as White, and held Doctorate degrees reported higher levels of work engagement in comparison to their counterparts. These findings confirmed the concepts and relationships proposed in the theoretical model, as shown in Fig. 1.

This study found that nurses' work engagement was lower than

the existing literature findings, especially before the COVID-19 pandemic [22–26]. These findings were expected but concerning because of the COVID-19 pandemic impact and the current social and economic challenges. The current challenges require a highly engaged nurse workforce, which is essential to maintain the vibrancy and energy of an organization. Healthcare organizations have been striving to improve employee work engagement. High levels of work engagement have been shown to have significant, positive relationships with nurses' improved perceptions of job satisfaction, quality of care, and personal health [3,11]. Nurses' work engagement, job satisfaction, nursing care quality, and retention are closely interrelated. Nurses' work engagement is positively associated with improved patient outcomes, including patient

satisfaction and safety [3,11]. Nurses' job satisfaction is correlated to intent to leave [27,28] and can fully mediate the relationships between work engagement and intent to leave [2]. Job satisfaction and work engagement were important mediators in the relationship between nurses' intention to stay and their organizational awareness and attitude toward work [29]. Nurses' job satisfaction had a negative relationship with the intent to leave [30].

Regarding influencing factors, nurses' work engagement, satisfaction, and retention can be affected by many factors. Work engagement is contingent on contextual factors (i.e., structural empowerment, social support) and personal characteristics (i.e., efficacy, optimism) [22]. Nurses' difficult working conditions and perceived risks, such as psychological and physical risks, can significantly decrease work engagement and retention while worsening staffing shortages [31]. Challenging work environments also contribute to the overall negative outcomes in nursing, leading to high work-related stress [32], high compassion fatigue [33,34], burnout [34,35], and post-traumatic stress [34,35]. Nurses' work engagement is significant in mediating nurses' job satisfaction and patients' care quality and influences the relationship between organizations' collaborative environment and nurses' job satisfaction and turnover intention [11]. Intent to leave is another sensitive topic in the current nursing workforce literature.

Authors of research studies [36,37] expressed concerns about nurses leaving the profession during the COVID-19 pandemic. This study found that about 30% of the nurses reported their intent to leave within the following year, and another 26% were undecided. According to the findings of the linear regression analysis, nurses who were older, self-identified as Caucasian, and held Doctorate degrees reported higher levels of work engagement in comparison to their counterparts. These findings are consistent with existing research that indicates the unfavorable impact of racism-related stress on nurses' engagement and practice, particularly among stigmatized racial groups [38]. Other research also found that employees who were 50 years or older had significantly higher work engagement scores than those younger than 50 years of age [39]. Research explains that older workers may likely invest more effort in their work and have higher levels of resilience and persistence when facing difficulties [40]. This study underscores the significance of considering age as a contributing factor to work engagement levels among nurses. It further emphasizes the importance of recognizing and addressing racism-related stress and age-related factors in promoting psychological resilience and creating an inclusive work environment that supports the well-being and engagement of nurses from diverse backgrounds. Healthcare organizations should prioritize diversity, equity, and inclusion initiatives to foster an environment that values and leverages the strengths of all employees.

The analysis also revealed a positive association between higher job satisfaction and lower intent to leave, both of which were linked to higher work engagement among nurses. These findings underscore the importance for healthcare organizations and nurse leaders to identify and address the underlying causes and develop effective solutions for improving retention. Strategies aiming to enhance job satisfaction and retention among young, minority, and associate/diploma nurses should be prioritized to enhance their work engagement.

This study found that certified nurses had high or very high job satisfaction compared with non-certified nurses, providing evidence for healthcare organizations to explore ways to support nurses to pursue continued professional development that leads to obtaining specialty certifications. Nurses' specialty certification status may positively correlate with nurses' job satisfaction and a sense of belonging and engagement [41,42]. Nurses' certification status, the validation of mastery of specialty knowledge beyond the

scope of an RN licensure, is also related to better nurse engagement and healthcare quality [43,44]. Research indicates that specialty certification may promote professionalism and patient care quality through improved engagement, commitment, accountability, and continuing professional development and learning [42–44]. Continuing professional development, such as obtaining and maintaining specialty certifications, is a key factor related to job satisfaction and should be targeted by nurse leaders to improve job satisfaction, retention, quality of care, and productivity among nurses [41].

