

## ORIGINAL ARTICLE

# Health indicators as moderators of occupational commitment and nurses' intention to leave

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## Abstract

**Aim:** This study examined the hypothesis that health indicators moderate the relationship between occupational commitment and intention to leave among nurses, using a large sample in Japan.

**Methods:** A self-administered questionnaire was distributed to all registered nurses ( $N = 11,171$ ) working in group hospitals in western Japan in 2014. The questionnaire evaluated intention to leave, occupational commitment, psychological distress, cumulative fatigue, and demographic variables. After a preliminary analysis of the bivariate and multivariate associations between variables and intention to leave, we tested the interactions between occupational commitment and health indicators on intention to leave.

**Results:** Of the 5,768 returned questionnaires, data from 5,505 (49.3%) participants were analyzed. Participants' mean age was 36.27 years ( $SD = 10.37$ ). Most (95.14%) were women. According to a generalized estimating equation, the interaction of continuance occupational commitment and cumulative fatigue was significantly related to intention to leave ( $b = -0.0055$ ). Additionally, the interaction of affective occupational commitment and psychological distress was significantly related to intention to leave ( $b = 0.0079$ ).

**Conclusions:** This study clarified that the relationship between occupational commitment and intention to leave was robust for nurses in good health. Interventions aimed at reducing fatigue and improving psychological distress should be implemented to prevent the protective effects of occupational commitment on nurses' intention to leave from being compromised.

## KEYWORDS

employee turnover, health, Japan, moderator variables, nurses, occupations

## 1 | INTRODUCTION

In previous decades, there has been a cyclical nursing shortage in many countries, usually the result of increasing demand outstripping a static or a more slowly increasing

supply of nurses (International Council of Nurses, 2005). Despite the increasing demand, the supply of nurses has been reduced by the high turnover rate in this population. Nurses' turnover has been recognized as a problem in many countries, and is well-documented (Chen, Chu, Wang, &

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Lin, 2008; Hayes et al., 2006, 2012; O'Brien-Pallas et al., 2006; O'Brien-Pallas, Murphy, Shamian, Li, & Hayes, 2010). Thus, to resolve this nursing supply problem, it is essential to address nurse turnover.

Arguably the strongest direct predictor of turnover is intention to leave (Alexander, Lichtenstein, Oh, & Ullman, 1998). Although intention to leave and turnover do not have the same structure regarding predictors, they have several commonalities (Cohen, 2000), and intention to leave has been used as a predictor of turnover in many previous studies (Han, Trinkoff, & Gurses, 2015; Homburg, Heijden, & Valkenburg, 2013; Li, Galatsch, Siegrist, Müller, & Hasselhorn, 2011; Lindqvist, Alenius, Griffiths, Runesdotter, & Tishelman, 2015; O'Brien-Pallas et al., 2010; Takase, Teraoka, & Kousuke, 2014). Accordingly, many past studies have explored the predictors of nurses' intention to leave, particularly certain health indicators and psychosocial factors. Health indicators related to intention to leave include psychological distress, cumulative fatigue, and burnout, while the related psychosocial factors include job satisfaction, workload, and stressors. For instance, some previous studies showed the effects of job satisfaction on nurses' intention to leave (Applebaum, Fowler, Fiedler, Osinubi, & Robson, 2010; Ma, Lee, Yang, & Chang, 2009). Other research has shown that intention to leave among nurses increases with increased workload (Baernholdt & Mark, 2009; Chiu, Chung, Wu, & Ho, 2009; Finkleman, Laine, Leino-Kilpi, Hasselhorn, & Salanterä, 2008), greater cumulative fatigue (Tei-Tominaga, 2013; Tei-Tominaga & Miki, 2010), and poor self-rated health (de Oliveira, Griep, Portela, & Rotenberg, 2017). Nurses with high intention to leave showed significantly higher scores on measures of stressors and health problems than did nurses with low intention to leave (Estryn-Bahar et al., 2007).

Contrastingly, few studies have explored professional traits, such as occupational commitment (Lee, Carswell, & Allen, 2000; Numminen, Leino-Kipli, Isoaho, & Meretoja, 2015; Parry, 2008), as predictors of intention to leave among nurses; past research on nurses' intention to leave typically focused on physical and mental health-related factors (de Oliveira et al., 2017; Estryn-Bahar et al., 2007; Perry et al., 2016; Tei-Tominaga, 2013; Tei-Tominaga & Miki, 2010). This is perhaps because health problems are regarded as more fundamental related factors compared to professional traits. However, the overall quality of nursing care is likely to decrease if nurses with high levels of professional awareness leave their nursing jobs. Hence, it is necessary to explore the professional traits that influence nurses' intention to leave.

