Factors influencing work engagement among psychiatric nurses in Japan

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Abstract

Aim: To identify the factors influencing work engagement among psychiatric nurses.

Background: Work engagement is an essential outcome that promotes nurses' performance, but studies investigating its influencing factors remain limited in psychiatric settings. We hypothesized that job resources and personal resources positively predict psychiatric nurses' work engagement and have a particularly positive impact on engagement when job demand is high.

Methods: This cross-sectional study included 425 Japanese psychiatric nurses. Data regarding demographics, job resources, personal resources (emotional intelligence), job demand (patients' attitude toward nurses), and work engagement were collected followed by data analysis using hierarchical multiple regression.

Results: Reward, supervisor support, nurse–physician collaboration, other-emotion appraisal, and use of emotion were positively related to work engagement. Patients' unpleasant attitude toward nurses boosted the association of reward and supervisor support with work engagement.

Conclusions: Certain job resources, empathic ability, and self-motivation ability may enhance work engagement. Furthermore, reward and supervisor support may be particularly useful when psychiatric nurses face patients' unpleasant attitude.

Implications for Nursing Management: For enhancing psychiatric nurses' work engagement, nursing leaders should educate nurses' skills related to empathy and self-motivation, consider whether nurses are confronted with patients' unpleasant attitude, and improve the job resources.

Keywords: work engagement, psychiatric nursing, emotional intelligence, workplace, job demands–resources theory

INTRODUCTION

Psychiatric hospitals face many tasks, including inpatient discharge promotion (Okumura et al., 2018), treatment of elderly patients with mental disorders (World Health Organization, 2017), and risk management during psychiatric patient care (Slemon, 2017), all of which necessitate better performance by mental health care providers in their work environment. Psychiatric nurses often experience stressful events due to psychiatric patients' mental symptoms and maladaptive behaviors, such as disturbed and unpredictable behavior (Hassen & Tumah, 2018), unpleasant attitude toward nurses (Yada et al., 2011), and aggression (Fujimoto et al., 2017). These situations characteristic of psychiatry can negatively influence psychiatric nurses' mental health and performance and consequently inactivate their workplace. Therefore, identifying strategies that create an activated workplace wherein psychiatric nurses can achieve excellent performance is imperative.

Work engagement has been defined as a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption (Shaufeli et al., 2002). Vigor refers to high levels of psychological energy and mental resilience during work. Dedication is described as involvement in one's work and experiencing a sense of significance, enthusiasm, and challenge. Absorption refers to being totally immersed in and focused on one's work (Shaufeli et al., 2002). Employees with enhanced work engagement are expected to perform better by experiencing positive emotions, better health, and improved productivity (Bakker, 2011). Empirical studies have demonstrated that work engagement improves various nurse performances, such as patient-centered care among nurses working in retirement homes (Abdelhadi

& Drack-zahavy, 2012), creativity among geriatric nurses (Toyama & Mauno, 2017), and extra-role performance among nurses working in large general hospitals (Salanova et al., 2011). Furthermore, Van Bogaert et al. (2013) reported that work engagement facilitated quality of care among psychiatric nurses. These results corroborate the importance of enhancing work engagement to improve psychiatric nurses' performance.

BACKGROUND

To clarify targeted strategies that enhance work engagement, identifying potentially modifiable factors that stimulate work engagement is imperative. Previous studies have shown that reward (Adriaenssens et al., 2015; Wang et al., 2017), job control (Adriaenssens et al., 2015; Van Bogaert et al., 2017), supervisor and/or coworker support (García-Sierra et al., 2016; Poulsen et al, 2016), and nurse–physician collaboration (Van Bogaert et.al. 2017) were positively and significantly associated with work engagement. These work-related factors have been recognized as potential predictors of work engagement among nonpsychiatric nurses. Magnavita and Heponiemi (2012) have reported that the prevalence of patients' negative attitudes towards nurses, such as hostile, aggressive, annoying, or unpleasant behaviors was higher in psychiatric settings than in nonpsychiatric. Considering such a difference in job characteristics, factors related to work engagement among psychiatric nurses may also differ from those among nonpsychiatric nurses.

