



Psychological safety in enhancing the competence of nurse educators among early career nursing faculty in Japan: A cross-sectional study

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ABSTRACT

Background: Given the diverse roles and responsibilities expected of academic nurse educators, it is essential that they acquire relevant nursing educator competencies. Early career nursing faculty often struggle to engage in their tasks. Therefore, systematic support is crucial in developing the necessary capacities for early career nursing faculty. In organizational sociology, the positive interaction between organizational and individual resources enhances the competence of nurse educators. Psychological safety enhances organizational members' ability to cope with challenges and perform effectively. It may also foster a high sense of coherence, linked to improved job performance and competence in nursing faculty. Both psychological safety and coherence promote work engagement, further boosting nurse educator competence.

Aim: This study explored the relationships between psychological safety, sense of coherence, work engagement, and competence of nurse educators among assistant professors and assistants in nursing education.

Design: A cross-sectional survey design was used. Data were collected from 164 early career nursing faculty using an anonymous self-administered web-based questionnaire. The study measured the psychological safety, sense of coherence, work engagement, and competence of academic nurse educators. The mediating effects of a sense of coherence and work engagement on the relationship between psychological safety and competency were assessed using the PROCESS macro model. Bootstrapping with 5,000 re-samples was used to determine the significance of the mediating effects.

Setting: The study was conducted from October 1 to December 31, 2022, at nursing universities in Japan.

Results: Positive correlations were identified among psychological safety, sense of coherence, work engagement, and the competence of nurse educator. The sense of coherence and work engagement indirectly mediated the relationship between psychological safety and the competence of nurse educator. A serial multiple mediation model demonstrated that psychological

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safety indirectly influenced the competence of nurse educator through a sense of coherence and work engagement.

Conclusions: Supportive organizational environments foster a sense of coherence, enabling effective resource utilization and the competence of nurse educator development. While structured intervention programs such as faculty development are vital, establishing supportive systems that nurture adaptable qualities and use various resources is also essential. A positive work environment can create a cycle of increasing competency through positive attitudes toward work.

Contribution of the Paper

What is already known

Early career nursing faculty are often expected to handle diverse tasks without adequate preparation, leading to significant stress and suffering.

Systematic organizational support is needed to help early career nursing faculty develop their professional competence and performance as academic nursing educators.

Although various educational programs, such as faculty development initiatives, are available, they are not standardized across the country, and attending these programs can be burdensome.

What this paper adds

A sense of coherence or work engagement, enhanced by psychological safety, is a significant mediator for improving early career nursing faculty's competency.

A sense of coherence fostered by psychological safety contributes to competency by increasing work engagement.

Psychological safety encourages the development of personal resources in early-career nursing faculty, which increases positive job attitudes and enhances professional competencies.

Introduction

Nursing faculty play a multidimensional and vital role in preparing future nursing professionals (Mikkonen et al., 2018; World Health Organization, 2017; Zlatanovic et al., 2017). Nursing faculty are expected to obtain competencies encompassing educational knowledge and skills, attitudes, values, academic research, university administration, and community service (e.g., Compagnucci and Spigarelli, 2020; Czabanowska and Kuhlmann, 2021; Ryhtä et al., 2020; Salminen et al., 2021; Zlatanovic et al., 2021).

However, these extensive responsibilities often lead to considerable stress for nursing faculty, especially early career nursing faculty, owing to the overwhelming number of tasks and future uncertainty (Brown and Sorrell, 2017; Kalensky and Hande, 2017; McDermid et al., 2013; Weidman, 2013). In Western countries, qualification requirements for nursing faculty have been developed, and various faculty development programs and training initiatives for new faculty members have been implemented (Lahtinen et al., 2014; Salminen et al., 2010). Conversely, there is insufficient systematic and standardized pedagogical training for entering an academic nursing education career track. Additionally, the only requirements for early-career nursing teachers are a bachelor's degree or higher and specialized knowledge and experience in nursing, with other requirements determined by individual universities (Ministry of Education, Culture, Sports, Science, and Technology, 2021; Suzuki et al., 2019). Thus, early career nursing faculty often transition directly from clinical practice to academia without any pedagogical training, which leads to considerable stress (Doi et al., 2012; Suzuki et al., 2019). Early career nursing faculty need to understand the diverse contexts of nursing education and cultivate the ability to flexibly integrate various competencies of nurse educators (Fernandez et al., 2012; Oyamada et al., 2022). Improving early career competence of nurse educator is therefore essential and requires both self-learning and organizational support (Garner and Bedford, 2021; Groth et al., 2023; Oyamada et al., 2022; Smith et al., 2023; Sudo et al., 2014).

Faculty development programs and competency enhancement training are available at many universities. However, to generate the spare time and margin to participate in such programs, many faculty members have to adjust their teaching, research, or university administrative duties, making active participation difficult (Kameoka et al., 2008; Ohki, 2019). In addition, the construction of faculty development and instructional systems is costly in terms of implementation costs, energy, and workforce, and challenges have been noted in ongoing maintenance after construction (Nowell et al., 2017). These findings highlight the need for support that can be provided naturally as part of daily work without forcibly adjusting work and other duties. To address this issue, it is crucial to utilize the existing psychosocial resources inherent in the organizations. These resources include mentoring and practical examples from experienced senior nursing faculty, an organizational atmosphere conducive to the development of faculty members, and collaborative relationships that promote mutual support. By revitalizing these organizational psychosocial resources, both the organization and its

members can thrive and opportunities for human resource development can be provided with minimal time and effort (Malik and Garg, 2020). However, research has not been explored among early career nursing faculty using this approach.

In the field of organizational sociology, positive interactions between organizational and personal resources can enhance competencies, leading to beneficial outcomes (Fredrickson, 2001; Hobfoll, 1989; Xanthopoulou et al., 2009). Organizational resources enhance individuals' psychological resources and work engagement, which may lead to increased competencies. Additionally, enhanced work engagement can promote the psychological resources of individuals, further increasing competency (Shimazu et al., 2008; Xanthopoulou et al., 2009). Bakker et al. (2007) and Schaufeli and Bakker (2004) argue that organizational resources should be utilized to enhance job performance through increased work engagement. They also highlight the crucial role of individual resources in boosting both work engagement and job performance.