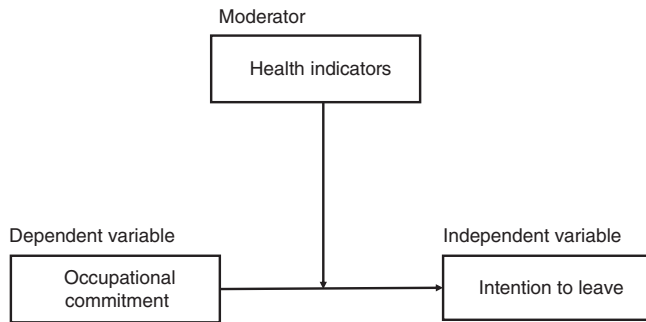
There is some evidence that occupational commitment is a good predictor of nurses' intention to leave. Lee et al. (2000) showed that occupational commitment had an indirect effect on organizational turnover intention via

occupational turnover intention. For newly graduated nurses, a high level of occupational commitment (particularly its affective, normative, and accumulated costs dimensions) was related to a lower level of intention to change the profession (Numminen et al., 2015). Affective occupational commitment was also found to protect against intention to leave one's occupation (Parry, 2008). Employees with a strong affective commitment remain with the occupation because they want to (Meyer, Allen, & Smith, 1993). Based on this past research, we expect that affective occupational commitment is a key predictor of nurses' intention to leave. Normative occupational commitment might also be a significant indicator of intention to leave or stay. Gambino (2010) discussed normative commitment as the strongest indicator of intention to remain. Thus, the overall evidence suggests that occupational commitment could be a powerful predictor of nurses' intention to leave.

Furthermore, committed persons are thought to be able to persist in their work, with commitment protecting against the negative effects of stress by enabling workers to attach direction and meaning to their work (Kobasa, 1982). In other words, commitment is one of the most important and protective variables for stress resistance. Therefore, occupational commitment might be expected to reduce the intention to leave if it effectively protects nurses from the stressors of the workplace (Lee et al., 2000; Numminen et al., 2015; Parry, 2008).

However, stress resistance factors, including occupational commitment, can be influenced by health conditions. Health conditions could also conceivably moderate or mediate the relationship between commitment and intention to leave, given that they are a fundamental determinant of work-related outcomes, including intention to leave. For instance, there is some evidence suggesting that occupational burnout—which is an indicator of physical and psychological health (McGrath, Houghton, & Reid, 1989)—is associated with worse morale and productivity among workers. Givtaj and Kalani (2016) further noted that occupational burnout is a factor related to weakened morale, while Wright and Bonett (1997) and Wright and Cropanzano (1998) found that occupational burnout is a better predictor of job performance than is job satisfaction. Health conditions are also associated with productivity loss (Zhang, Bansback, & Anis, 2011). In addition, the Centers for Disease Control and Prevention (2015) noted that workplace health programs can improve morale. Therefore, the apparently complex interrelations of health conditions with stress resistance (including occupational commitment) and intention to leave must be explored.

Based on the above background, we devised the following hypothesis: health indicators will moderate the relationship between occupational commitment and intention to



**FIGURE 1** Study hypothesis

leave among nurses (Figure 1). To verify this hypothesis, we examined how the interaction of occupational commitment and two indicators of health conditions—psychological distress and cumulative fatigue (an indicator of physical distress)—relates to intention to leave. In other words, we examined whether these health indicators moderated the relationship between occupational commitment and nurses' intention to leave, using a large sample in Japan.

## 2 | METHOD

### 2.1 | Sample and procedure

A self-administered questionnaire was distributed to all registered nurses who were not currently on maternity, childcare, or sick leave ( $N = 11,171$ ) across 28 hospitals in the same affiliated organization in western Japan in 2014. We chose the hospitals from this affiliated organization because they were advanced treatment hospitals and their standard nurse-to-patient ratio was 1:7. The nurses were instructed to complete the questionnaire and mail it individually, or to complete an online survey.

### 2.2 | Measures

Our questionnaire measured intention to leave, occupational commitment, psychological distress, cumulative fatigue, and demographic variables (age, sex, and education). The questionnaire was written in Japanese.

#### 2.2.1 | Intention to leave

Intention to leave was defined by Tei and Yamazaki (2003) as intention to change or leave one's current job. In the current study, intention to leave was assessed using a six-item scale developed by Tei and Yamazaki (2003). Each item asked about the participants' thoughts and behaviors related to resigning from their position. Responses were rated on a four-point Likert scale, ranging from 1 (none) to 4 (frequently did), where higher scores show a stronger intention

to leave. Tei and Yamazaki (2003) reported excellent internal consistency (Cronbach's alpha = 0.91) and factor validity by confirming that monophyletic factorial characteristics are consistent with theoretical assumptions.

