




## ORIGINAL ARTICLE

# Predictors of the intentions to leave among nurses in an academic medical center

Aoi Sato MD<sup>1</sup> | Yoshiteru Sato MD<sup>1</sup> | Norio Sugawara MD, PhD<sup>1,2</sup>  |  
Masataka Shinozaki MD, PhD<sup>1</sup> | Hiroaki Okayasu MD, PhD<sup>1</sup>  |  
Yasushi Kawamata MD, PhD<sup>1</sup> | Keita Tokumitsu MD<sup>1</sup> | Yumiko Uchibori BS<sup>3</sup> |  
Tomie Komatsu BS<sup>3</sup> | Norio Yasui-Furukori MD, PhD<sup>1</sup>  | Kazutaka Shimoda MD, PhD<sup>1</sup>

<sup>1</sup>Department of Psychiatry, Dokkyo Medical University School of Medicine, Tochigi, Japan

<sup>2</sup>Health Services Center for Students and Staff, Dokkyo Medical University, Tochigi, Japan

<sup>3</sup>Department of Nursing, Dokkyo Medical University Hospital, Tochigi, Japan

**Correspondence**

Norio Yasui-Furukori, MD, PhD, Department of Psychiatry, Dokkyo Medical University School of Medicine, 880 Kitakobayashi, Mibu, Tochigi 321-0293, Japan.  
Email: [furukori@dokkyomed.ac.jp](mailto:furukori@dokkyomed.ac.jp)

**Funding information**

Japan Agency for Medical Research and Development, Grant/Award Numbers: JP19dk0307083, JP20dk0307081; Grants-in-Aid for Scientific Research from the Japan Society for the Promotion of Research, Grant/Award Numbers: 20K07134, 21K07486

**Abstract**

**Aim:** Nurses are an essential human resource for the healthcare system. However, high turnover of nurses is a current issue. Reducing the high turnover of nurses is crucial for facilitating the sustainable provision of care in hospitals. The purpose of this study was to explore the factors affecting nurses' intentions to leave among nurses in an advanced medical center.

**Methods:** Using a cross-sectional design, we conducted a questionnaire survey of nurses working at an academic medical center in August 2020. Of the 1063 distributed questionnaires, there were 821 (77.2%) valid responses. The questionnaire included items on the Kessler 6 (K6), New Brief Job Stress Questionnaire (New BJSQ), Organizational Justice Questionnaire (OJQ), and intention to leave a hospital job.

**Results:** Overall, the mean age of the nurses was  $34.3 \pm 10.1$  years and 87.8% (721/821) of them were female. Among respondents, 19.5% (160/821) had a strong intention to leave. After adjusting for all the variables, a logistic regression analysis revealed that longer working hours, job rank (staff nurse), work-self-balance positive (imbalance), workplace harassment (no bullying), and interactional justice (unfair supervisor) were determinants associated with strong intentions to leave.

**Conclusions:** Approximately one-fifth of nurses working at advanced medical center had a strong intention to leave. However, our findings can help managers predict the turnover of nurses by understanding occupational characteristics. Managing work-self-balance and treating staff fairly could improve work environments. Further research focusing on the outcome of actual turnover rather than intention to leave is needed.

**KEYWORDS**

intentions to leave, management, nurses, university hospital, work environments

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2022 The Authors. *Psychiatry and Clinical Neurosciences Reports* published by John Wiley & Sons Australia, Ltd on behalf of Japanese Society of Psychiatry and Neurology.

## INTRODUCTION

Nurses are an essential human resource for healthcare systems. The increasing elderly population has increased the demand for health-care by nurses in OECD countries,<sup>1</sup> and high turnover in nurses is a current issue.<sup>2</sup> Nursing has been recognized as a highly stressful occupation,<sup>3</sup> and higher stress could result in nurse turnover.<sup>2</sup> The turnover of nurses leads to increased costs related to recruiting new staff and arranging orientation programs.<sup>4</sup> Furthermore, an understaffed work environment is associated with a lower quality of nursing care, resulting in increased mortality.<sup>5</sup> It is crucial to improve nurse retention to facilitate the sustainable provision of care in hospitals. When nurses decide to leave their jobs for personal reasons, the roles of managers to prevent it are ethically and practically limited. However, if such decisions are based on occupational conditions and organizational culture, managers can intervene.<sup>6</sup>

Previous studies have investigated the factors of nurse retention,<sup>7-9</sup> and the factors are classified into four levels consisting of the individual, job-related, interpersonal and organizational levels.<sup>2</sup> To date, several interventions targeting nurse retention have been tested.<sup>10-12</sup> However, a recent systematic review investigating the usefulness of interventions failed to find components of successful interventions.<sup>10</sup> Previous findings indicate that higher intention to leave is a strong predictor of resignation.<sup>13,14</sup> Given the high turnover in nurses, it is necessary to clarify the factors affecting nurses' intentions to leave.