Studies have shown that job satisfaction and the nurse practice environment (nurse–physician collaboration and nursing management) positively affected work engagement among psychiatric nurses

(Hontake & Ariyoshi, 2018; Van Bogaert et al., 2013). Gillet et al. (2019) demonstrated that supervisor support was indirectly and positively related to psychiatric nurses' work engagement through psychological need satisfaction. However, given the sparse studies on work engagement among psychiatric nurses than among nonpsychiatric nurses, factors related to psychiatric nurses' work engagement have not been sufficiently identified. Furthermore, factors reflecting the characteristics of psychiatric nursing have not been considered in the previous studies.

First among the factors that reflect the characteristics of psychiatric nursing is patients' unpleasant attitude toward nurses, which has been recognized as one of the representative job stressors psychiatric nurses face (Hassen & Tumah, 2018). Previous studies have shown that patients' unpleasant attitude was positively correlated with psychological distress among psychiatric nurses (Yada et al., 2014; Yoshizawa et al., 2016).

Another factor important for psychiatric nurses is emotional intelligence, which is defined as "the ability to monitor one's own and others' feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and actions" (Salovey & Mayer, 1990). Given the utility of emotional intelligence for building nurse–patient relationship, which is the basis of psychiatric nursing practice, emotional intelligence has been considered a requirement for psychiatric nurses (Fitzpatrick, 2016). Previous studies have reported that emotional intelligence was negatively correlated with burnout among psychiatric nurses (De Looff et al., 2018). Additionally, based on a modification of the conceptualization of Mayer and Salovey (1990), emotional intelligence has been conceptualized as composed of four distinct

dimensions (Wong & Law, 2002), i.e., self-emotion appraisal (SEA; ability to understand one's emotions), other-emotion appraisal (OEA; empathic ability to perceive and understand other people's emotions), regulation of emotion (ROE; ability to regulate one's emotions), and use of emotion (UOE; ability to motivate oneself toward a goal). Zhu et al. (2015) have demonstrated that all four dimensions of emotional intelligence positively correlated with work engagement of nonpsychiatric nurses.

Studies on factors related to psychiatric nurses' work engagement remain limited. Furthermore, no study has yet verified whether some key variables (e.g., patients' attitude toward nurses and emotional intelligence) important to psychiatric nurses may be associated with work engagement. As such, a comprehensive exploration of factors influencing psychiatric nurses' work engagement from different aspects is necessary.

THEORETICAL MODEL

Work engagement has frequently been studied within the job demands–resources (JD-R) theory (Bakker & Demerouti, 2007; Keyko et al., 2016) in which several factors can be incorporated. Bakker (2011) proposed an evidence-based work engagement model adapted from JD-R theory. According to his model, job and personal resources positively predict work engagement and have a particularly positive impact on engagement when job demands are high. Job resources are job aspects that have motivational potential, help reach organizational goals, and can be used to deal with job demands (Bakker, 2011). The aforementioned work-related factors such as reward, job control, supervisor support, coworker support, and nurse–physician collaboration are considered job resources. Personal resources are aspects of the self

that are linked to resiliency and the ability of successful management (Hobfoll et al., 2003). Emotional intelligence dimensions are considered personal resources. Job demands are job aspects that require sustained physical and/or psychological effort and are associated with certain physiological and/or psychological costs (Bakker & Demerouti, 2007). Patients' attitude toward nurses is considered job demand.

Based on the Bakker's model (Bakker, 2011) and the presented empirical evidence, we set a hypothesized model of factors influencing work engagement among psychiatric nurses (Figure 1), comprising the following five hypotheses:

H1: Job resources (reward, job control, supervisor support, coworker support, and nurse–physician collaboration) positively predict work engagement among psychiatric nurses.

H2: Personal resources (emotional intelligence dimensions) positively predict work engagement among psychiatric nurses.

H3: Job demand (patients' attitude toward nurses) negatively predicts work engagement among psychiatric nurses.

H4: Job demand (patients' attitude toward nurses) boosts the positive relationship between job resources and work engagement among psychiatric nurses.

H5: Job demand (patients' attitude toward nurses) boosts the positive relationship between personal resources and work engagement among psychiatric nurses.

AIM

133 This study aimed to identify the factors influencing work engagement among psychiatric nurses.

134 ## METHODS

135 ### Study design

136 The current study utilized a cross-sectional and correlational design.

137 ### Sample and setting

138 Participants consisted of psychiatric nurses working at nine private psychiatric hospitals throughout
139 the Kinki region of Japan who were selected through convenience sampling. The inclusion criteria required
140 that participants be either a registered nurse or a licensed practical nurse and engaged in direct psychiatric
141 patient care. Nurse managers were excluded. To determine the appropriate sample size for this study, a
142 power analysis was conducted. Based on an α value of 0.05, 25 predictors, and a power level of 0.80, our
143 calculation revealed that 172 participants were required to obtain a moderate effect size (0.13). Assuming a
144 response rate of 25%, 688 questionnaires had to be distributed.