#### 2.2.2 | Occupational commitment

Occupational commitment was theoretically defined and verified by Meyer, Allen, and Smith (1993). Meyer et al. (1993) extended the concept of organizational commitment (Allen & Meyer, 1990) to occupational domain. Meyer et al. employed a multidimensional approach to the study of occupational commitment, which provides a more complete understanding of a person's ties to his or her occupation. Meyer et al. stated that the nature of the person's involvement in that occupation might differ depending on what form of commitment is predominant. They defined three components of occupational commitment: affective, normative, and continuance. Employees with a strong affective commitment remain with the occupation because they want to, those with a strong continuance commitment remain because they need to, and those with a strong normative commitment remain because they feel they ought to do so (Meyer et al., 1993).

Occupational commitment was assessed using a 17-item scale, the Japanese version of the Allen and Meyer Three-Dimensional Occupational Commitment Scale; Satoh, Asakura, Watanabe, and Shimojo (2015) translated and examined the reliability and the validity of the scale. The scale contains three subscales that measure affective occupational commitment (six items), continuance occupational commitment (five items), and normative occupational commitment (six items). Responses were rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater occupational commitment. Satoh et al. (2015) reported adequate internal consistency (Cronbach's alpha for all items = 0.82, for the affective occupational commitment subscale = 0.84, for the continuance occupational commitment subscale = 0.69, for the normative occupational commitment subscale = 0.76). Satoh et al. also reported adequate concurrent validity for the three subscales, as supported by correlations with job satisfaction ( $r = 0.34$ ,  $0.17$ , and  $r = 0.22$ , respectively;  $P < .001$ ).

#### 2.2.3 | Psychological distress

Psychological distress was assessed using the six-item Kessler Psychological Distress Scale, Japanese version (K6). The scale was originally developed by Kessler et al. (2002). Kessler et al. (2002) verified the K6, which includes “so

depressed”, “nervous”, “restless”, “worthless”, “hopeless” and “everything an effort.”

Furukawa et al. (2008) translated the K6 into Japanese. Responses are rated on a five-point Likert scale, ranging from 1 (none) to 5 (always), where higher scores indicate worse psychological distress. The scale has good internal consistency (Cronbach's  $\alpha = 0.85$ ) and validity when compared with DSM-IV mood and anxiety disorders diagnosed using an interview conducted by a lay-person in the community sample (Sakurai, Nishi, Kondo, Yanagida, & Kawakami, 2011).

### 2.2.4 | Cumulative fatigue

Cumulative fatigue was assessed using a 13-item scale called the Cumulative Fatigue for Labour, developed by Shimomitsu (2008). This scale focuses on symptoms related to physical cumulative fatigue, although it includes a few mental symptoms (Shimomitsu, 2008). Contrasting psychological distress, which can be a maladaptive psychological response to a stressful situation, cumulative fatigue is not task specific (Bültman, Kant, Schörer, & Kasl, 2002). Responses are rated on a three-point Likert scale, ranging from 1 (none) to 3 (frequently), where higher scores show higher cumulative fatigue. Shimomitsu (2008) reported and good internal consistency for various labor samples (Cronbach's  $\alpha \geq 0.8$ ) and confirmed validity, as the scale can identify the degree of cumulative fatigue among various employees.

## 2.3 | Analyses

We first examined the bivariate associations of intention to leave with occupational commitment and the various health indicators, and then performed a multivariate analysis using a generalized estimating equation (GEE), which allowed us to analyze correlated data that otherwise could be modeled as a generalized linear model (SAS Institute Inc, 2018). These datasets can arise from clustering in which measurements are taken from participants who share a common characteristic (SAS Institute Inc, 2018). GEE assumes that each case in a cluster is not independent and correlated. For that reason, GEE shows non-standardized estimates ( $b$ ) but does not show standardized estimates ( $\beta$ ). We estimated robust standard errors to account for clustering within the hospitals. We also examined the effects of the interaction of occupational commitment and health indicators to intention to leave by GEE. Then, we tested interaction terms between occupational commitment and health indicators. Continuous variables were centered at their means (to reduce multicollinearity and facilitate interpretation of the intercepts), and significant interactions were clarified with graphs

and analyses of slopes. For the GEE, we expressed the results to four decimal places because the values were rather small. For all analyses, we used SAS version 9.13 (SAS Institute Inc, Cary, NC, USA).

## 2.4 | Ethical considerations

The ethics committee at the university where the corresponding author worked granted approval for the study on June 24, 2013. Official permission was obtained from the hospitals where the participants worked. The ethical issues concerned the participants' confidentiality and anonymity during the study period and publication process. Participants were informed of the purpose and design of this study, and the voluntary nature of their participation. Final agreement to participate in this study and publication of data were certified by individual participants by returning the questionnaire.

## 3 | RESULTS

Of the 5,768 returned questionnaires, 263 incomplete responses were excluded; thus, data for 5,505 participants (49.3%) were analyzed. Participants' demographic information is shown in Table 1. Additionally, Table 2 shows the descriptive statistics of the dependent and independent (moderator) variables of this study.