Psychological safety, defined as the shared belief that individuals can express ideas and concerns without fear of negative consequences, and organizations in which this is in place are important for newcomers (Edmondson, 1999; Edmondson and Lei, 2014), is crucial for fostering competence and professional development of early career nursing faculty, but its usefulness has not been examined with them. In organizations with high psychological safety, individuals can engage in critical discussions and collaborative problem-solving with confidence (Carmeli and Gittel, 2009; Collins and Smith, 2006). Such an environment facilitates critical team discussions (e.g., Edmondson, 1999), knowledge sharing (Gong et al., 2012; Siemsen et al., 2009), and the development of new insights and the creation of innovative solutions (Ayala Calvo and García, 2018; Edmondson and Lei, 2014; Zhou and Chen, 2021). It enhances organizational members' ability to effectively handle difficulties and crises by increasing their ability to respond to challenges, think and make decisions (Frazier et al., 2017; Newman et al., 2017; Zhou and Chen, 2021). It also fosters a positive feedback loop of improved job performance through enhanced work engagement (Basit, 2017; Kahn, 1990; May et al., 2004; Petrov et al., 2023; Salanova et al., 2023). This highlights the importance of psychological safety as an organizational resource in developing early career nursing faculty competencies, but it is not empirically evident.

An individual resource that can enhance competency is a sense of coherence. Sense of coherence is the belief that one's environment is predictable, manageable, and meaningful, and it is strengthened by alignment with shared values and resources at work (Antonovsky, 1979; Antonovsky, 1989). Sense of coherence enables effective coping with challenges by leveraging general resistance resources (Antonovsky, 1989; Mittelmarm et al., 2022) and is enhanced in work environments that promote trust and cooperation, leading to improved well-being and the competence of nurse educators (Broetje et al., 2020; Feldt et al., 2004; Tabata and Togari, 2022). A higher sense of coherence is strongly correlated with better job performance, managing multifaced roles, and overall competency, particularly among nursing faculty (Harri, 1998; Hlad'ó et al., 2022). It also promotes work engagement, which, when combined with psychological safety, further enhances the competence of nurse educator (Derbis and Jasiński, 2018; González-Siles et al., 2022; Malagon-Aguilera et al., 2019; Vogt et al., 2016). The above are still theoretical hypotheses and thus require empirical verification.

Based on these insights, this study focuses on the interaction between organizational and individual resources in enhancing the competence of nurse educator among early career nursing faculty. The following hypotheses are proposed:

H1: Psychological safety positively influences the competence of nurse educator through sense of coherence.

H2: Psychological safety positively influences the competence of nurse educator through work engagement.

H3: Psychological safety facilitates sense of coherence, and work engagement enhanced by sense of coherence contributes to increased competency.

This study will provide basic data for the construction of support measures for the competency development of early career nursing faculty in Japanese nursing colleges.

Materials and methods

Design and participants

A cross-sectional survey was implemented using anonymous, self-administered online questionnaires. Participants were academic nurse educators employed at nursing universities and members of the Japan Association of Nursing Programs.

We contacted the deans of 286 nursing universities registered with the Japan Association of Nursing Programs in Universities from April 2022 to request their participation in the survey. Nine universities affiliated with the authors' institutions were excluded as they chose not to participate. Of the universities contacted, 86 universities responded regarding their consent to participate in the survey, and access to the online survey system was provided to nursing faculty belonging to those universities. Before responding to the online survey, participants were asked to indicate their consent to participate in this study. Only those who checked the "I agree" box were taken to the survey response page. In this study, consent to cooperate in the survey was considered to have been obtained by checking the "I agree" box and sending the survey response from the online survey system.

Procedures

Data were collected using an online questionnaire, which was distributed to participating universities. There were 2621 academic nurse educators across 86 nursing universities, and 448 educators completed the survey (response rate of 17.1 %). The inclusion criteria were early career nursing faculty; that is, academic educational assistants and assistant professors holding a nursing license in nursing universities in Japan. Of the responses obtained, only data from early career nursing teachers ($n = 164$) were extracted and analyzed. The survey was conducted from October 1, 2022, to December 31, 2022.

Variables

Psychological safety

Psychological safety in the university where the participants work was assessed using the seven-item Japanese version of the Team psychological safety scale (Ishii, 2020) originally developed by Edmondson (1999). Examples of items include, “Members of this team are able to bring up problems and tough ideas,” “It is difficult to ask other members of this team for help,” and “Working with members of this team, my unique skills and talents are valued and utilized.” Responses were rated on a five-point Likert scale, ranging from 1 = “strongly disagree” to 5 = “strongly agree.” The Cronbach’s alpha was 0.83, indicating good internal consistency.

Sense of coherence

Participants’ sense of coherence was assessed using the 13-item Japanese version of the Sense of Coherence scale (Antonovsky, 1987; Togari and Yamazaki, 2005), which is distributed across three subscales: comprehensibility, manageability, and meaningfulness. Examples of items include, “Do you have the feeling that you are in an unfamiliar situation and don’t know what to do?” “How often do you have the feeling that there is little meaning in the things you do in your daily life?” and “How often do you have feelings that you are not sure you can control?” Responses to each item were rated on a seven-point semantic differential scale, with scores ranging from 13 to 91 points. A higher score indicates a higher capacity to overcome difficulties. The Cronbach’s alpha for the scale was 0.83, indicating good internal consistency.

Work engagement

Work engagement was assessed using the Japanese short version of the Utrecht Work Engagement Scale (Shimazu et al., 2008). The scale comprises nine items across three domains: vigor, which refers to high psychological energy and mental resilience at work; dedication, described as involvement in one’s work and experiencing feelings of enthusiasm, significance, and challenge; and absorption, which relates to being totally immersed in and having difficulty detaching oneself from work. Examples of items include, “At my work, I feel bursting with energy,” “I am enthusiastic about my job,” and “I am immersed in my work.” Responses were rated on a six-point Likert scale ranging from 0 = “never” to 6 = “always.” The Cronbach’s alpha was 0.94, indicating excellent internal consistency.

Competence of nurse educator

The competencies of the nursing faculty were assessed using original questionnaires developed by Satoh et al. (2020). The questionnaire comprised items based on competence deemed necessary for nursing faculty, as clarified by Satoh et al. (2020). Examples of items include, “Facilitates learning that fosters the integration of teaching on campus and nursing practice in clinical settings,” “Engages in self-improvement to enhance ethical sensitivity,” “Works on tasks of daily educational activities from a research perspective,” and “Participates in organizational management proactively.” Participants rated the extent to which each of the 15 competence items applied to them on a four-point Likert scale ranging from 1 = “not applicable” to 4 = “always true.”