Previous studies were conducted mostly at regional hospitals. There are few reports focusing on employees working in academic medical centers, which are regarded as hospitals that provide not only the best possible clinical care but also the education and research environment. Academic medical centers play a wider range of roles than regional hospitals, and nurses working at such centers might encounter more occupational stress. Different working conditions based on institutional characteristics might result in novel indicators of turnover in nurses.

In this study, we focused on nurses working at an academic medical center. The objectives of this investigation were as follows: (1) to evaluate the degree of intention to leave of nurses and (2) to explore the factors affecting intentions to leave among nurses in an academic medical center.

## SUBJECTS AND METHODS

### Study subjects

Using a cross-sectional design, anonymous self-administered pen-and-paper questionnaires were distributed to 1063 nurses working at Dokkyo Medical University School of Medicine from the end of July to the beginning of August 2020. The total number of valid responses for age, gender, and intention to leave was 821 (77.2%). This study was approved by the Bioethics Committee of Dokkyo Medical

University (ref: 29112), and it complies with the Declaration of Helsinki and the Japanese Ethical Guidelines for Medical and Health Research Involving Human Subjects.

### Sociodemographic and employment characteristics

The participants completed anonymous questionnaires including questions about their sociodemographic backgrounds (age, gender, marital status, habitual alcohol intake, and education) and employment characteristics (working hours per week, job rank, and night shift). Marital status was categorized as follows: single, married, or others (widows and divorced). Habitual alcohol intake was evaluated on the basis of responses ("yes" or "no") to the following question: "Do you drink three times or more in a week?" Education was classified as nursing school, junior college, or university. Regarding working hours per week, respondents were asked to answer with the following categories: <40, 40-49, 50-59, and ≥60 h. Job rank was categorized as follows: staff nurse, subchief nurse, or chief nurse. Night shift was evaluated on the basis of responses ("yes" or "no") to the following questions: "Do you work in night shifts?"

### Comprehensive psychological distress

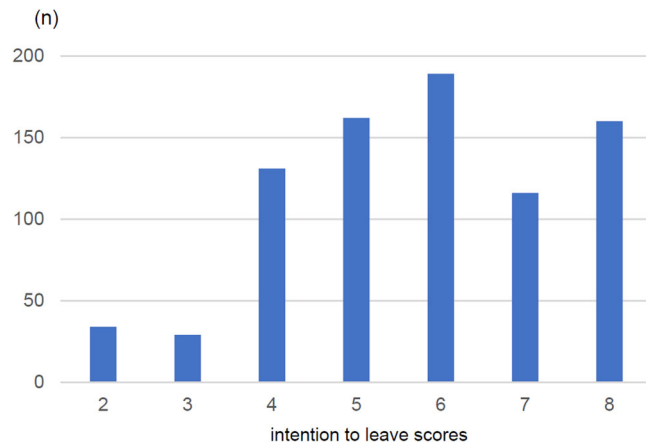
The participants' comprehensive psychological distress was assessed with the Kessler 6 (K6).<sup>15,16</sup> The K6 comprises six questions pertaining to the assessment of psychological distress, and higher K6 values indicate higher levels of psychological distress. In line with the recommended K6 cutoff point, any participants with total scores >13 were defined as having severe psychological distress.<sup>17</sup>

### Occupational stress

Job-related stress was assessed with the New Brief Job Stress Questionnaire (New BJSQ).<sup>18</sup> The following measures were selected from the New BJSQ: emotional demand, role conflict, role clarity, career opportunity, predictability, work-self-balance (negative), work-self-balance (positive), supervisor support, coworker support, support from family and friends, workplace harassment, and workplace social capital. The included items were assessed on a four-point scale with possible responses of "strongly agree," "agree," "disagree," and "strongly disagree." Higher scores indicated lower stress levels.