According to the GEE results, age ( $b = -0.0103$ ,  $P < .001$ ), sex ( $b = 0.9012$ ,  $P < .001$ ), education ( $b = -0.4534$ ,  $P < .05$ ), affective occupational commitment ( $b = -0.2161$ ,  $P < .001$ ), continuance occupational commitment ( $b = -0.1875$ ,  $P < .001$ ), normative occupational commitment ( $b = -0.0886$ ,  $P < .001$ ), cumulative fatigue ( $b = 0.1604$ ,  $P < .001$ ), and psychological distress ( $b = 0.2757$ ,  $P < .001$ ) were all significantly related to intention to leave (Table 3).

**TABLE 1** Participants' basic attributes

Variable	<i>n</i>	%
Sex		
Male	268	4.86
Female	5,237	95.14
Educational background		
Vocational school or junior college for registered nurses	4,641	84.31
Baccalaureate program (4-year program in nursing) or Masters program in nursing	864	15.69
	<b>Mean</b>	<b>SD</b>
Age (years)	36.27	10.37

**TABLE 2** Descriptive statistics of the variables

Variable	M	SD	Minimum	Maximum
Affective occupational commitment	21.43	3.94	6.00	30.00
Continuance occupational commitment	13.62	3.06	4.00	20.00
Normative occupational commitment	17.35	3.54	6.00	30.00
Cumulative fatigue	23.09	6.01	13.00	39.00
Psychological distress	11.44	5.07	6.00	30.00

Furthermore, the interaction of continuance occupational commitment and cumulative fatigue was significantly related to intention to leave ( $b = -0.0055$ ,  $P < .05$ ; Table 4). In other words, the effect of continuance occupational commitment on intention to leave was moderated by cumulative fatigue level, after controlling for other variables. More specifically, for nurses with low continuance occupational commitment ( $-2$  SD), intention to leave was 2.9 points higher than the mean in a subgroup with high cumulative fatigue ( $+2$  SD) while it was 1.2 points lower than the mean in a subgroup with low cumulative fatigue ( $-2$  SD; Figure 2).

Finally, the interaction of affective occupational commitment and psychological distress was also significantly related to intention to leave ( $b = 0.0079$ ,  $P < .001$ ; Table 5), indicating that psychological distress moderated the relationship between affective occupational commitment and intention to leave after controlling for other variables. For nurses with low

**TABLE 3** Generalized estimating equation for the effects of occupational commitment and health indicators on intention to leave

Parameter	<i>b</i>	SE	<i>P</i>
Intercept	-0.7994	0.1957	***
Age	-0.0103	0.0081	***
Sex	0.9012	0.2038	***
Education	-0.4534	0.1979	*
Affective occupational commitment	-0.2161	0.0147	***
Continuance occupational commitment	-0.1875	0.0193	***
Normative occupational commitment	-0.0886	0.0146	***
Cumulative fatigue	0.1604	0.0179	***
Psychological distress	0.2757	0.0188	***

Note: Independent variable: intention to leave.

*b* means estimate for generalized estimating equation.

\* $P < .05$ ; \*\* $P < .01$ ; \*\*\* $P < .001$ .

**TABLE 4** Generalized estimating equation of the effects of the interaction between continuance occupational commitment and cumulative fatigue on intention to leave

Parameter	<i>b</i>	SE	<i>P</i>
Intercept	-0.7914	0.1953	***
Age	-0.0101	0.0081	***
Sex	0.8921	0.2031	***
Education	-0.4527	0.1978	*
Affective occupational commitment	-0.2150	0.0148	***
Continuance occupational commitment	-0.1900	0.0190	***
Normative occupational commitment	-0.0900	0.0146	***
Cumulative fatigue	0.1605	0.0179	***
Psychological distress	0.2760	0.0186	***
Continuance occupational commitment $\times$ cumulative fatigue	-0.0055	0.0024	*

Note: Independent variable: intention to leave.

*b* means estimate for generalized estimating equation.

\* $P < .05$ ; \*\* $P < .01$ ; \*\*\* $P < .001$ .