145 ### Instruments

146 *Work engagement*

147 Work engagement was assessed using the nine-item short version of the Utrecht Work Engagement
148 Scale (UWES-9) (Shaufeli et al., 2006; Shimazu et al., 2008), which includes three subscales measuring
149 vigor, dedication, and absorption with three items for each subscale. This scale had seven response
150 alternatives ranging from 0 (never) to 6 (always), with higher scores indicating higher work engagement.
151 The UWES-9 was found to have acceptable internal consistency, reliability, and construct validity

(Shimazu et al., 2008). Accordingly, this sample had a Cronbach's α coefficient of 0.94. The average score was calculated as an index of work engagement.

Job resources

Job resources included reward, job control, supervisor support, coworker support, and nurse–physician collaboration.

Reward was assessed using the short version of the Effort–Reward Imbalance Questionnaire (ERIQ-S) (Siegrist et al., 2009; Kurioka, 2013), which includes a seven-item reward subscale. Items were scored using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) with higher scores indicating a positive perception of reward, including mutual respect and promotion. The ERIQ-S was found to have acceptable internal consistency reliability and construct validity (Kurioka, 2013). Accordingly, this sample had a Cronbach's α coefficient of 0.64. Subscale scores were determined by summing the seven items.

Job control, supervisor support, and coworker support were assessed using the Job Content Questionnaire (JCQ) (Karasek et al., 1998; Kawakami et al., 1995), which includes a three-item decision authority (i.e., job control) subscale, a four-item supervisor support subscale, and a four-item coworker support subscale. All items were scored using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) with higher scores indicating higher perceived job control, supervisor support, and coworker support. The JCQ was found to have acceptable internal consistency reliability and construct

validity (Kawakami et al., 1995). Accordingly, this sample had a Cronbach's α coefficient of 0.69–0.94. Each subscale score was determined by summing the items within the respective subscale.

Nurse–physician collaboration was assessed using the "Collegial Nurse–Physician Relations" subscale of the Practice Environment Scale of the Nursing Work Index (PES-NWI) (Lake, 2002; Ogata et al., 2010). This subscale includes three items that were scored using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) with higher scores indicating better nurse–physician relations. The PES-NWI was found to have acceptable internal consistency reliability and content validity (Ogata et al., 2010). Accordingly, this sample had a Cronbach's α coefficient of 0.89. Subscale scores were determined by summing the three items.

Personal resources (Emotional intelligence dimensions)

Emotional intelligence was assessed using the Wong and Law Emotional Intelligence Scale (WLEIS) (Law et al., 2004; Wong & Law, 2002; Toyota & Yamamoto, 2011). The WLEIS is a 16-item scale consisting of four subscales: SEA (e.g., "I really understand what I feel"), OEA (e.g., "I have a good understanding of the emotions of people around me"), ROE (e.g., "I can always calm down quickly when I am very angry"), and UOE (e.g., "I would always encourage myself to try my best"), with four items in each subscale. This scale had seven response alternatives, ranging from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating higher self-perceived emotional ability. The WLEIS was found to have acceptable internal consistency, reliability, and construct validity (Toyota & Yamamoto, 2011).

188 Accordingly, this sample had a Cronbach's α coefficient of 0.76–0.89. Each subscale score was determined
189 by summing the items within the respective subscale.
190 *Job demand (Patients' attitude toward nurses)*
191 Patients' attitude toward nurses was assessed using the "Attitude of Patients" subscale of the
192 Psychiatric Nurse Job Stressor Scale (PNJSS) (Yada et al., 2011), which includes six items that evaluate
193 the degree to which psychiatric patients display an unpleasant attitude toward nurses (e.g., "I feel that there
194 are patients who have an unpleasant attitude toward me."). Respondents ranked each item according to a
195 100-mm visual analog scale, with each millimeter being equivalent to 1 point (response range: 0–600) and
196 higher scores indicating higher job stress due to psychiatric patients' unpleasant attitude toward nurses. The
197 PNJSS was found to have good internal consistency reliability and construct validity (Yada et al., 2011).
198 Accordingly, this sample had a Cronbach's α coefficient of 0.87. Subscale scores were determined by
199 summing the six items.
200 *Demographics*
201 Demographic variables included age, years of psychiatric hospital work experience, gender,
202 qualification (registered or licensed practical nurse), and type of ward (acute, chronic, or others).
203 **Data collection**
204 Data collection took place from August to October in 2018. Nursing directors of each hospital were
205 asked for their cooperation with this survey, all of who agreed to participate. Anonymous self-administered
206 questionnaires were subsequently distributed to all eligible nurses (N=730) working at each hospital.