Nurses play a critical role in responding to emergencies and disasters, including infectious disease outbreaks, natural disasters, and acts of terrorism. They often face intense stress, trauma, and burnout while providing care during such events. Therefore, identifying effective coping strategies can help nurses maintain resilience, prevent burnout, and provide better patient care. The analysis of coping strategies can also help healthcare organizations and policymakers develop effective interventions to support nurses and promote their mental health and well-being. Nurse leadership plays a significant role in establishing and maintaining a healthy work environment and enhancing nurses' work environments, job satisfaction, and intent to stay [45,46,47]. Based on the existing literature and a newly published research study regarding organizational culture and roles in promoting nurse specialty certification [36], specific strategies are proposed below:

- (1) Promoting an organizational culture that supports nurses to get specialty certifications: An organization's culture/atmosphere determines its employees' behaviors. If organizations have policies that emphasize nurses' professional development and specialty certifications, nurses will have a better chance to study and obtain certificates.
- (2) Sharing resources with nurses: Study materials are expensive. Nurse leaders may initiate an undertaking to share resources at work, sending a positive message to encourage nurses to study for the certification exam and promoting nurses' sense of ownership and belonging. A sense of ownership and belonging is essential in promoting nurses' resilience and well-being, especially during challenging times.
- (3) Mentoring and role modeling: Nurse leaders play an essential role in promoting work engagement by fostering such contextual factors through leadership support and access to resources and cultivating those personal characteristics in their staff.
- (4) Recognizing nurses' efforts and accomplishments: When being recognized, nurses feel valued, which is essential for promoting nurses' job satisfaction and work engagement.
- (5) Cultivating a sense of meaning, purpose, and support: These strategies are especially important during complex and challenging times, such as the COVID-19 pandemic. Organizations need to help nurses create meaning and purpose for professional development, including obtaining specialty certifications to increase nurses' sense of achievement and pride. These strategies can also mitigate nurses' burnout symptoms.
- (6) Organizations should recognize biographical differences regarding work engagement and develop individual plans to provide professional counseling and support as needed.

Nurse leaders need to explore ways to promote nurse job satisfaction to improve nurses' work engagement which is positively associated with nurses' perception of nursing care quality and negatively related to the intent to leave. As indicated in the Convergent Care Theory, healthcare is a complex system that

encounters uncertainty and unpredictability from patients' care perspectives and the complexity and intricacies of the multi-layered stakeholders. It requires the synergy of all stakeholders, including healthcare organizations, leaders, teams, and individuals, to work together to achieve the best outcomes. It is important to continually evaluate nurses' work environments, professional life quality, and job satisfaction to provide the most optimal work environments that facilitate excellent nursing care for the patients and health outcomes for nurses.

## 6. Limitations and recommendations

This online survey study has several limitations. One limitation is the potential for self-selection bias. This study sent the survey link to nurses via email, and participants took the survey voluntarily. However, those who chose to participate in this study might only represent some of the target nurse population, leading to skewed results. More specifically, most of the participants were specialty-certified nurses. Are the specialty-certified nurses more motivated to complete the survey, or do their positions allow additional time to complete surveys? Secondly, online surveys rely on participants' self-reporting, which may be subject to response biases and inaccuracies. Nurse respondents may have provided socially desirable responses or not have accurately recalled or reported information, which could affect the validity and reliability of the data collected. But because there were no interactions between participants and researchers, it was challenging for researchers to clarify responses or probe into their answers.

Additionally, online surveys may exclude individuals, such as those with limited internet access, which might have limited some potential participants, resulting in a biased sample. Furthermore, online surveys need more control over the survey environment. This limitation made it challenging to ensure consistent conditions for this study, leading to distractions or incomplete responses. Lastly, because the data were collected at a single point in time, we could not explore the cause and effect among the variables, such as does certification cause job satisfaction or does job satisfaction make one desirous of additional education and certification. Thus, longitudinal and intervention studies are needed to explore the underlying cause and effect. Further research may also explore the impact of factors, such as organizational culture, interprofessional collaboration, and leadership types, on work engagement, job satisfaction, and patient care qualities.

## 7. Conclusions

This study confirmed the interconnectedness of the variables studied and highlighted the differences in job satisfaction between nurses with and without specialty certifications and other influencing factors. The nurses' responses are vital to determine the health of the nursing profession and highlight areas for improvement. Since there is a significant difference in job satisfaction between certified and non-certified nurses, organizations and nurse leaders may explore ways to promote nurses' job satisfaction and thus improve their work engagement, which is positively correlated with nursing care quality and negatively associated with intent to leave. Another critical approach for healthcare organizations and nurse leaders is to provide more support and resources to male, minority, and associate/diploma nurses.

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## CRedit authorship contribution statement

**Holly Wei:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing - original draft, Writing - review & editing, Project administration. **Leann Horsley:** Writing - original draft preparation, Writing - review & editing. **Yan Cao:** Data curation, Writing - original draft preparation, Writing-reviewing & editing. **Lisa M. Haddad:** Writing - original draft preparation, Writing - review & editing. **Katherine C. Hall:** Writing - original draft preparation, Writing - review & editing. **Roslyn Robinson:** Writing- original draft preparation, Writing - review & editing. **Margaret Powers:** Writing - original draft preparation, Writing - review & editing. **Debra Anderson:** Writing - original draft preparation, Writing - review & editing.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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## Appendix ASupplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2023.09.010>.

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