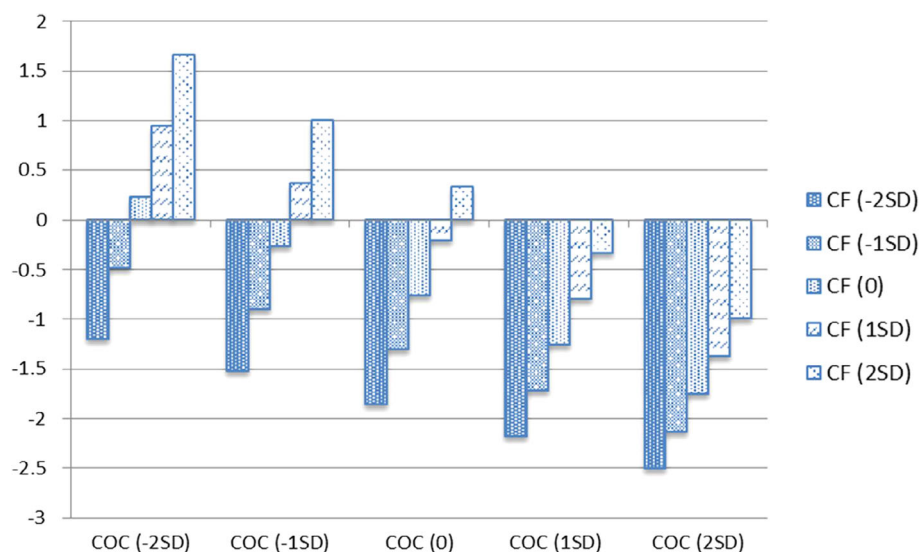
affective occupational commitment ( $-2$  SD), intention to leave was 5.9 points higher in a subgroup with high psychological distress ( $+2$  SD) than in a subgroup with low psychological distress ( $-2$  SD; Figure 3). The other interaction terms (affective occupational commitment  $\times$  cumulative fatigue, continuance occupational commitment  $\times$  psychological distress, normative occupational commitment  $\times$  cumulative fatigue, normative occupational commitment  $\times$  psychological distress) were not significantly related to intention to leave.

## 4 | DISCUSSION

This study clarified that psychological distress and cumulative fatigue served as moderators of the relationship between occupational commitment and intention to leave. The present work is novel because it focuses on health indicators as moderators of the relationship between occupational commitment and intention to leave of nurses, whereas the only past study that we know of examining moderating effects in this context focused on professionalism (a professional trait) as a moderator of the influences of work conditions and burnout on intention to leave (Numminen et al., 2015).

First, we found that cumulative fatigue moderated the effect of continuance occupational commitment on intention to leave. In other words, generally nurses who have higher continuance occupational commitment tend to have lower intention to leave. However, when nurses simultaneously have higher cumulative fatigue, their intention to leave will increase even if their continuance occupational commitment is high.





**FIGURE 2** The interaction of continuance occupational commitment and cumulative fatigue on intention to leave. COC, continuous occupational commitment; CF, cumulative fatigue

Continuance occupational commitment is viewed as a tendency to “engage in consistent lines of activity” (Becker, 1960, p. 30) based on an individual’s recognition of the costs or “lost side-bets” associated with discontinuing the activity (Allen & Meyer, 1990). This measure reflects cost-based commitment, and higher scores on the Allen and Meyer Three-Dimension Occupational Commitment Scale reflect an unwillingness to leave the occupation because of the high costs of doing so (Allen & Meyer, 1990). The current study adds new knowledge indicating that cumulative fatigue can cause people to lose their desire to continue their occupation because of their perceived investment in it.

**TABLE 5** Generalized estimating equation of the effects of the interaction between affective occupational commitment and psychological distress on intention to leave

Parameter	<i>b</i>	SE	<i>P</i>
Intercept	−0.7713	0.1952	***
Age	−0.0101	0.0080	***
Sex	0.9231	0.2014	***
Education	−0.4443	0.2013	*
Affective occupational commitment	−0.2225	0.0148	***
Continuance occupational commitment	−0.1854	0.0192	***
Normative occupational commitment	−0.0923	0.0143	***
Cumulative fatigue	0.1549	0.0181	***
Psychological distress	0.2893	0.0195	***
Affective occupational commitment × psychological distress	0.0079	0.0016	***

Note: Independent variable: intention to leave.

*b* means estimate for generalized estimating equation.

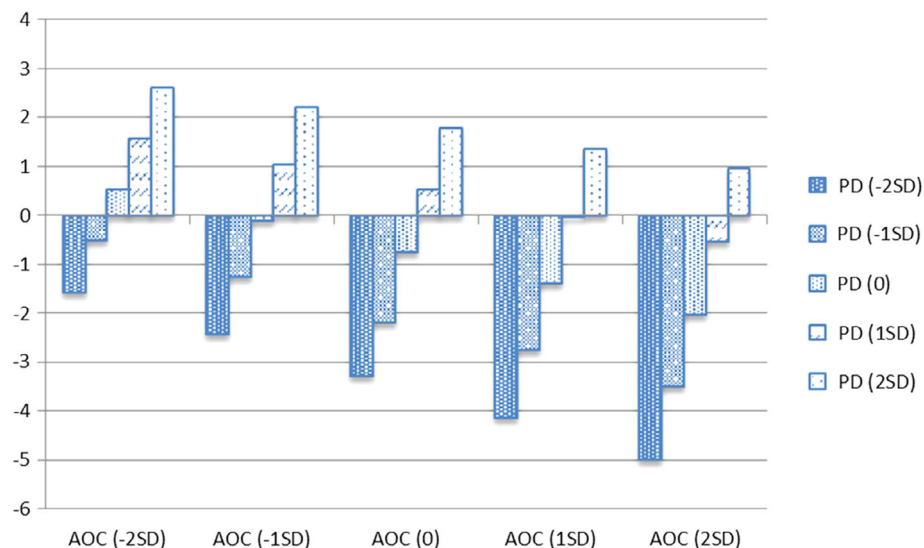
\**P* < .05.; \*\**P* < .01.; \*\*\**P* < .001.