### Questionnaire for organizational justice

The participating employees' perceptions of fairness were measured using the Organizational Justice Questionnaire (OJQ).<sup>19</sup> The Japanese version of the OJQ is based on Elovainio's scale,<sup>20</sup> which is a modified version of the original scale developed by Moorman.<sup>21</sup> The OJQ consists of a seven-item procedural justice subscale and a



**FIGURE 1** Frequency distribution of intention to leave scores among nurses. The lowest score is 2 and the highest score is 8.

six-item interactional justice subscale. All the items of both subscales were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), and higher scores indicated higher levels of organizational justice.

### Intention to leave a hospital job

The examined outcome, namely, the participants' "intention to leave", was measured using the original two items: "I intend to continue working at this hospital" and "I intend to leave this hospital if I get a favorable job offer." The first query was rated according to four response choices: "strongly agree = 1," "agree = 2," "disagree = 3," and "strongly = 4 disagree," while the second query was inversely rated with the same choices. The lowest score is 2, and the highest score is 8. Higher scores indicated higher levels of the intention to leave a hospital job. Higher scores of intention to leave are associated with actual resignation,<sup>13,14</sup> and the frequency distribution of intention to leave scores among our participants was bimodal (Figure 1). Therefore, participants with total scores of 8 were defined as having strong intentions to leave. For the participants in this study, the  $\alpha$  coefficients of the intention to leave items were acceptable ( $\alpha = 0.72$ ).

### Statistical analysis

A t test and a  $\chi^2$  test were used to compare the group with strong (total scores of 8) intention to leave and others (total scores of 2–7). Due to the skewed distribution of intention to leave scores, a logistic regression model was used to perform multivariate analysis. In the analysis, the dependent variable was strong intention to leave of nurses, and the independent variables were sociodemographic and employment characteristics, K6 scores, New BJSQ measures, and OJQ subscales. The number of patients used in the analysis without missing values was 696. All analyses were conducted using SPSS

Statistics version 25.0 statistical software, and the significance level was set to 0.05 (two-tailed test).

## RESULTS

Figure 1 shows the frequency distribution of intention to leave scores among nurses. Among respondents, 19.5% (160/821) had a strong intention to leave. Table 1 contains the sociodemographic and occupational factors of the participants. When analyzing the association of participants' characteristics with the degree of intention to leave, there were differences in age, marital status, job rank, K6 score, New BJSQ measures (emotional demand, role conflict, career opportunity, predictability, work–self-balance negative, work–self-balance positive, supervisor support, workplace social capital), and OJQ subscales (procedural justice and interactional justice).

A logistic regression analysis revealed that longer working hours, job rank, New BJSQ measures (work–self-balance positive and workplace harassment), and OJQ subscales (interactional justice) were associated with strong intentions to leave (Table 2).

## DISCUSSION

Approximately one-fifth of nurses working at academic medical center had a strong intention to leave a hospital job. After adjusting for all the variables, longer working hours ( $\geq 60$ ), job rank (staff nurse), work–self-balance (positive) (imbalance), workplace harassment (no bullying), and interactional justice (unfair supervisor) showed significant associations with strong intentions to leave.

Among nurses with a strong intention to leave, 12% answered that they worked 60 h or more per week. Some studies indicating an association between longer working hours and intention to leave supported our results.<sup>22,23</sup> However, several studies did not show such an association.<sup>24–26</sup> Unmeasured factors, such as the character of the institution or organization, might affect the abovementioned inconsistent results. Although professional training does not increase job satisfaction,<sup>27</sup> nurses working in academic medical centers might have more duties of such activities than those in regional hospitals.

Work–life balance (WLB) is an important concern for all workers, and it could play a key role in nurse retention. In our participants, nurses with a strong intention to leave showed poorer status of work–self-balance than those without it. A longitudinal study conducted in Japan showed that nurses with the ability to act to achieve WLB showed a lower intention to leave than those without it.<sup>28</sup> In addition to a direct effect on intention to leave, poor WLB could be a mediator between occupational stress and psychological health.<sup>29</sup> Indeed, poor WLB could affect intention to leave. However, some demographic and occupational factors, such as the number of children and work wards/units, could have a moderating effect on intention to leave.<sup>30</sup> While having children increased the intention to leave among nurses in the child-rearing generation, it did not among those in other generations.<sup>31</sup>