Completed questionnaires were placed into envelopes, sealed, and posted to a collection box located within the wards.

Data analysis

A descriptive analysis of the study variables was conducted. Either Student's t-test or one-way analysis of variance was performed to compare mean work engagement scores between subgroups of discrete variables, while Pearson's correlation coefficients were calculated to determine correlations between continuous variables. Hierarchical multiple regression analysis with mean-centered predictor variables was conducted to estimate the strength of the association of demographics (control variables) (step 1), job resources, personal resources and job demand (step 2) and job resources*job demand interaction terms and personal resources*job demand interaction terms (step 3) with work engagement. To better explore the moderating effects of job demand, the interactions were plotted using the standardized regression coefficients of regression lines for high (1 SD above the mean) and low (1 SD below the mean) levels of the job demand. Additionally, data were checked for multicollinearity using the variance inflation factor (VIF). Statistical analysis was performed using R version 3.6.0, with $p<0.05$ being considered statistically significant.

Ethical considerations

The Institutional Review Board of the Graduate School of Health Science, Kobe University, approved this study (No 712). Participants received a written explanation of the aims, methods, voluntary

nature of the study, and the protection of anonymity. Only those who agreed to participate in the study answered the questionnaire.

RESULTS

Among the 730 nurses who received questionnaires, 425 returned completed questionnaires (response rate: 58.2%).

Sample demographics (Table 1)

Participants had a mean (± standard deviation) age and psychiatric hospital work experience of 42.12 ± 11.43 and 11.45 ± 9.13 years, respectively. The majority of the psychiatric nurses were female (66.82%) and registered nurses (83.76%). Moreover, 36.71% were engaged in acute wards, and 40.94% were assigned to chronic wards.

Work engagement (Table 2)

Participants had a mean (± standard deviation) work engagement score of 2.33 ± 1.00.

Comparison of work engagement between subgroups of study variables

No significant differences in work engagement were identified for study variables.

Correlations between study variables (Table 2)

No significant correlation was observed between work engagement and psychiatric hospital work experience. A significant negative correlation was found between work engagement and patients' attitude toward nurses. Moreover, significant positive correlations were found between work engagement and other variables.

Hypothesis testing

Hierarchical multiple regression analysis found that reward (β=0.20; p<0.001), supervisor support (β=0.10; p=0.038), nurse–physician collaboration (β=0.13; p<0.01), OEA (β=0.12; p=0.011), UOE (β=0.35; p<0.001), reward*patients' attitude toward nurses (β=0.10; p=0.028) and supervisor support*patients' attitude toward nurses (β=0.10; p=0.019) were significantly associated with work engagement (Table 3). Thereby H1, H2, and H4 were partly supported, while H3 and H5 were not supported. The significant interaction effects are presented in Figure 2 and 3. Additionally, all VIF values did not exceed 2.0 in this model.

DISCUSSION

The present study has been the first to comprehensively explore the factors influencing psychiatric nurses' work engagement from multiple aspects, such as job resources, personal resources, and job demand.

Accordingly, our results revealed that psychiatric nurses with the ability to self-motivate (UOE) tend to possess higher work engagement. This study has also been the first to show that the self-motivation dimension of emotional intelligence may play a particularly important role in enhancing work engagement among psychiatric nurses. Regarding motivation, psychiatric nurses are working in a stressful environment, and enhancing their job motivation has been recognized as an important task (Engin & Cam, 2009). However, psychiatric nurses' motivations vary according to individual characteristics (Gimba and Duma, 2015), and the approach toward strengthening them should also vary