Individual attributes

Participants’ demographic characteristics included sex, age group (in five-year increments from under 24 years to over 75 years), years of teaching experience, current academic position, educational level, and main affiliation (national, public, or private university).

Statistical analyses

Data analyses were performed using IBM SPSS version 29.0 (IBM SPSS Statistics for Windows, IBM Corp., Armonk, NY, United States). Descriptive statistics were used to analyze participants’ demographic characteristics, whereas Pearson’s correlation coefficients and partial correlation coefficients (controlling years of education, clinical experiment years, university affiliation, and educational background) were used to analyze the relationships between the variables. The PROCESS macro for SPSS was used to examine the mediating roles of sense of coherence and work engagement on the association between psychological safety and the competence of nurse educator. PROCESS Model 4 was used to examine the simple mediating effect of a sense of coherence and work engagement on the relationship between psychological safety and the competence of nurse educator (H1 and H2). This method was used to verify the effect of the independent variable on the mediating variable; assess the effect of the mediating variable on the dependent variable; and test the indirect effect of the independent variable on the dependent variable through the mediating variable while directly testing how the independent variable affects the dependent variable.

PROCESS Model 6 was used to examine the serial multiple mediating effects of sense of coherence (first mediator) and work engagement (second mediator) on the relationship between psychological safety and the competence of nurse educator (H3). Serial mediation is a technique that models the process by which multiple mediating variables transfer their influence in a cascading fashion, allowing the indirect influence of an independent variable on a dependent variable to be assessed through two mediating variables. In serial mediation analysis, PROCESS Macro’s Model 6 is used to simultaneously evaluate the following: 1. the influence of the independent variable (psychological safety) on the first mediation variable (sense of coherence), 2. the influence of the first mediation variable (sense of coherence) on the second mediation variable (work engagement), 3. the influence of the second mediation variable (work engagement) on the dependent variable (competence of nurse educator), and furthermore the independent variable (psychological safety)’s direct effects on the dependent variable (competence of nurse educator) were assessed simultaneously. For both

PROCESS Model 4 and Model 6, a bootstrap method with 5000 re-samples was used to test statistical robustness by estimating the 95 % confidence interval (CI) for the mediating effect. When 95 % CI did not include zero, the mediating effect was significant.

Control variables included individual attributes that could influence the competence of nurse educator. The statistical significance level (*p*-value) for all the analyses was two-tailed, with values below 0.05 considered significant.

Ethical considerations

This study was approved by the ethics committee of the authors' affiliate institution (ID 34–13) and complied with the requirements stipulated in the Declaration of Helsinki.

RESULTS

Participants' characteristics

As outlined in Table 1, about 86.0 % (*n* = 141) of the participants were women, and the average years of experience as nursing faculty was 4.84 (\pm 3.74; range: 0–17). Their primary affiliations were with private universities (53.0 %: *n* = 87). Regarding education level, 71.3 % had a master's degree (*n* = 117) and 11.0 % had obtained a doctorate (*n* = 18).

Relationship between study variables

The Pearson's correlation coefficients and the partial correlation coefficients are illustrated in Table 2. Significant correlations were observed between the competence of nurse educator, psychological safety, sense of coherence, and work engagement, both when not controlled for or controlled for by attribute variables.

Mediating roles of sense of coherence and work engagement

Our mediation analysis using PROCESS Model 4 revealed that psychological safety had a significant positive relationship with sense of coherence (β = 0.740, SE = 0.085, *p* < .001), which was positively related to the competence of nurse educator (β = 0.206, SE = 0.050, *p* < .001; Table 3). However, psychological safety did not have a significant direct effect on the competence of nurse educator (β = 0.110, SE = 0.065, *p* = .093). This supports Hypothesis 1, indicating that sense of coherence mediates the relationship between psychological safety and the competence of nurse educator, with an indirect effect of 0.152 (SE = 0.045, 95 % CI [0.068–0.245]).

Similarly, there was a positive relationship between psychological safety and work engagement (β = 0.685, SE = 0.081, *p* < .001), and work engagement was significantly positively related to the competence of nurse educator (β = 0.3255, SE = 0.049, *p* < .001). However, psychological safety had no significant direct effect on the competence of nurse educator (β = 0.040, SE = 0.060, *p* = .5114). This supports Hypothesis 2, indicating that work engagement mediates the relationship between psychological safety and the competence of nurse educator with an indirect effect of 0.223 (SE = 0.057, 95 % CI [0.123–0.349]).

Table 1
Characteristics related to the teaching backgrounds of the early career nursing faculty (*N* = 164).

Variables	n		%	
Age (years)				
25–29	11		6.7	
30–34	33		20.1	
35–39	33		20.1	
40–44	34		20.7	
45–49	32		19.5	
50–54	14		8.5	
55–59	6		3.7	
70–74	1		0.6	
Education level				
Junior nursing college or university	29		17.7	
Master's degree	117		71.3	
Doctoral degree	18		11	
Main component				
National university	24		14.6	
Public university	53		32.3	
Private university	87		53.0	
Years of teaching experience	Mean	SD	Min	Max
	4.84	3.74	0	17

Note. SD: standard deviation, Min: minimum, Max: maximum.

Table 2

Descriptive statistics and correlation coefficients among psychological safety, sense of coherence, work engagement and competency ($N = 164$).

	Pearson's correlation coefficients			Partial correlation coefficients ¹⁾			Median	Mean	SD	Min	Max
	Psychological safety	Sense of coherence	Work engagement	Psychological safety	Sense of coherence	Work engagement					
Psychological safety							29	28.45	8.9	21	84
Sense of coherence	.564***			.571***			52	52.15	11.43	7	49
Work engagement	.556***	.568***		.558***	.560***		27	26.78	10.81	1	54
Competency	.314***	.458***	.553***	.349***	.438***	.560***	41	41.29	6.86	19	59

Note. *** $p < .001$; SD: standard deviation, Min: minimum, Max: maximum.

¹⁾ Control covariates: educational level, main component of university, and years of teaching experience.

Table 3Mediation effects of SOC and work engagement on the relationship between psychological safety and competency ($N = 164$).