**TABLE 1** Sociodemographic and occupational characteristics of participants

	Strong intention to leave 8 points	Others 2–7 points	
Age	31.4 ± 7.9	35.0 ± 10.4	<i>p</i> < 0.001
Gender (being men)	11.9% (19/160)	12.3% (81/661)	<i>p</i> = 1.000
Married	33.1% (52/157)	46.1% (302/654)	
Others (widows and divorced)	0.6% (1/157)	1.5% (10/654)	
Habitual alcohol intake (drinking three times or more a week)	20.9% (33/158)	20.4% (133/652)	<i>p</i> = 0.913
Education			
Nursing school	71.9% (115/160)	76.2% (502/659)	<i>p</i> = 0.526
Junior college	4.4% (7/160)	3.8% (25/659)	
University	23.8% (38/160)	20.0% (132/659)	
Working hours per week			
<40	12.7% (20/158)	17.9% (117/652)	<i>p</i> = 0.089
40–49	46.8% (74/158)	50.9% (332/652)	
50–59	28.5% (45/158)	23.3% (152/652)	
≥60	12.0% (19/158)	7.8% (51/652)	
Job rank			
Staff nurse	99.3% (150/151)	88.9% (569/640)	<i>p</i> < 0.001
Subchief nurse	0.7% (1/151)	6.4% (41/640)	
Chief nurse	0.0% (0/151)	4.6% (30/640)	
Night shift (answering Yes)	88.8% (142/160)	83.5% (142/160)	<i>p</i> = 0.113
K6 score	9.9 ± 6.8	7.3 ± 5.3	<i>p</i> < 0.001
New BJSQ measures			
Emotional demand	1.7 ± 0.7	2.0 ± 0.6	<i>p</i> < 0.001
Role conflict	2.1 ± 0.6	2.4 ± 0.6	<i>p</i> < 0.001
Role clarity	2.9 ± 0.5	2.9 ± 0.4	<i>p</i> = 0.982
Career opportunity	2.7 ± 0.6	2.8 ± 0.5	<i>p</i> < 0.001
Predictability	2.3 ± 0.6	2.4 ± 0.6	<i>P</i> = 0.015
Work–self-balance (negative)	2.0 ± 0.9	2.4 ± 0.8	<i>p</i> < 0.001
Work–self-balance (positive)	1.8 ± 0.8	2.2 ± 0.7	<i>p</i> < 0.001
Supervisor support	2.1 ± 0.7	2.4 ± 0.7	<i>p</i> < 0.001
Coworker support	2.7 ± 0.8	2.8 ± 0.7	<i>p</i> = 0.144
Support from family and friends	3.3 ± 0.8	3.3 ± 0.7	<i>P</i> = 0.910
Workplace harassment	3.2 ± 0.9	3.3 ± 0.8	<i>p</i> = 0.152
Workplace social capital	2.5 ± 0.7	2.8 ± 0.6	<i>p</i> < 0.001
OJQ subscales			
Procedural justice	2.7 ± 0.8	3.1 ± 0.7	<i>p</i> < 0.001
Interactional justice	2.9 ± 1.0	3.4 ± 0.8	<i>p</i> < 0.001

Note: Data indicate mean ± standard deviation.

Abbreviations: K6, Kessler 6; BJSQ, Brief Job Stress Questionnaire; OJQ, Organizational Justice Questionnaire.

**TABLE 2** Results of logistic regression analysis predicting strong intention to leave among nurses

	Odds ratio	95% CI	Wald's value	P value
Age	0.98	0.95–1.01	1.84	0.175
Gender (being men)	0.88	0.46–1.69	0.15	0.701
Marital status (reference: single)				
Married	0.77	0.46–1.32	0.89	0.346
Others (widows and divorced)	1.05	0.10–10.71	0.00	0.969
Habitual alcohol intake				
(drinking three times or more a week)	1.28	0.75–2.20	0.81	0.367
Education (reference: nursing school)				
Junior college	2.07	0.76–5.63	2.03	0.155
University	1.00	0.60–1.66	0.00	0.995
Working hours per week				
(reference: <40)				
40–49	0.99	0.51–1.92	0.00	0.967
50–59	1.00	0.59–1.69	0.00	0.993
≥60	2.26	1.04–4.92	4.19	0.041
Job rank (reference: staff nurse)				
Chief or subchief nurse	0.07	0.01–0.60	5.94	0.015
Night shift (answering Yes)	0.94	0.45–1.95	0.03	0.871
K6 score	1.03	0.99–1.07	1.70	0.193
New BJSQ measures				
Emotional demand	0.81	0.54–1.23	0.96	0.327
Role conflict	1.01	0.64–1.60	0.00	0.963
Role clarity	1.35	0.80–2.28	1.29	0.257
Career opportunity	0.75	0.47–1.19	1.45	0.229
Predictability	1.18	0.79–1.76	0.66	0.415
Work-self-balance (negative)	0.85	0.61–1.17	1.00	0.316
Work-self-balance (positive)	0.52	0.36–0.75	11.99	0.001
Supervisor support	0.78	0.49–1.24	1.09	0.296
Coworker support	1.00	0.70–1.44	0.00	0.994
Support from family and friends	1.04	0.75–1.44	0.06	0.808
Workplace harassment	1.42	1.03–1.96	4.58	0.032
Workplace social capital	0.74	0.49–1.12	2.02	0.155
OJQ subscales				
Procedural justice	0.90	0.64–1.27	0.36	0.549
Interactional justice	0.69	0.49–0.96	4.87	0.027