from person to person (Gagné & Deci, 2005). Therefore, psychiatric nurses who have the ability to self-motivate may be likely to find the most effective ways of motivating themselves, achieve their goals, and consequently increase work engagement. Moreover, the present study showed that psychiatric nurses with the ability to empathize (OEA) tend to possess higher work engagement. This finding is similar to that presented in a previous study wherein a positive relationship was found between the interpersonal dimension, including empathy of emotional intelligence, and work engagement among nonpsychiatric nurses (Pérez-Fuentes et al., 2018). Empathy has been considered to cultivate a deeper interpersonal relationship between psychiatric patients and nurses (Delaney et al., 2017). Furthermore, not only are psychiatric nurses required to understand their patients' feelings and build rapport as mental health care professionals, they also hope for and derive pleasure from such actions (Hummelvol & Severinsson, 2001). Therefore, psychiatric nurses with empathic ability who succeed in building good relationships with their patients may be able to enhance work engagement by taking pride in their work and enjoying it. Unexpectedly, this study shows that the abilities to understand self-emotion (SEA) and regulate self-emotion (ROE) are not related to work engagement, which is inconsistent with a previous finding among nonpsychiatric nurses (Zhu et al., 2015). Because most psychiatric nurses use these abilities as a matter of course in the daily care for patients with mental illnesses, these abilities may not be able to become predictors of their work engagement.

Our results indicate that psychiatric nurses with a positive perception of reward, supervisor support, and nurse–physician collaboration tend to possess higher work engagement. This finding regarding

282 reward was consistent with that presented in previous studies among nonpsychiatric nurses (Adriaenssens
283 et al., 2015; Wang et al., 2017). Providing adequate rewards may be an essential job resource among all
284 nurses. The findings regarding supervisor support and nurse–physician collaboration obtained herein were
285 consistent with those obtained in previous studies among psychiatric nurses (Gillet et al., 2019; Van
286 Bogaert et al., 2013). Considering that multi-disciplinary team care is mainstream in psychiatric hospitals,
287 good relations with different positions and occupations may be particularly important factors for
288 enhancing work engagement. Here job control and coworker support were not related to work
289 engagement, which was inconsistent with previous findings on psychiatric nurses (Hontake & Ariyoshi,
290 2018). But their model did not include rewards, supervisor support, and nurse–physician collaboration. It
291 is an important finding in this area that these factors particularly enhance the work engagement of
292 psychiatric nurses.

293 On the contrary, the current study demonstrated that psychiatric patients' unpleasant attitude toward
294 nurses (job demand) did not predict work engagement. Although we assumed that patients' unpleasant
295 attitude toward nurses would decrease psychiatric nurses' work engagement based on previous reports
296 showing that such attitudes facilitate poor mental health among psychiatric nurses (Yada et al., 2014;
297 Yoshizawa et al., 2016), our results did not support this assumption. This suggests that psychiatric nurses
298 may be able to maintain work engagement even in the face of negative attitudes from patients.

299 Here the job demand was confirmed to have an important moderating role. The results demonstrate
300 that the positive impacts of reward and supervisor support on work engagement are strengthened when

301 psychiatric nurses face the patients' unpleasant attitude toward nurses (i.e., when job demand is high). The
302 patients' unpleasant attitudes are considered common phenomena in psychiatric hospitals (Hassen &
303 Tumah, 2018; Magnavita & Heponiemi, 2012), and how to cope with them has been an important issue for
304 organizations and individuals. In this respect, our findings suggest that reward and supervisor support may
305 work more effectively as facilitators of work engagement, especially in a demanding environment. Unlike
306 our expectations, the relationships between personal resources and work engagement were not affected by
307 job demand. Emotional abilities are always used in psychiatric nursing, and those effects may remain the
308 same regardless of whether the work environment is stressful.

309 **Implications for nursing management**

310 The present study showed that certain work conditions, especially reward, supervisor support, and
311 nurse–physician collaboration, were positively related to work engagement among psychiatric nurses.
312 Traditionally, nursing leaders have targeted and improved such job resources. Nonetheless, continued
313 improvement in job resources, particularly in psychiatric settings, is necessary. As rewards and supervisor
314 support work more effectively when job demand is high, nursing leaders should provide resources such as
315 rewards and support, especially for nurses who are struggling with nurse–patient relationships. On the
316 contrary, psychiatric nurses should not passively expect others to improve their work environment but
317 rather need to actively utilize their own abilities to improve their work engagement. As such, the present
318 study showed that psychiatric nurses' ability to self-motivate and empathize were facilitators of work
319 engagement. To develop self-motivation, psychiatric nurses must be made aware of the importance of

self-motivation, factors that stimulate motivation (motivators) need to be clarified, and a work environment with easy access to motivators must be established. Regarding empathic ability, an experimental study (Kahriman et al., 2016) demonstrated that empathy-based training was able to improve nurses' empathic skills. Thus, incorporating training on empathic skills into educational programs may be effective in developing psychiatric nurses' empathic ability.