Second, we found that psychological distress moderated the effect of affective occupational commitment on intention to leave. In other words, generally nurses who have higher affective occupational commitment tend to have lower intention to leave; however, when nurses have higher psychological distress, their higher intention to leave can be high even when their affective occupational commitment is high. According to Lee et al. (2000), commitment to one’s occupation is essentially conceptualized as a psychological link between a person and his or her occupation based on one’s affective reaction to that occupation. A person with strong occupational commitment will more strongly identify with, and experience more positive feelings about the occupation than will a person with weak occupational commitment (Lee et al., 2000). In revealing that psychological distress moderated the effect of affective occupational commitment on intention to leave, our findings suggest that psychological distress can disrupt nurses’ emotional connections to their occupation. This finding is novel in the field of occupational commitment.

We found a significant interaction effect between variables with a reasonable connection. Specifically, the connection between psychological distress and affective occupational commitment seems to be an affective domain. Bültman et al. (2002) found psychological distress to be associated with emotional demands. The connection between cumulative fatigue and continuance occupational commitment was not clear; however, this indicates that maintaining continuance occupational commitment requires a fulfilling job, especially one with latitude to making decisions. Bültman et al. showed that cumulative fatigue is particularly associated with low latitude to making decisions and passive work.

On the other hand, psychological distress did not moderate the effects of continuance occupational commitment on

**FIGURE 3** The interaction of affective occupational commitment and psychological distress on intention to leave. AOC, affective occupational commitment; PD, psychological distress



intention to leave. Additionally, cumulative fatigue did not moderate the effects of affective occupational commitment on intention to leave. These results mean that psychological distress and continuance occupational commitment, or cumulative fatigue and affective occupational commitment, independently influenced intention to leave.

Cumulative fatigue and psychological distress also did not moderate the effects of normative occupational commitment. Generally, normative commitment means a belief about one's responsibility to the organization, occupation, or profession (Allen & Meyer, 1990). Hence, normative commitment is near the “obligation domain,” but far from the “affective domain,” and so on. Therefore, the result that cumulative fatigue and psychological distress did not moderate the effects of normative occupational commitment is reasonable.

The theoretical contribution of this study is that it confirms that certain health indicators can moderate the relationship between occupational commitment and nurses' intention to leave. Previously, there has been little research considering how both occupational commitment and health indicators relate to nurses' intention to leave, and no one explored the interactional effects of these variables. This makes our study an important contribution to the general body of knowledge on nurses' intention to leave.

The results also have practical significance for nursing management. First, interventions such as reducing extra workload or job stress aimed at reducing fatigue and psychological distress among nurses should be implemented to maximize the positive effects of occupational commitment on intention to leave. Second, to reduce nurses' cumulative fatigue and to improve psychological distress, reconstruction of nurses' work environments is needed, such as reform of the shift work system for nurses. Finally, interventions such

as professional development programs should be provided to directly improve nurses' occupational commitment.

This study has some limitations. First, this study only dealt with occupational commitment as a professional trait for predicting nurses' intention to leave. For the professional traits, there are some other possible predictors for the intention to leave such as professional autonomy, professionalism, and competency. Future research should test the relationship between other professional traits and intention to leave of nurses, including the interactions with common predictor variables such as health indicators. Second, we employed a cross-sectional design; thus, data from a longitudinal survey are needed to infer causal effects.

## 5 | CONCLUSIONS

This study clarified that although higher occupational commitment was in general associated with a decreased intention to leave among nurses, cumulative fatigue and psychological distress moderated these relationships. The study findings suggest that interventions to reduce fatigue and psychological distress should be implemented to maximize the positive effects of occupational commitment on nurses' intention to leave.

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## CONFLICT OF INTEREST

The authors declare they have no competing interests.

## AUTHOR CONTRIBUTIONS

KA secured the research grant, analyzed and interpreted the data, and wrote and edited the manuscript. TA supervised research design and analysis and assisted with the revision of the manuscript. MS and IW designed the research and undertook the data collection. YH undertook the data collection and assisted with the revision of the manuscript.