Abbreviations: BJSQ, Brief Job Stress Questionnaire; K6, Kessler 6; OJQ, Organizational Justice Questionnaire; 95% CI, 95% confidence interval.

Managers should treat staff with respect in the workplace,<sup>32</sup> and organizational justice is the concept concerning employee perceptions of fairness. In our participants, nurses with a strong intention to leave felt poorer interactional justice than those without it. Interactional justice, which is defined as the quality of interpersonal treatment that focuses on

the dissemination of information, is a dimension of organizational justice.<sup>19</sup> Previous studies also showed that organizational justice could affect intention to leave in nurses both directly and indirectly.<sup>33,34</sup>

Among 72 chief or subchief nurses, only one nurse marked full scores of intentions to leave, demonstrating that the nurse

had strong intention. Our results showed that chief or subchief nurses had less intention to leave. However, a previous report concerning job rank and intention to leave in nurses did not find such an association.<sup>24</sup> Our study setting is different from that of a previous study. At academic medical centers, nurses with strong intentions to stay in a hospital job might attain a higher job rank.

In our results, a lower stress level of workplace harassment was associated with intentions to leave a hospital job in logistic regression analysis. This result is inconsistent with previous findings.<sup>34,35</sup> In univariate analysis, we did not find significant differences in the level of workplace harassment measure between nurses with and without strong intentions to leave. We have no clear explanation as to how it came in this way.

A recent systematic review showed that demographic factors (male sex, younger age, higher educational attainment, unmarried status, and working in a remote region), job satisfaction, job stress, burnout, WLB, interpersonal communication, and patient violence were related to intention to leave among overall health workers in primary care.<sup>36</sup> WLB and interpersonal communication, including interactional justice, might be common factors across areas of expertise.<sup>37</sup>

The current study also has several limitations. First, this study was conducted at a single academic medical center in certain geographic locations in Japan. After the study, 128 nurses resigned and four nurses retired in a fiscal year. In Japan, 10.6% of nurses quit their hospitals in a fiscal year.<sup>38</sup> The resignation rate of our study participants seems to be somewhat higher than national representative data. The generalizability of our findings should be cautiously interpreted. Second, our study is limited by the fact that nurses were asked about intentions to leave a hospital job. Although intention to leave is an important indicator of leaving a profession,<sup>6,39</sup> the responses of nurses may not accurately reflect resignation behavior in the future. Third, the cross-sectional nature of the study does not allow for causal assumptions between the predictors and intentions to leave. Future studies with longitudinal designs are needed to investigate these associations. Fourth, several potential factors, such as nurse staffing level, satisfaction with income, and physical and mental illness, were not assessed in our study. The nurse staffing level may be a particularly important factor.<sup>40</sup> A higher staffing level may have confounded the results. Stratification by nurse staffing level should be a feature of future studies.

In conclusion, our study revealed that longer working hours, being a staff nurse, work-self-imbalance, and poor interactional justice were associated with intentions to leave for Japanese nurses at an academic medical center. Our results carry important implications for the management of job control, WLB, and organizational justice in nursing. Promotion of WLB among nurses may aid in the prevention of job turnover. However, the interpretation of our results was hampered by the lack of data concerning actual resignations as well as nurse staffing levels, satisfaction with income, and physical and mental illness.

## PATIENT CONSENT STATEMENT

The research subjects were requested to cooperate in writing using a cooperation request form, and the survey was conducted using a self-administered questionnaire with no names. The completed forms were placed in a return envelope and deposited in a collection box, which was considered consent for the study.