LIMITATIONS

This study selected participants only from private psychiatric hospitals, which have differences in work environments from public hospitals, such as salary and security systems, which may limit the generalizability of our results. Additionally, the current study used a cross-sectional design that does not determine the direction of the relationship between work engagement and other factors.

CONCLUSIONS

The present study demonstrated that reward, supervisor support, nurse–physician collaboration, empathic ability, and self-motivation ability positively affect work engagement. Additionally, reward and supervisor support have particularly positive effects on work engagement when psychiatric nurses face patients' unpleasant attitudes. To enhance work engagement among psychiatric nurses, nursing leaders should consider the patients' attitude toward nurses, improve the work environment and encourage nurses' abilities to self-motivate and empathize.

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TABLES

Table 1

Demographics of the sample (*N*=425)

	Mean ± SD or N (%)
Age	42.12 ± 11.43
Psychiatric hospital work experience	11.45 ± 9.13
Gender	
Male	141 (33.18)
Female	284 (66.82)
Qualification	
Registered nurse	356 (83.76)
Licensed practical nurse	69 (16.24)
Type of ward	
Acute	156 (36.71)
Chronic	174 (40.94)
Others	95 (22.35)

SD, standard deviation.

Table 2

Means, standard deviations, scale reliability, and correlations of the study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Age	1												
2 Psychiatric hospital work experience	0.61**	1							.				
3 Reward	−0.14**	−0.18**	1										
4 Job control	0.16**	0.11*	0.30**	1									
5 Supervisor support	−0.10*	−0.11*	0.49**	0.27**	1								
6 Coworker support	−0.14*	−0.12*	0.36**	0.17**	0.39**	1							
7 Collaboration with physician	−0.11*	−0.08	0.31**	0.20**	0.25**	0.33**	1						
8 Patients' attitude toward nurses	−0.13**	−0.14**	−0.10*	−0.21**	−0.06	−0.05	−0.01	1					
9 EI (SEA)	0.11*	0.13**	0.03	0.13**	0.09	−0.06	−0.08	−0.19**	1				
10 EI (OEA)	−0.02	−0.05	0.06	0.14**	0.05	0.03	0.04	−0.12*	0.46**	1			
11 EI (ROE)	0.12*	0.10*	0.17**	0.21**	0.17**	0.16**	0.10	−0.31**	0.38**	0.30**	1		
12 EI (UOE)	0.10*	0.03	0.06	0.17**	0.11*	0.05	0.01	−0.19**	0.38**	0.45**	0.41**	1	
13 Work engagement	0.12*	0.04	0.33**	0.28**	0.29**	0.24**	0.24**	−0.17**	0.18**	0.30**	0.29**	0.45**	1
Response range			7–28	3–12	4–16	4–16	3–12	0–600	4–28	4–28	4–28	4–28	0–6
Mean	42.12	11.45	17.72	8.14	11.57	11.72	8.02	220.14	18.35	17.31	15.45	14.91	2.33
SD	11.43	9.13	2.55	1.47	2.55	1.70	1.72	118.92	3.88	3.71	4.09	4.02	1.00
Cronbach's α			0.64	0.69	0.82	0.94	0.89	0.87	0.89	0.76	0.79	0.81	0.94

*p<0.05; **p<0.01***; p<0.001. SD, standard deviation

EI, emotional intelligence; SEA, self-emotion appraisal; OEA, other-emotion appraisal; ROE, regulation of emotion; UOE, use of emotion