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## REFERENCES

- Alexander, J. A., Lichtenstein, R., Oh, H. J. & Ullman, E. (1998). A causal model of voluntary turnover among nursing personnel in long-term psychiatric settings. *Research in Nursing & Health*, 21 (5), 415–427.
- Allen, N. J. & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology*, 63, 1–18.
- Applebaum, D., Fowler, S., Fiedler, N., Osinubi, O. & Robson, M. (2010). The impact of environmental factors on nursing stress, job satisfaction, and turnover intention. *Journal of Nursing Administration*, 40(7-8), 323–328.
- Baernholdt, M. & Mark, B. A. (2009). The nurse work environment, job satisfaction and turnover rates in rural and urban nursing units. *Journal of Nursing Management*, 17(8), 994–1001.
- Becker, H. S. (1960). Notes on the concept of commitment. *Am J Sociol*, 66(1), 32–40.
- Bültman, U., Kant, I. J., Schörer, C. A. P. & Kasl, S. V. (2002). The relationship between psychosocial work characteristics and fatigue and psychological distress. *International Archives of Occupational and Environmental Health*, 75, 259–266.
- Centers for Disease Control and Prevention. (2015). *Improve morale and organizational reputation*. Atlanta, Georgia: Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/workplacehealthpromotion/model/control-costs/benefits/morale.html>
- Chen, H.-C., Chu, C.-I., Wang, Y.-H. & Lin, L.-C. (2008). Turnover factors revisited: A longitudinal study of Taiwan-based staff nurses. *International Journal of Nursing Studies*, 45, 277–285.
- Chiu, Y. L., Chung, R. G., Wu, C. S. & Ho, C. H. (2009). The effects of job demands, control, and social support on hospital clinical nurses' intention to turn over. *Applied Nursing Research*, 22(4), 258–163.
- Cohen, A. (2000). The relationship between commitment forms and work outcomes: A comparison of three models. *Human Relations*, 53(3), 387–417.
- de Oliveira, D. R., Griep, R. H., Portela, L. F. & Rotenberg, L. (2017). Intention to leave profession, psychosocial environment and self-rated health among registered nurses from large hospitals in Brazil: A cross-sectional study. *BMC Health Services Research*, 17, 21. <https://doi.org/10.1186/s12912-016-1949-6>.
- Estryn-Bahar, M., van der Heijden, B. I., Ogińska, H., Camerino, D., Le Nézet, O., Conway, M. *et al.* (2007). The impact of social work environment, teamwork characteristics, burnout, and personal factors upon intent to leave among European nurses. *Medical Care*, 45 (10), 939–950.
- Finkleman, M., Laine, M., Leino-Kilpi, H., Hasselhorn, H. M. & Salanterä, S. (2008). Explaining young registered Finnish nurses' intention to leave the profession: A questionnaire survey. *International Journal of Nursing Studies*, 45(5), 727–739.
- Furukawa, T. A., Kawakami, N., Saitoh, M., Ono, Y., Nakane, Y., Nakamura, Y. *et al.* (2008). The performance of the Japanese version of the K6 and K10 in the World Psychological Distress Survey Japan. *International Journal of Methods in Psychiatric Research*, 17(3), 152–158.
- Gambino, K. M. (2010). Motivation for entry, occupational commitment and intent to remain: A survey regarding registered nurse retention. *Journal of Advanced Nursing*, 66(11), 2532–2541.
- Givtaj, M. & Kalani, N. (2016). Studying job burnout based on the physical conditions of the workplace and quality of work life of employees in Jahrom University of Medical Sciences. *Journal of Fundamental and Applied Sciences*, 8(3S), 1859–1868.
- Han, K., Trinkoff, A. M. & Gurses, A. (2015). Work-related factors, job satisfaction and intention to leave the current job among United States nurses. *Journal of Clinical Nursing*, 24, 3224–3232.
- Hayes, L. J., O'Brien-Palas, L., Duffield, C., Shamian, J., Buchan, J., Hughes, F. *et al.* (2006). Nurse turnover: A literature review. *International Journal of Nursing Studies*, 43, 237–263.
- Hayes, L. J., O'Brien-Pallas, L., Duffield, C., Shamian, J., Buchan, J., Hughes, F. *et al.* (2012). Nurse turnover: A literature review – An update. *International Journal of Nursing Studies*, 49, 887–905.
- Homburg, V., Heijden, B. V. D. & Valkenburg, L. (2013). Why do nurses change jobs? An empirical study on determinants of specific nurses' post-exit destinations. *Journal of Nursing Management*, 21, 817–826.
- International Council of Nurses. (2005). *The global shortage of registered nurses: An overview of issues and actions*. Geneva, Switzerland: International Council of Nurses. Retrieved from <http://www.icn.ch/publications/the-global-shortage-of-registered-nurses-an-overview-of-issues-and-actions/>
- Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S. L. *et al.* (2002). Short screening scales to monitor population prevalence and trends in non-specific psychological distress. *Psychological Medicine*, 32, 959–976.
- Kobasa, S. C. (1982). Commitment and coping in stress resistance among lawyers. *Journal of Personality and Social Psychology*, 42 (4), 707–717.
- Lee, K., Carswell, J. J. & Allen, N. J. (2000). A meta-analytic review of occupational commitment: Relations with person- and work-related variables. *Journal of Applied Psychology*, 85(5), 799–811.
- Li, J., Galatsch, M., Siegrist, J., Müller, B. H. & Hasselhorn, M. (2011). Reward frustration at work and intention to leave the nursing profession: Prospective results from the European longitudinal NEXT study. *International Journal of Nursing Studies*, 48, 628–635.
- Lindqvist, R., Alenius, L. S., Griffiths, P., Runesdotter, S. & Tishelman, C. (2015). Structural characteristics of hospital and nurse-reported care quality, work environment, burnout and leaving intentions. *Journal of Nursing Management*, 23, 263–274.