## AUTHOR CONTRIBUTIONS

All authors made a significant contribution to the work reported, whether in the conception, study design, execution, acquisition of data, analysis and interpretation, or all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## ACKNOWLEDGMENTS

The authors would like to thank all coworkers of this study for their skillful contributions to the data collection and management. This study was supported by the Japan Agency for Medical Research and Development (AMED) under grant numbers JP19dk0307083 and JP20dk0307081, Health and Labor Sciences Research Grants (19GC1201), and Grants-in-Aid for Scientific Research (KAKENHI: 20K07134, 21K07486) from the Japan Society for the Promotion of Research (JSPS). The funders had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

## CONFLICT OF INTEREST

Kazutaka Shimoda has received research support from Novartis Pharma, Dainippon Sumitomo Pharma, Astellas Pharma, Meiji Seika Pharma, Eisai, Pfizer, Otsuka Pharmaceutical, Daiichi Sankyo, and Takeda Pharmaceutical and honoraria from Eisai, Mitsubishi Tanabe Pharma, Takeda Pharmaceutical, Meiji Seika Pharma, Janssen Pharmaceutical, Shionogi, Dainippon Sumitomo Pharma, Daiichi Sankyo, and Pfizer. The remaining authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

Although the data underlying the study's findings are anonymized, they contain potentially identifying or sensitive patient information. Under the ethical restrictions and legal framework of Japan, the data are unsuitable for public deposition. Please contact the Bioethics Committee of Dokkyo Medical University, which have set restrictions on data sharing. On request, the ethics committees will assess whether researchers meet the criteria for access to confidential data.

## ETHICS APPROVAL STATEMENT

This protocol for this study was approved by the Bioethics Committee of Dokkyo Medical University (Approval Number: 29112) and it complies with the Declaration of Helsinki and the Japanese Ethical Guidelines for Medical and Health Research Involving Human Subjects.