502 **Table 3**

503 Hierarchical multiple regression analysis for work engagement

	Work engagement		
	ΔR	β	SE
(STEP 1)	0.02		
Demographics			
Age		0.01	0.05
Psychiatric hospital work experience		0.03	0.05
Gender (to male)		0.03	0.09
Qualification (to registered nurse)		0.05	0.11
Type of ward (reference: acute)			
Chronic		0.05	0.11
Others		−0.07	0.09
(STEP 2)	0.32***		
Job resources			
Reward		0.20***	0.05
Job control		0.07	0.04
Supervisor support		0.10*	0.05
Coworker support		0.05	0.05
Nurse–physician collaboration		0.13**	0.04
Personal resources (EI dimensions)			
SEA		−0.05	0.05
OEA		0.12*	0.05
ROE		0.04	0.05
UOE		0.35***	0.05
Job demand			
Patients' attitude toward nurses		−0.05	0.04
(STEP 3)	0.06**		
Job resources * job demand interaction terms			
Reward*patients' attitude toward nurses		0.10*	0.03
Job control*patients' attitude toward nurses		0.03	0.04
Supervisor support*patients' attitude toward nurses		0.10*	0.04
Coworker support*patients' attitude toward nurses		−0.03	0.04
Nurse–physician collaboration*patients' attitude toward nurses		0.01	0.04
Personal resources * job demand interaction terms			
SEA*patients' attitude toward nurses		<0.01	0.05

OEA*patients' attitude toward nurses		0.03	0.05
ROE*patients' attitude toward nurses		−0.03	0.05
UOE*patients' attitude toward nurses		0.05	0.05
R^2	0.40^{***}		
Adjusted R^2	0.37		

504 * p<0.05; ** p<0.01; *** p<0.001.

505 ΔR, change in explained variance.

506 SE, standard error.

507 EI, emotional intelligence; SEA, self-emotion appraisal; OEA, other-emotion appraisal; ROE, regulation of

508 emotion; UOE, use of emotion

509

FIGURE LEGENDS

Figure 1 Hypothesized model of factors influencing work engagement among psychiatric nurses

Figure 2 Interaction effect of reward and job demand (patients' attitude toward nurses) on work engagement among psychiatric nurses

Figure 3 Interaction effect of supervisor support and job demand (patients' attitude toward nurses) on work engagement among psychiatric nurses

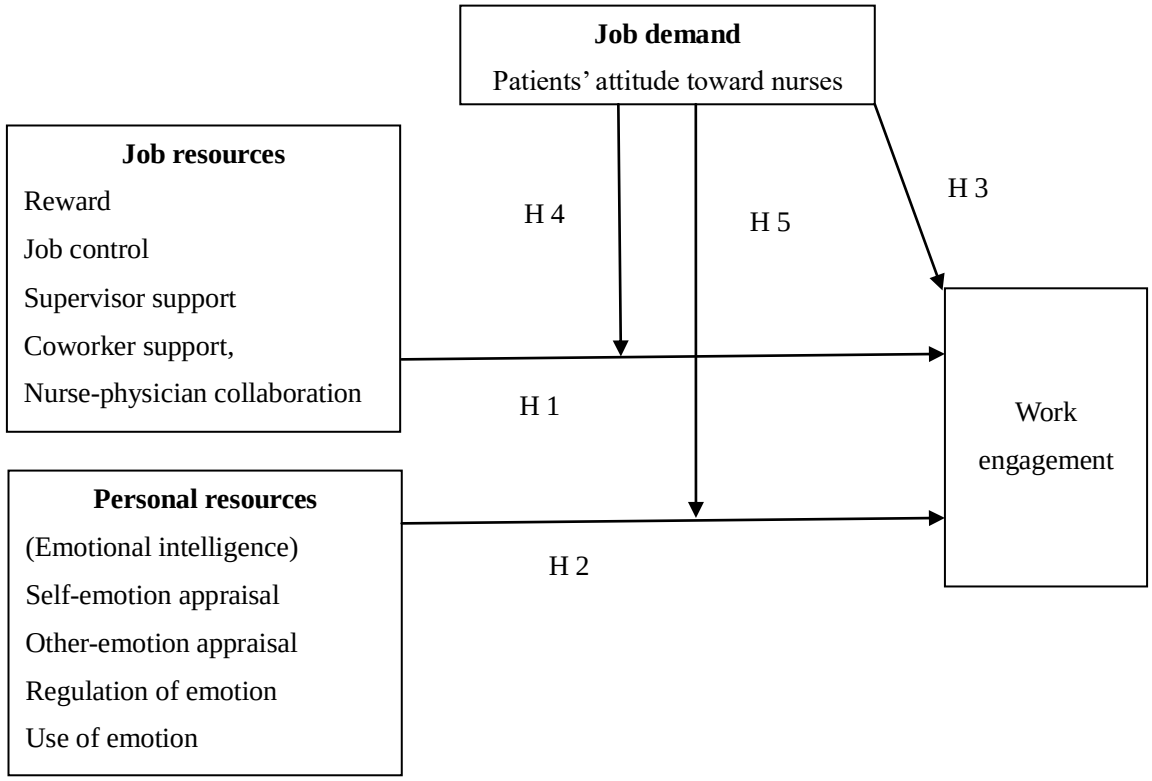
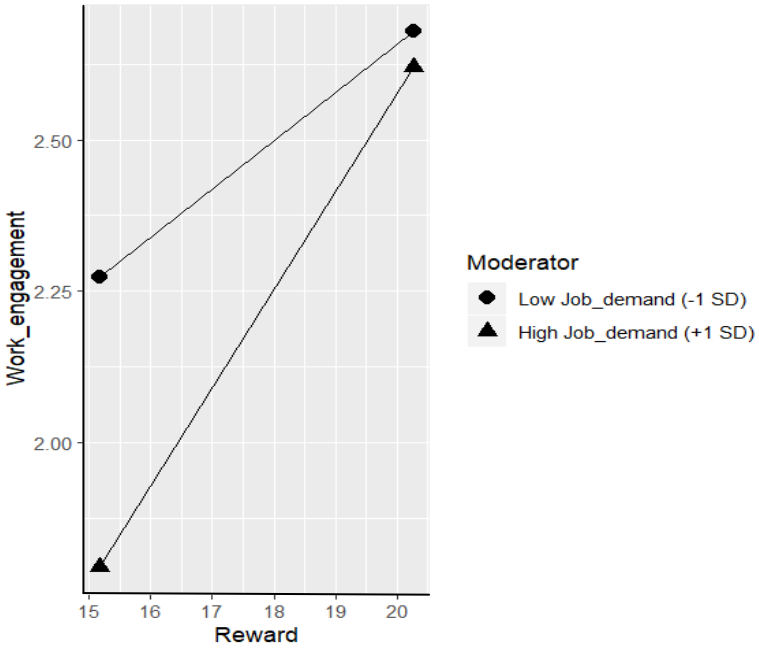