- Ma, J. C., Lee, P. H., Yang, Y. C. & Chang, W. Y. (2009). Predicting factors related to nurses' intention to leave, job satisfaction, and perception of quality of care in acute care hospitals. *Nursing Economics*, 27(3), 178–184.
- McGrath, A., Houghton, D. & Reid, N. (1989). Occupational stress, and teachers in Northern Ireland. *Work and Stress*, 3, 359–368.
- Meyer, J. P., Allen, N. J. & Smith, C. A. (1993). Commitment to organization and occupations: Extension and test of a three-component conceptualization. *Journal of Applied Psychology*, 78(4), 538–551.
- Numminen, O., Leino-Kipli, H., Isoaho, H. & Meretoja, R. (2015). Newly graduated nurses' occupational commitment and its associations with professional competence and work-related factors. *Journal of Clinical Nursing*, 25, 117–126.
- O'Brien-Pallas, L., Griffin, P., Shamian, J., Duffield, C., Hughes, F., Spence Laschinger, H. K. et al. (2006). The impact of nurse turnover on patient, nurse, and system outcomes: A pilot study and focus for a multicenter international study. *Policy, Politics & Nursing Practice*, 7(3), 169–179.
- O'Brien-Pallas, L., Murphy, G. T., Shamian, J., Li, X. & Hayes, L. J. (2010). Impact and determinants of nurse turnover: A pan-Canadian study. *Journal of Nursing Management*, 18, 1073–1086.
- Parry, J. (2008). Intention to leave the profession: Antecedents and role in nurse turnover. *Journal of Advanced Nursing*, 64(2), 157–167.
- Perry, L., Gallagher, R., Duffield, C., Sibbritt, D., Bichel-Findlay, J. & Nicholls, R. (2016). Does nurses' health affect their intention to remain in their current position? *Journal of Nursing Management*, 24, 1088–1097.
- Sakurai, K., Nishi, A., Kondo, K., Yanagida, K. & Kawakami, N. (2011). Screening performance of K6/K10 and other screening instruments for mood and anxiety disorders in Japan. *Psychiatry and Clinical Neurosciences*, 65, 434–441.
- SAS Institute Inc. (2018). *Generalized estimating equations*. Cary, NC: SAS Institute Inc. Retrieved from <https://support.sas.com/rnd/app/stat/topics/gee/gee.pdf>
- Satoh, M., Asakura, K., Watanabe, I. & Shimojo, Y. (2015). Reliability and validity of the Japanese version of the occupational commitment scale. *Journal of Japan Academy of Nursing Science*, 35, 63–71.
- Shimomitsu, T. (2008). *Comprehensive survey of job stress and cumulative fatigue for method of application to occupation*. Tokyo, Japan: Ministry of Health, Labour and Welfare. Retrieved from <http://www.tmu-ph.ac/pdf/H17H19report.pdf> (in Japanese).
- Takase, M., Teraoka, S. & Kousuke, Y. (2014). Investigating the adequacy of the competence-turnover intention model: How does nursing competence affect nurses' turnover intention? *Journal of Clinical Nursing*, 24, 805–816.
- Tei, M. & Yamazaki, Y. (2003). The impact of work and organizational characteristics on the health status, job dissatisfaction and turnover intentions of workers in an information service industry. *Sangyo Eiseigaku Zasshi*, 45, 20–30 (in Japanese).
- Tei-Tominaga, M. (2013). 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. *Environmental Health and Preventive Medicine*, 18, 293–305.
- Tei-Tominaga, M. & Miki, A. (2010). A longitudinal study of factors associated with intention to leave among newly graduated nurses in eight advanced treatment hospitals in Japan. *Industrial Health*, 48, 305–316.
- Wright, T. A. & Bonett, D. G. (1997). The contribution of burnout to task performance. *Journal of Organizational Behavior*, 18, 491–499.
- Wright, T. A. & Cropanzano, R. (1998). Emotional exhaustion as a predictor of job performance and voluntary turnover. *Journal of Applied Psychology*, 83, 486–493.
- Zhang, W., Bansback, N. & Anis, A. H. (2011). Measuring and valuing productivity loss due to poor health: A critical review. *Social Science & Medicine*, 72, 185–192.

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