## ORCID

Norio Sugawara  <http://orcid.org/0000-0001-7058-664X>

Hiroaki Okayasu  <http://orcid.org/0000-0003-4206-307X>

Norio Yasui-Furukori  <http://orcid.org/0000-0002-4414-3770>

## REFERENCES

- Scheffler RM, Arnold DR. Projecting shortages and surpluses of doctors and nurses in the OECD: what looms ahead. *Health Econ Policy Law*. 2019;14(2):274–90. <https://doi.org/10.1017/S174413311700055X>
- Halter M, Boiko O, Pelone F, Beighton C, Harris R, Gale J, et al. The determinants and consequences of adult nursing staff turnover: a systematic review of systematic reviews. *BMC Health Serv Res*. 2017;17(1):824. <https://doi.org/10.1186/s12913-017-2707-0>
- Happell B, Dwyer T, Reid-Searl K, Burke KJ, Caperchione CM, Gaskin CJ. Nurses and stress: recognizing causes and seeking solutions. *J Nurs Manag*. 2013;21(4):638–47. <https://doi.org/10.1111/jonm.12037>
- Contino DS. How to slash costly turnover. *Nurs Manage*. 2002;33(2):10. <https://doi.org/10.1097/00006247-200202000-00003>
- Twigg DE, Gelder L, Myers H. The impact of understaffed shifts on nurse-sensitive outcomes. *J Adv Nurs*. 2015;71(7):1564–72. <https://doi.org/10.1111/jan.12616>
- MorBark E, Nissly JA, Levin A. Antecedents to retention and turnover among child welfare, social work, and other human service employees: what can we learn from past research? A review and meta-analysis. *Soc Serv Rev*. 2001;75(4):625–61. <https://doi.org/10.1086/323166>
- Falatah R, Salem OA. Nurse turnover in the Kingdom of Saudi Arabia: an integrative review. *J Nurs Manag*. 2018;26(6):630–8. <https://doi.org/10.1111/jonm.12603>
- Wakeman J, Humphreys J, Russell D, Guthridge S, Bourke L, Dunbar T, et al. Remote health workforce turnover and retention: what are the policy and practice priorities? *Hum Resour Health*. 2019;17(1):99. <https://doi.org/10.1186/s12960-019-0432-y>
- Yamaguchi Y, Inoue T, Harada H, Oike M. Job control, work-family balance and nurses' intention to leave their profession and organization: a comparative cross-sectional survey. *Int J Nurs Stud*. 2016;64:52–62. <https://doi.org/10.1016/j.ijnurstu.2016.09.003>
- Brook J, Aitken L, Webb R, MacLaren J, Salmon D. Characteristics of successful interventions to reduce turnover and increase retention of early career nurses: a systematic review. *Int J Nurs Stud*. 2019;91:47–59. <https://doi.org/10.1016/j.ijnurstu.2018.11.003>
- Kang J, Jeong YJ. Effects of a smartphone application for cognitive rehearsal intervention on workplace bullying and turnover intention among nurses. *Int J Nurs Pract*. 2019;25(6):e12786. <https://doi.org/10.1111/ijn.12786>
- Rickard G, Lenthall S, Dollard M, Opie T, Knight S, Dunn S, et al. Organisational intervention to reduce occupational stress and turnover in hospital nurses in the Northern Territory, Australia. *Collegian*. 2012;19(4):211–21. <https://doi.org/10.1016/j.colegn.2012.07.001>
- Alexander JA, Lichtenstein R, Oh HJ, Ullman E. A causal model of voluntary turnover among nursing personnel in long-term psychiatric settings. *Res Nurs Health*. 1998;21(5):415–27. [https://doi.org/10.1002/\(sici\)1098-240x\(199810\)21:5<415::aid-nur5>3.0.co;2-q](https://doi.org/10.1002/(sici)1098-240x(199810)21:5<415::aid-nur5>3.0.co;2-q)
- Hendrix WH, Robbins T, Miller J, Summers TP. Effects of procedural and distributive justice on factors predictive of turnover. *J Soc Behav Pers*. 1998;13(4):611–32.
- Furukawa TA, Kawakami N, Saitoh M, Ono Y, Nakane Y, Nakamura Y, et al. The performance of the Japanese version of the K6 and K10 in the World Mental Health Survey Japan. *Int J Methods Psychiatr Res*. 2008;17(3):152–8. <https://doi.org/10.1002/mpr.257>
- Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand SL, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med*. 2002;32(6):959–76. <https://doi.org/10.1017/s0033291702006074>
- Sakurai K, Nishi A, Kondo K, Yanagida K, Kawakami N. Screening performance of K6/K10 and other screening instruments for mood and anxiety disorders in Japan. *Psychiatry Clin Neurosci*. 2011;65(5):434–41. <https://doi.org/10.1111/j.1440-1819.2011.02236.x>
- Inoue A, Kawakami N, Shimomitsu T, Tsutsumi A, Haratani T, Yoshikawa T, et al. Development of a short questionnaire to measure an extended set of job demands, job resources, and positive health outcomes: the new brief job stress questionnaire. *Ind Health*. 2014;52(3):175–89. <https://doi.org/10.2486/indhealth.2013-0185>
- Inoue A, Kawakami N, Tsutsumi A, Shimazu A, Tsuchiya M, Ishizaki M, et al. Reliability and validity of the Japanese version of the Organizational Justice Questionnaire. *J Occup Health*. 2009;51(1):74–83. <https://doi.org/10.1539/joh.I8042>
- Elovainio M, Kivimäki M, Vahtera J. Organizational justice: evidence of a new psychosocial predictor of health. *Am J Public Health*. 2002;92(1):105–8. <https://doi.org/10.2105/ajph.92.1.105>
- Moorman RH. Relationship between organizational justice and organizational citizenship behaviors: do fairness perceptions influence employee citizenship? *J Appl Psychol*. 1991;76(6):845–55. <https://doi.org/10.1037//0021-9010.76.6.845>
- Dall'Ora C, Griffiths P, Ball J, Simon M, Aiken LH. Association of 12 h shifts and nurses' job satisfaction, burnout and intention to leave: findings from a cross-sectional study of 12 European countries. *BMJ Open*. 2015;5(9):e008331. <https://doi.org/10.1136/bmjopen-2015-008331>
- Ma Y, Chen F, Xing D, Meng Q, Zhang Y. Study on the associated factors of turnover intention among emergency nurses in China and the relationship between major factors. *Int Emerg Nurs*. 2022;60:101106. <https://doi.org/10.1016/j.ienj.2021.101106>
- Saijo Y, Yoshioka E, Kawanishi Y, Nakagi Y, Itoh T, Yoshida T. Relationships of job demand, job control, and social support on intention to leave and depressive symptoms in Japanese nurses. *Ind Health*. 2016;54(1):32–41. <https://doi.org/10.2486/indhealth.2015-0083>
- Shimizu T, Eto R, Horiguchi I, Obata Y, Feng Q, Nagata S. Relationship between turnover and periodic health check-up data among Japanese hospital nurses: a three-year follow-up study. *J Occup Health*. 2005;47(4):327–33. <https://doi.org/10.1539/joh.47.327>
- Tei-Tominaga M. Factors related to the intention to leave and the decision to resign among newly graduated nurses: a complete survey in a selected prefecture in Japan. *Environ Health Prev Med*. 2013;18(4):293–305. <https://doi.org/10.1007/s12199-012-0320-8>
- Squires JE, Hoben M, Linklater S, Carleton HL, Graham N, Estabrooks CA. Job satisfaction among care aides in residential long-term care: a systematic review of contributing factors, both individual and organizational. *Nurs Res Pract*. 2015;2015:157924. <https://doi.org/10.1155/2015/157924>
- Matsuo M, Suzuki E, Takayama Y, Shibata S, Sato K. Influence of striving for work-life balance and sense of coherence on intention to leave among nurses: a 6-month prospective survey. *Inquiry*. 2021;58:469580211005192. <https://doi.org/10.1177/00469580211005192>
- Sugawara N, Danjo K, Furukori H, Sato Y, Tomita T, Fujii A, et al. Work-family conflict as a mediator between occupational stress and psychological health among mental health nurses in Japan. *Neuropsychiatr Dis Treat*. 2017;13:779–84. <https://doi.org/10.2147/NDT.S127053>