Job demand
Patients' attitude toward nurses
Job resources
Reward
Job control
Supervisor support
Coworker support,
Nurse-physician collaboration
Personal resources
(Emotional intelligence)
Self-emotion appraisal
Other-emotion appraisal
Regulation of emotion
Use of emotion
H 1
H 2
H 3
H 4
H 5
Work
engagement

Figure 1


Work_engagement
2.50
2.25
2.00
15
16
17
18
19
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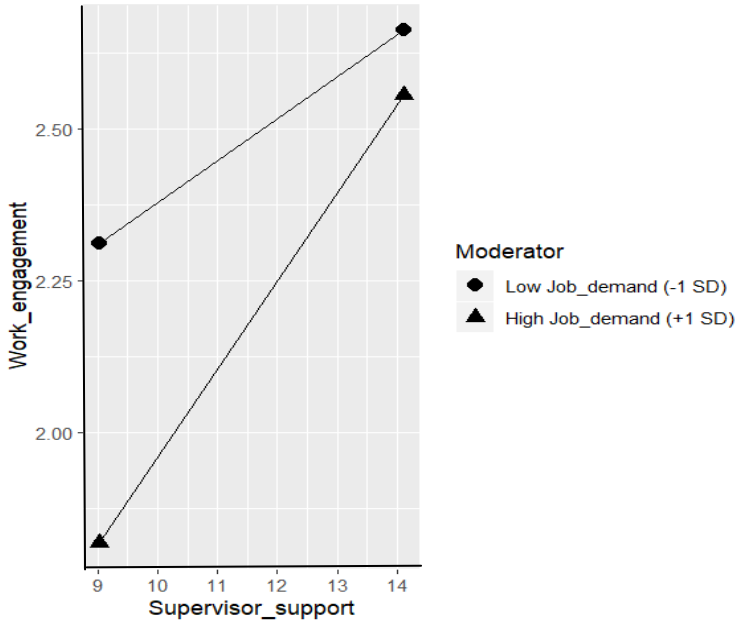
Reward
Moderator
Low Job_demand (-1 SD)
High Job_demand (+1 SD)

Figure 2



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550

551 **Figure 3**

552

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