	B	SE	t	P	LLCI	ULCI
Psychological safety → SOC → Competency						
Total effect	0.262	0.056	4.664	0.000	0.151	0.373
Direct effect	0.110	0.065	1.688	0.093	−0.019	0.239
Indirect effect	0.152	0.045			0.068	0.245
Psychological safety → Work engagement → Competency						
Total effect	0.262	0.056	4.664	0.000	0.151	0.373
Direct effect	0.040	0.060	0.658	0.511	−0.079	0.158
Indirect effect	0.223	0.057			0.123	0.349

Note. B = unstandardized coefficient; SE = Heteroscedasticity Consistent; SE: Standard Error; SOC: Sense of Coherence; LLCI = 95 % lower limit confidence interval; ULCI = 95 % upper limit confidence interval; Boot = statistics for the indirect effects are the result of the bootstrapping method; Covariates: Educational level, main component of university, and years of teaching experience.

Serial multiple mediation analysis

A serial multiple mediation analysis revealed significant indirect effects of sense of coherence and work engagement on the relationship between psychological safety and the competence of nurse educator. The total effect of the psychological safety and the competence of nurse educator of nursing faculty was 0.262 ($SE = 0.056$, $t = 4.66$, $p < .001$, 95 % CI [0.147–0.369]). However, the total direct effect was not significant (0.283; $SE = 0.067$, 95 % CI [0.151–0.373]).

The indirect effects operated through three paths: (1) psychological safety → sense of coherence → competence of nurse educator (estimated effect = 0.080), accounting for 29.1 % of total indirect effects; (2) psychological safety → work engagement → competence of nurse educator (estimated effect = 0.124), accounting for 45.0 % of total indirect effects; and (3) psychological safety → sense of coherence → work engagement → competence of nurse educator (estimated effect = 0.072), accounting for 26.0 % of total indirect effects (Table 4; Fig. 1).

Discussion

The analysis of this study demonstrated that psychological safety indirectly enhanced competency by increasing a sense of coherence or work engagement, with psychological safety not directly affecting competency. Further, it was revealed that a sense of coherence, when enhanced by psychological safety, also contributed to the competence of nurse educator by boosting work engagement.

Sense of coherence as a mediating role of the relationship between psychological safety and the competence of nurse educator

Several studies of company employees claim that psychological safety has a direct effect on job performance (Baer and Frese, 2003; Schaubroeck et al., 2011) and that reduced occurrence of errors and mistakes allows employees to focus on their work, leading to improved performance (Faraj and Yan, 2009; Mayer and Gavin, 2005). The current results provide new theoretical insights that show that psychological safety as a psychosocial environmental resource does not directly enhance competency. Rather, it facilitates the formation and reinforcement of individual intrinsic factors, which subsequently enhance competency.

The finding that a sense of coherence enhanced by psychological safety is positively associated with increased competency suggests that psychological safety is an important organizational asset for early career nursing faculty and is consistent with previous research on general workers (Edmondson and Lei, 2014; Frazier et al., 2017; Newman et al., 2017).

Psychological safety fosters an environment of mutual trust and honesty among team members, potentially enhancing a sense of coherence. While previously observed in corporate settings or healthcare providers (Broetje et al., 2020; Feldt et al., 2004; Tabata and

Table 4Effects of sense of coherence and work engagement on the relationship between psychological safety and competency; serial multiple mediation model ($N = 164$).

	B	SE	t	P	LLCI	ULCI
Total effect	0.262	0.056	4.664	0.000	0.151	0.373
Direct effect	−0.013	0.064	−0.208	0.836	−0.140	0.113
	Boot Effect	Boot SE			Boot LLCI	Boot ULCI
Total indirect effect	0.276	0.067			0.158	0.419
(1) Psychological safety → Sense of coherence → Competency	0.080	0.037			0.014	0.160
(2) Psychological safety → Work engagement → Competency	0.124	0.043			0.053	0.220
(3) Psychological safety → Sense of coherence → Work engagement → Competency	0.071	0.025			0.029	0.126

Note. B = unstandardized coefficient; SE = Heteroscedasticity Consistent; SE: Standard Error; LLCI = 95 % lower limit confidence interval; ULCI = 95 % upper limit confidence interval; Boot = statistics for the indirect effects are the result of the bootstrapping method; Covariates: Educational level, main component of university, and years of teaching experience.

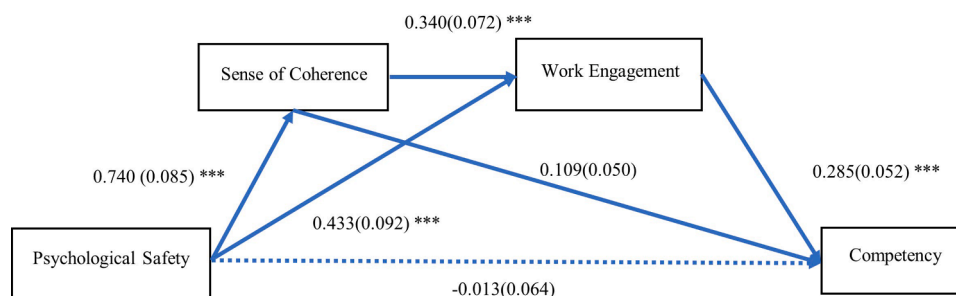


Fig. 1. Path coefficients of the serial multiple mediation model.

Note. (): standard error in parentheses; Solid line: significant; Dotted line: non-significant; Education level, main component of university, and years of teaching experience were covariates in the model; * $p < .05$, *** $p < .001$.

Togari, 2022), this study pioneers the identification of this relationship in early career nursing faculty, extending our understanding of the impact of psychological safety across professions. Additionally, psychologically safe workplaces foster inclusive decision-making, enhancing employees' sense of coherence (Antonovsky, 1989; Yamazaki et al., 2019). This heightened sense of coherence correlates with improved job-related skills (Kawamura et al., 2021; Ohta et al., 2015; Strauser and Lustig, 2003), particularly in nursing, in which it boosts practice skills and problem-solving abilities (Manabe et al., 2012; Takahashi et al., 2011; Tanaka et al., 2012). This study extends these findings to early career nursing faculty and suggests that psychological safety is an important organizational resource for inexperienced nursing faculty that indirectly enhances the competence of nurse educator through an enhanced sense of coherence.