30. Al Zamel LG, Abdullah KL, Chan CM, Piaw CY. Moderating effect of demographic characteristics on the relationship between work life quality and turnover intention: a cross-sectional study. *Florence Nightingale J Nurs.* 2021;29(2):203–11. <https://doi.org/10.5152/FNJV.2021.20069>
31. Tei-Tominaga M, Asakura K, Asakura T. Generation- common and -specific factors in intention to leave among female hospital nurses: a cross-sectional study using a large Japanese sample. *Int J Environ Res Public Health.* 2018;15(8):1591. <https://doi.org/10.3390/ijerph15081591>
32. Sugawara N, Saito M, Nakamura K. What is the purpose of the Stress Check Program? *J Occup Health.* 2016;58(6):653–5. <https://doi.org/10.1539/joh.16-0170-OP>
33. Cao T, Huang X, Wang L, Li B, Dong X, Lu H, et al Effects of organisational justice, work engagement and nurses' perception of care quality on turnover intention among newly licensed registered nurses: a structural equation modelling approach. *J Clin Nurs.* 2020;29(13-14):2626–37. <https://doi.org/10.1111/jocn.15285>
34. Cheung T, Lee PH, Yip PSF. The association between workplace violence and physicians' and nurses' job satisfaction in Macau. *PLoS One.* 2018;13(12):e0207577. <https://doi.org/10.1371/journal.pone.0207577>
35. Rhead RD, Chui Z, Bakolis I, Gazard B, Harwood H, MacCrimmon S, et al Impact of workplace discrimination and harassment among National Health Service staff working in London trusts: results from the TIDES study. *BJPsych Open.* 2020;7(1):e10. <https://doi.org/10.1192/bjo.2020.137>
36. He R, Liu J, Zhang WH, Zhu B, Zhang N, Mao Y. Turnover intention among primary health workers in China: a systematic review and meta-analysis. *BMJ Open.* 2020;10(10):e037117. <https://doi.org/10.1136/bmjopen-2020-037117>
37. Huang X, Li Z, Wan Q. From organisational justice to turnover intention among community nurses: a mediating model. *J Clin Nurs.* 2019;28(21-22):3957–65. <https://doi.org/10.1111/jocn.15031>
38. Japanese Nursing Association. Survey of hospital and outpatient nursing. 2021 [cited 2020 Sept 2]. Available from: <https://www.nurse.or.jp/home/publication/pdf/research/97.pdf> (in Japanese).
39. Takase M. A concept analysis of turnover intention: implications for nursing management. *Collegian.* 2010;17(1):3–12. <https://doi.org/10.1016/j.colegn.2009.05.001>
40. North N, Leung W, Ashton T, Rasmussen E, Hughes F, Finlayson M. Nurse turnover in New Zealand: costs and relationships with staffing practises and patient outcomes. *J Nurs Manag.* 2013;21(3):419–28. <https://doi.org/10.1111/j.1365-2834.2012.01371.x>

**How to cite this article:** Sato A, Sato Y, Sugawara N, Shinozaki M, Okayasu H, Kawamata Y, et al. Predictors of the intentions to leave among nurses in an academic medical center. *Psychiatry Clin Neurosci Rep.* 2022;1:e48. <https://doi.org/10.1002/pcn5.48>