Work engagement as a mediating role of the relationship between psychological safety and the competence of nurse educator

Our study also demonstrated that psychological safety enhances work engagement and is positively related to competency among early career nursing faculty, aligns with Kahn's (1990) research on general workers. According to the job demands–resources theory, workplace psychosocial resources enhance work engagement, leading to improved job performance (Bakker and Schaufeli, 2008; Bakker et al., 2023; Han et al., 2021). Studies have further demonstrated that higher levels of work engagement enhance practical skills and nursing practice competence (Ghazawy et al., 2021; Keyko et al., 2016). This finding supports the theoretical and empirical evidence that work engagement mediates the relationship between workplace psychosocial resources and job performance. Moreover, based on the theory that positive emotions, as represented by work engagement, broaden individuals' perspectives, interests, and behaviors and increase their personal resources (e.g., skills and abilities), thereby promoting personal growth (Fredrickson, 2001; Salanova et al., 2010), increasing work engagement can lead to positive and motivated personal work engagement, which is proposed to foster work competence. Therefore, maintaining positive and proactive attitudes toward one's job among inexperienced nursing faculty can nurture work competence.

Implications of this study

This study also indicated that even for nurse educators in the early stages of their careers, psychological safety enhances a sense of coherence; provides coping skills to coordinate and manage the multifaceted role required of educators; and has a cascading effect that leads to positive attitudes toward work, positive engagement, enthusiasm, and increased competence. In sum, even without investing a great deal of cost, effort, and human resources to set up a special faculty development program or mentoring system, preparing an organization with a high level of psychological safety could foster the skills of early career nursing faculty. For example, as presented in the scale items (Edmondson, 1999), it is essential to foster an organizational climate that allows early-career nursing faculty to easily seek advice when faced with insurmountable challenges. Additionally, it is also imperative to foster a group climate where early career nursing faculty' circumstances are respected and problems are solved collaboratively through constructive dialogue, rather than through criticism or blame. Further, the current findings partially support the conclusions and theoretical frameworks of previous research. Specifically, a supportive work climate cyclically enhances their engagement, motivation, and competency development (Tanaka, 2018). Resource expansion theory posits that organizational resources boost employees' job performance and enthusiasm, which broadens their perspectives, interests, and cognitive processes. These positive behaviors promote individual growth by enhancing skills and competencies (Fredrickson, 2001).

Limitations

Despite its important implications for developing the competence of nurse educator among early career nursing faculties, our study has certain limitations. First, although we revealed a serial multiple mediation model among psychological safety, sense of coherence, work engagement, and the competence of nurse educator, the data were based on a cross-sectional analysis. Further research is needed to validate whether these results can be theoretically and empirically substantiated, and to ascertain their reproducibility. Future longitudinal studies should address the fact that this study did not indicate a causal relationship between these variables.

Second, our study used only self-reported questionnaires, which introduces a potential for social desirability bias. Educators often rate their own competence of nurse educator more positively compared to assessments by students or mentors (Salminen et al., 2013). To mitigate this bias, future studies should incorporate objective evaluations alongside self-assessments.

Third, the years of teaching experience as nursing faculty ranged from 0 to 17 years. Despite having teaching experience, early career nursing faculty cannot be promoted unless they meet specific criteria, such as obtaining a degree, research achievements, number of publications, and fulfilling university roles. Consequently, even those in the most junior positions, such as early career nursing faculty, may have many years of experience. Future studies must explore factors related to competency improvement, considering position and the quantity and quality of teaching experience. Finally, the desired sample size for this study was calculated to be $n = 108$ with a significance level of 0.05, a power level of 0.8, and an effect size of f^2 0.15, using G*Power 3.1.9.7 (Faul et al., 2007, 2009). Later, the statistical power was 0.94 based on the actual number of analyzed data ($n = 164$), with a significance level of 0.05 and an effect size of f^2 0.15. However, since the response rate for this study was 17.1 %, it is possible that only those with a strong interest in the content of this study responded to the questionnaire, and caution should be exercised in interpreting the results. The current results indicate that the response rate for past Internet surveys conducted in Japan targeting nursing teachers ranged from 14 % to 25 %, while the response rate for Internet surveys targeting non-nursing faculty was only around 20 % (Chitose, 2020; Yoshimura, 2020). In considering research results that better reflect the actual situation, future studies must devise more suitable research methods, including data collection.

Conclusions

The mediation analysis of this research revealed that sense of coherence and work engagement indirectly mediated the relationship between psychological safety and the competence of nurse educator among early career nursing faculty in Japanese universities. Further, a serial multiple mediation model demonstrated that psychological safety indirectly influenced the competence of nurse educator through sense of coherence and work engagement. On the other hand, psychological safety did not have a significant direct effect on the competence of nurse educator among early career nursing faculty in Japan.

Ethics approval

Ethical approval was obtained from the Tokyo Healthcare university Academic Ethics Committee (ID 34–13).

Data availability

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

CRediT authorship contribution statement

Miho Satoh: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Naoko Sato:** Supervision, Methodology, Investigation, Formal analysis, Conceptualization. **Noriko Tamura:** Methodology, Investigation, Conceptualization. **Akiko Fujimura:** Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

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

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References

- Antonovsky, A., 1987. *Unraveling the Mystery of health: How people Manage Stress and Stay Well*. Jossey-Bass, San Francisco, CA, USA.
- Ayala Calvo, J.C., García, G.M., 2018. Hardiness as moderator of the relationship between structural and psychological empowerment on burnout in middle managers. *J. Occup. Organ. Psychol.* 91 (2), 362–384. <https://doi.org/10.1111/joop.12194>.
- Baer, M., Frese, M., 2003. Innovation is not enough: climates for initiative and psychological safety, process innovations, and firm performance. *J. Organ. Behav.* 24 (1), 45–68. <https://doi.org/10.1002/job.179>.

- Bakker, A.B., Demerouti, E., Sanz-Vergel, A., 2023. Job demands-resources theory: ten years later. *Annu. Rev. Org. Psychol. Org. Behav.* 10 (1), 25–53. <https://doi.org/10.1146/annurev-orgpsych-120920-053933>.
- Bakker, A.B., Hakanen, J.J., Demerouti, E., Xanthopoulou, D., 2007. Job resources boost work engagement, particularly when job demands are high. *J. Educ. Psychol.* 99 (2), 274–284. <https://doi.org/10.1037/0022-0663.99.2.274>.
- Bakker, A.B., Schaufeli, W.B., 2008. Positive organizational behavior: engaged employees in flourishing organizations. *J. Organ. Behav.* 29 (2), 147–154. <https://doi.org/10.1002/job.515>.
- Basit, A.A., 2017. Trust in supervisor and job engagement: mediating effects of psychological safety and felt obligation. *J. Psychol.* 151 (8), 701–721. <https://doi.org/10.1080/00223980.2017.1372350>.
- Broetje, S., Bauer, G.F., Jenny, G.J., 2020. The relationship between resourceful working conditions, work-related and general sense of coherence. *Health Promot. Int.* 35 (5), 1168–1179. <https://doi.org/10.1093/heapro/daz112>.
- Brown, T., Sorrell, J., 2017. Challenges of novice nurse educator's transition from practice to classroom. *Teach. Learn. Nurs.* 12 (3), 207–211. <https://doi.org/10.1016/j.teln.2017.03.002>.
- Carmeli, A., Gittell, J.H., 2009. High-quality relationships, psychological safety, and learning from failures in work organizations. *J. Organ. Behav.* 30 (6), 709–729. <https://doi.org/10.1002/job.565>.
- Chitose, Y., 2020. A comparison of response rate, respondent profile, and item nonresponse between survey modes: an assessment from SOGI survey based on a random selection from basic resident registration. *J. Popul. Probl.* 76 (4), 467–487 in Japanese.
- Collins, C.J., Smith, K.G., 2006. Knowledge exchange and combination: the role of human resource practices in the performance of high-technology firms. *Acad. Manage. J.* 49 (3), 544–560. <https://doi.org/10.5465/AMJ.2006.21794671>.
- Compagnucci, L., Spigarelli, F., 2020. The third mission of the university: a systematic literature review on potentials and constraints. *Technol. Forecast. Soc. Change* 161, 120284. <https://doi.org/10.1016/j.techfore.2020.120284>.
- Czabanowska, K., Kuhlmann, E., 2021. Public health competences through the lens of the COVID-19 pandemic: what matters for health workforce preparedness for global health emergencies. *Int. J. Health Plann. Manage.* 36 (S 1), 14–19. <https://doi.org/10.1002/hpm.3131>.
- Derbis, R., Jasiński, A.M., 2018. Work satisfaction, psychological resiliency and sense of coherence as correlates of work engagement. *Cogent. Psychol.* 5 (1), 1451610. <https://doi.org/10.1080/23311908.2018.1451610>.
- Doi, Y., Hosoda, Y., Hoshi, K., 2012. The learning needs and related factors of nursing college junior faculty. *J. School of Nurs. Osaka Prefecture Univ.* 18 (1), 33–44 in Japanese.
- Edmondson, A., 1999. Psychological safety and learning behavior in work teams. *Adm. Sci. Q.* 44 (2), 350–383.
- Edmondson, A.C., Lei, Z., 2014. Psychological safety: the history, renaissance, and future of an interpersonal construct. *Annual Review of Organizational Psychology and Organizational Behavior* 1 (1), 23–43. <https://doi.org/10.1146/annurev-orgpsych-031413-091305>.
- Faraj, S., Yan, A., 2009. Boundary work in knowledge teams. *J. Appl. Psychol.* 94 (3), 604–617. <https://doi.org/10.1037/a0014367>.
- Faul, F., Erdfelder, E., Buchner, A., Lang, A.G., 2009. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behav. Res. Methods* 41 (4), 1149–1160.
- Faul, F., Erdfelder, E., Lang, A.G., Buchner, A., 2007. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav. Res. Methods* 39 (2), 175–191.
- Feldt, T., Kivimäki, M., Rantala, A., Tolvanen, A., 2004. Sense of coherence and work characteristics: a cross-lagged structural equation model among managers. *J. Occup. Organ. Psychol.* 77 (3), 323–342. <https://doi.org/10.1348/0963179041752655>.
- Fernandez, N., Dory, V., Ste-Marie, L.G., Chaput, M., Charlin, B., Boucher, A., 2012. Varying conceptions of competence: an analysis of how health sciences educators define competence. *Med. Educ.* 46 (4), 357–365. <https://doi.org/10.1111/j.1365-2923.2011.04183.x>.
- Frazier, M.L., Fainshmidt, S., Klinger, R.L., Pezeshkan, A., Vacheva, V., 2017. Psychological safety: a meta-analytic review and extension. *Pers. Psychol.* 70 (1), 113–165.
- Fredrickson, B.L., 2001. The role of positive emotions in positive psychology. The broaden-and-build theory of positive emotions. *Am. Psychol.* 56 (3), 218–226. <https://doi.org/10.1037/0003-066x.56.3.218>.
- Garner, A., Bedford, L., 2021. Reflecting on educational preparedness and professional development for early-career nurse faculty: A phenomenological study. *Nurse Educ. Pract.* 53, 103052. <https://doi.org/10.1016/j.nepr.2021.103052>.
- Ghazawy, E.R., Mahfouz, E.M., Mohammed, E.S., Refaei, S.A., 2021. Nurses' work engagement and its impact on the job outcomes. *Int. J. Healthc. Manage.* 14 (2), 320–327. <https://doi.org/10.1080/20479700.2019.1644725>.
- Gong, Y., Cheung, S.-Y., Wang, M., Huang, J.-C., 2012. Unfolding the proactive process for creativity: Integration of the employee proactivity, information exchange, and psychological safety perspectives. *J. Manage.* 38 (5), 1611–1633. <https://doi.org/10.1177/0149206310380250>.
- González-Siles, P., Martí-Vilar, M., González-Sala, F., Merino-Soto, C., Toledano-Toledano, F., 2022. Sense of coherence and work stress or well-being in care professionals: A systematic review. *Healthcare* 10 (7), 1347. <https://doi.org/10.3390/healthcare10071347>.
- Groth, S.M., Duncan, R., Lassiter, J., Madler, B.J., 2023. Onboarding orientation for novice nurse faculty: a quality improvement pilot project. *Teach. Learn. Nurs.* 18 (1), 212–218. <https://doi.org/10.1016/j.teln.2022.07.010>.
- Han, S.-H., Sung, M., Suh, B., 2021. Linking meaningfulness to work outcomes through job characteristics and work engagement. *Human Resour. Deve. Int.* 24 (1), 3–22. <https://doi.org/10.1080/13678868.2020.1744999>.
- Harri, M., 1998. The sense of coherence among nurse educators in Finland. *Nurse Educ. Today* 18 (3), 202–212. [https://doi.org/10.1016/S0260-6917\(98\)80080-4](https://doi.org/10.1016/S0260-6917(98)80080-4).
- Hobfoll, S.E., 1989. Conservation of resources. A new attempt at conceptualizing stress. *Am. Psychol.* 44 (3), 513–524. <https://doi.org/10.1037/0003-066x.44.3.513>.
- Ishii, R., 2020. Cultivating team psychological safety. *JMA Management Center, Tokyo* in Japanese.
- Kahn, W.A., 1990. Psychological conditions of personal engagement and disengagement at work. *Acad. Manage. J.* 33 (4), 692–724. <https://doi.org/10.2307/256287>.
- Kalensky, M., Hande, K., 2017. Transition from expert clinician to novice faculty: a blueprint for success. *J. Nurse Practit.* 13 (9), e433–e439. <https://doi.org/10.1016/j.nurpra.2017.06.005>.
- Kameoka, T., Funashima, N., Nomoto, Y., Murakami, M., Suzuki, M., 2008. Problems that nursing faculty who were members of faculty development committee of BSN or ADN programs encounter. *J. Jpn. Soc. Nurs. Res.* 31 (5), 57–62 in Japanese.
- Kawamura, K., Shimada, A., Morioka, I., 2021. Relationship between work improvement and work engagement in financial industry: examination based on the level of sense of coherence. *Nihon Eiseigaku Zasshi* 76, 21005. <https://doi.org/10.1265/jjh.21005> in Japanese.
- Keyko, K., Cummings, G.G., Yonge, O., Wong, C.A., 2016. Work engagement in professional nursing practice: a systematic review. *Int. J. Nurs. Stud.* 61, 142–164. <https://doi.org/10.1016/j.ijnurstu.2016.06.003>.
- Lahtinen, P., Leino-Kilpi, H., Salminen, L., 2014. Nursing education in the European higher education area - Variations in implementation. *Nurse Educ. Today* 34 (6), 1040–1047. <https://doi.org/10.1016/j.nedt.2013.09.011>.
- Malagon-Aguilera, M.C., Suñer-Soler, R., Bonmatí-Tomas, A., Bosch-Farré, C., Gelabert-Vilella, S., Juvinyà-Canal, D., 2019. Relationship between sense of coherence, health and work engagement among nurses. *J. Nurs. Manage.* 27 (8), 1620–1630. <https://doi.org/10.1111/jonm.12848>.
- Manabe, E., Komatsu, M., Izumi, M., Kuragaichi, E., Hashimoto, H., Kitajima, K., Okayama, Y., 2012. Correlation between sense of coherence and satisfaction and work environment and nursing clinical skills among nurses at university hospitals. *J. Int. Nurs. Res.* 35 (2), 19–25 in Japanese.
- Malik, P., Garg, P., 2020. Learning organization and work engagement: the mediating role of employee resilience. *Int. J. Human Resour. Manage.* 31 (8), 1071–1094.
- May, D.R., Gilson, R.L., Harter, L.M., 2004. The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work. *J. Occup. Organ. Psychol.* 77 (1), 11–37. <https://doi.org/10.1348/096317904322915892>.
- Mayer, R.C., Gavin, M.B., 2005. Trust in management and performance: who minds the shop while the employees watch the boss? *Acad. Manage. J.* 48 (5), 874–888. <https://doi.org/10.5465/AMJ.2005.18803928>.

- McDermid, F., Peters, K., Daly, J., Jackson, D., 2013. I thought I was just going to teach': stories of new nurse academics on transitioning from sessional teaching to continuing academic positions. *Contemp. Nurse* 45 (1), 46–55. <https://doi.org/10.5172/conu.2013.45.1.46>.
- Mikkonen, K., Ojala, T., Sjögren, T., Piirainen, A., Koskinen, C., Koskinen, M., Koivula, M., Sormunen, M., Saaranen, T., Salminen, L., Koskimäki, M., Ruotsalainen, H., Lähteenmäki, M.L., Wallin, O., Mäki-Hakola, H., Kääriäinen, M., 2018. Competence areas of health science teachers - A systematic review of quantitative studies. *Nurse Educ. Today* 70, 77–86. <https://doi.org/10.1016/j.nedt.2018.08.017>.
- Ministry of Education, Culture, Sports, Science, and Technology. (2021). University establishment standards. https://www.mext.go.jp/b_menu/shingi/chousa/koutou/053/gijiroku/_icsFiles/afldfile/2012/10/30/1325943_02_3_1.pdf (accessed 2024/02/25).
- Mittelmarm, M.B., Eriksson, M., Sagy, S., Pelikan, J.M., Vaandrager, L., Magistretti, C.M., Lindström, B., Bauer, G.F., 2022. Salutogenesis for thriving societies. *The Handbook of Salutogenesis*. Springer International Publishing, Cham, pp. 635–638.
- Newman, A., Donohue, R., Eva, N., 2017. Psychological safety: a systematic review of the literature. *Human Resour. Manage. Rev.* 27 (3), 521–535. <https://doi.org/10.1016/j.hrmr.2017.01.001>.
- Nowell, L., Norri, J.M., Mrklas, K., White, D.E., 2017. A literature review of mentorship programs in academic nursing. *J. Prof. Nurs.* 33, 334–344. <https://doi.org/10.1016/j.profnurs.2017.02.007>.
- Ohta, M., Higuchi, Y., Kumashiro, M., Yamato, H., Sugimura, H., 2015. Work improvement factors for the amelioration of work ability, with a focus on individual capacity to deal with stress in an IT company. *J. UOEH* 37 (1), 23–32 in Japanese.
- Oki, H., 2019. Current issues of faculty development in higher education in Japan. *Nagoya J. Higher Edu.* 19, 17–32 in Japanese.
- Oyamada, K., Nozaki, M., Nakahara, R., 2022. Development of a professional development tool for new assistant professors in nursing colleges. *J. Japan Acad. Nurs. Edu.* 32 (2), 137–150 in Japanese.
- Petrov, S., Oprea, B., Opariuc-Dan, C., 2023. Psychological safety and job performance: the mediating role of work engagement and job crafting. *Psihologia Resurselor Umane* 21 (2), 89–99. <https://doi.org/10.24837/pru.v21i2.536>.
- Ryhtä, I., Elonen, I., Saaranen, T., Sormunen, M., Mikkonen, K., Kääriäinen, M., Koskinen, C., Koskinen, M., Koivula, M., Koskimäki, M., Lähteenmäki, M.L., Wallin, O., Sjögren, T., Salminen, L., 2020. Social and health care educators' perceptions of competence in digital pedagogy: a qualitative descriptive study. *Nurse Educ. Today* 92, 104521. <https://doi.org/10.1016/j.nedt.2020.104521>.
- Salanova, M., Schaufeli, W.B., Xanthopoulou, D., Bakker, A.B., 2010. The gain spiral of resources and work engagement: sustaining a positive worklife. In: Bakker, A. B., Leiter, M.P. (Eds.), *Work engagement: A handbook of Essential Theory and Research*. Psychology Press, pp. 118–131.
- Salminen, L., Minna, S., Sanna, K., Jouko, K., Helena, L.K., 2013. The competence and the cooperation of nurse educators. *Nurse Educ. Today* 33 (11), 1376–1381. <https://doi.org/10.1016/j.nedt.2012.09.008>.
- Salminen, L., Stolt, M., Saarikoski, M., Suikkala, A., Vaartio, H., Leino-Kilpi, H., 2010. Future challenges for nursing education—A European perspective. *Nurse Educ. Today* 30 (3), 233–238. <https://doi.org/10.1016/j.nedt.2009.11.004>.
- Salminen, L., Tuukkanen, M., Clever, K., Fuster, P., Kelly, M., Kielé, V., Koskinen, S., Sveinsdóttir, H., Löyttyniemi, E., Leino-Kilpi, H., PROCOMP Nurse-Consortium, 2021. The competence of nurse educators and graduating nurse students. *Nurse Educ. Today* 98, 104769. <https://doi.org/10.1016/j.nedt.2021.104769>.
- Satoh, M., Fujimura, A., Sato, N., 2020. Competency of academic nurse educators. *SAGE Open. Nurs.* 6. <https://doi.org/10.1177/2377960820969389>, 2377960820969389.
- Schaubroeck, J., Lam, S.S.K., Peng, A.C., 2011. Cognition-based and affect-based trust as mediators of leader behavior influences on team performance. *J. Appl. Psychol.* 96 (4), 863–871. <https://doi.org/10.1037/a0022625>.
- Schaufeli, W.B., Bakker, A.B., 2004. Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *J. Organ. Behav.* 25 (3), 293–315. <https://doi.org/10.1002/job.248>.
- Shimazu, A., Schaufeli, W.B., Kosugi, S., Suzuki, A., Nashiwa, H., Kato, A., Sakamoto, M., Irimajiri, H., Amano, S., Hirohata, K., Goto, R., Kitaoka-Higashiguchi, K., 2008. Work engagement in Japan: validation of the Japanese version of the Utrecht Work Engagement Scale. *Appl. Psychol.* 57 (3), 510–523. <https://doi.org/10.1111/j.1464-0597.2008.00333.x>.
- Siemens, E., Roth, A.V., Balasubramanian, S., Anand, G., 2009. The influence of psychological safety and confidence in knowledge on employee knowledge sharing. *Manuf. Serv. Oper. Manage.* 11 (3), 429–447. <https://doi.org/10.1287/msom.1080.0233>.
- Smith, J., Kean, S., Vauhkonen, A., Elonen, I., Silva, S.C., Pajari, J., Cassar, M., Martín-Delgado, L., Zrubcova, D., Salminen, L., 2023. An integrative review of the continuing professional development needs for nurse educators. *Nurse Educ. Today* 121, 105695. <https://doi.org/10.1016/j.nedt.2022.105695>.
- Strauser, D.R., Lustig, D.C., 2003. The moderating effect of sense of coherence on work adjustment. *J. Employ. Couns.* 40 (3), 129–140. <https://doi.org/10.1002/j.2161-1920.2003.tb00863.x>.
- Suzuki, Y., Kaneko, J., Irie, H., Morikawa, N., Matsumoto, M., Hayashi, K., Onozaki, M., 2019. Research trend on faculty of nursing university—Problems of nursing teachers as seen in study purpose. *J. Int. Univ. Health Welfare* 24 (2), 61–72 in Japanese.
- Tabata, M., Togari, T., 2022. The link between factorial invariance and sense of coherence associated with the degree of favorability of the organizational climate at geriatric health services facilities: simultaneous multiple group analysis of care workers and nurses using a cross-sectional survey. *J. Japan Soc. Healthcare Admin.* 59 (3), 99–109 in Japanese.
- Takahashi, Y., Motoe, A., Furuichi, K., 2011. Relationship between life skills and sense of coherence in clinical nurses. *The Jpn. J. Health Sci. Res.* 15 (1), 71–76 in Japanese.
- Tanaka, C., 2018. Novice nursing teachers' essential experiences in developing their abilities. *Jpn. J. Medi. Nurs. Edu.* 27 (2), 21–28 in Japanese.
- Tanaka, I., Higa, H., Yamada, K., 2012. Comparison of clinical nursing competence based on attributes of nurses, and relationship between number of working years, sense of coherence, and spirituality. *J. Nurs. Soc. Univ. Toyama* 12 (2), 81–92 in Japanese.
- Togari, T., Yamazaki, Y., 2005. Examination of the reliability and factor validity of 13-item five-point version sense of coherence scale. *Jpn. J. Health Human Ecol.* 71 (4), 168–182 in Japanese.
- Vogt, K., Hakanen, J.J., Jenny, G.J., Bauer, G.F., 2016. Sense of coherence and the motivational process of the job-demands-resources model. *J. Occup. Health Psychol.* 21 (2), 194–207. <https://doi.org/10.1037/a0039899>.
- Weidman, N.A., 2013. The lived experience of the transition of the clinical nurse expert to the novice nurse educator. *Teach. Learn. Nurs.* 8 (3), 102–109. <https://doi.org/10.1016/j.teln.2013.04.006>.
- World Health Organization (2017). Nurse educator core competencies. Genève, Switzerland.
- Xanthopoulou, D., Bakker, A.B., Demerouti, E., Schaufeli, W.B., 2009. Reciprocal relationships between job resources, personal resources, and work engagement. *J. Vocat. Behav.* 74 (3), 235–244. <https://doi.org/10.1016/j.jvb.2008.11.003>.
- Yamazaki, Y., Togari, T., Sakano, J., 2019. Introduction to the sense of coherence in the salutogenic model. *Yushindo-Kobunsha*, Tokyo in Japanese.
- Yoshimura, H., 2020. Why are web survey results biased? Findings from two experimental web surveys. *Jpn. Sociol. Rev.* 71 (1), 65–83 in Japanese.
- Zhou, H., Chen, J., 2021. How does psychological empowerment prevent emotional exhaustion? Psychological safety and organizational embeddedness as mediators. *Front. Psychol.* 12, 546687. <https://doi.org/10.3389/fpsyg.2021.546687>.
- Zlatanovic, T., Havnes, A., Mausestagen, S., 2017. A research review of nurse teachers' competencies. *Vocat. Learn.* 10 (2), 201–233. <https://doi.org/10.1007/s12186-016-9169-0>.