



## Effects of knowledge sharing behavior on innovative work behavior among nursing Students: Mediating role of Self- leadership



Thanuja Ariyasinghe Asurakkody, Sang Hee Kim\*

Department of Nursing, College of Medicine, Inje University, 75 Bokji-ro, Busanjin-gu, Busan 47392, South Korea

### ARTICLE INFO

**Keywords:**  
Behavior  
Leadership  
Nursing  
Education  
Students

### ABSTRACT

**Background:** Individual innovation is fundamental to organizational performance in an ever-changing world. Employers today need individuals who can share knowledge and self-direct because they achieve organizational outcomes.

**Purpose:** This research aims to explore the relationship between knowledge sharing and innovative work by assessing the mediating role of self-leadership.

**Methods:** This cross-sectional descriptive study applied data from 148 nursing students from a public nursing school in Sri Lanka.

**Results:** Generally, our findings show a significant positive relationship between knowledge sharing behavior and innovative work behavior and that self-leadership fully mediate the relationship.

**Conclusions:** Overall, this study will contribute to educational organizations in healthcare by providing insights into the roles of knowledge sharing and self-leadership in stimulating nursing students' development and helping them become future innovators.

### 1. Introduction

From the industrial revolution to the present, health care organizations have depended on ongoing innovations to make products, services, and treatment procedures more effective and affordable. Organizational leaders see the value of inspiring employees to innovate and share their knowledge with co-workers because those ambitions generate sustainable organizational success (Edu-Valsania, Moriano, & Molero, 2016). Innovative work behavior (IWB) refers to "all employee behavior directed at the generation, introduction, and/or application (within a role, group or organization) of ideas, processes, products, or procedures, new to the relevant unit of adoption that supposedly significantly benefit the relevant unit of adoption" (De Spiegelare, Van Gyes, De Witte, Niesen, & Van Hootehem, 2014). Nursing innovation encompasses the formulation and advancement of new and current nursing care techniques (Huang, Weng, Wu, Lin, & Hsu, 2018).

Innovative work behavior among nurses contributes to organizational innovation as other professions (Afsar, 2016). Previous studies have suggested developing innovative work behavior among nurses and providing experimental opportunities to them so that they can contribute to effective treatment, quality of care, and work efficiency (Sonmez, Ispir, Onal, & Emiralioglu, 2019; Weng, Chen, Huang, Hung, & Hsu, 2016). According to De Jong and Den Hartog (2007), innovative

work behavior consists of four stages: idea generation, opportunity exploration, idea championing, and application, which leads to novel products. Researchers have confirmed that knowledge sharing is positively correlated with individual nurse innovation (Li-Ying, Paunova, & Egerod, 2016).

Nurses' knowledge sharing activities can lead to developing guidelines, contributing to research boards, symposiums, conferences, academic discussions, and reports, and updating expertise. Knowledge sharing is a set of specific behaviors that involves the interchanging of data or relevant knowledge in order to collaborate with others toward developing new ideas and implementing policies (Zhang, 2017). The process of knowledge sharing includes two subscales. The first phase consists of having tacit and explicit knowledge, and the second phase is participating in knowledge sharing (Sheng, Hartmann, Chen, & Chen, 2015). Tacit knowledge is complex, spontaneous, subjective, and difficult to explain to others (Magnier-Watanabe & Benton, 2017; Maravilhas & Martins, 2019). It accumulates through collaborative practices, experiences, and observations (Maravilhas & Martins, 2019). In contrast, explicit knowledge consists of information and know-how that are teachable objective, and verbalizable (Rogers & Révész, 2015).

Knowledge sharing, self-leadership, and innovative behavior have significant correlations (Widyani, Sarmawa, & Dewi, 2017). Therefore, we assumed that self-leadership might hold considerable influence over

\* Corresponding author.

E-mail addresses: [thanuja.ariyasinghe@gmail.com](mailto:thanuja.ariyasinghe@gmail.com) (T.A. Asurakkody), [iris0409@inje.ac.kr](mailto:iris0409@inje.ac.kr) (S.H. Kim).

knowledge sharing and the stages of innovative work. Self-leadership is a practice that empowers individuals to develop their self-motivation and self-direction through a set of behavior-focused natural reward and constructive thought pattern strategies (Manz, 1986). Individual innovation is more frequent when individuals use self-leadership skills as a set of strategies (Gomes, Curral, & Caetano, 2015). There are few studies on the relationship between knowledge sharing and innovative work behavior in health care. To the best of our knowledge, no research has been conducted among nursing students on their knowledge sharing and innovative work behaviors.

During the study process, individuals' innovative capacity is developed through thinking and identifying problems. Solving problems by generating new ideas requires using creativity and the solutions must be clarified them with support (Hu & Zhao, 2016). Knowledge sharing behavior is essential, because colleagues and experts' clarifications and validations are needed to support the generated ideas. Self-leadership is also needed as students must seek opportunities to develop their knowledge on their own. Educators should consider the development of innovative skills among nursing students to help them go beyond traditions as they are the future of nursing. Previous studies have noted that sharing knowledge activities basis of recollection, reputation, and reliability, and they can take on various roles (Mannan, Bakri, & Shaari, 2017).

Helping nursing students to think differently is needed to increase their creativity and, help them to acquire scientific knowledge and, understand research results. Thus, in this paper, we address these aspects nursing education. We believe that promoting innovative work behavior among nursing students and nurses may support the development of new treatment strategies, produce exciting future applications for health care, and encourage collaboration with other professionals and improve the quality of patient care.

In this study, we identify the general relationships between knowledge sharing, innovative work and self-leadership. The relationships between stages of innovative behavior are used to assess the mediating role of self-leadership among nursing students because the foundation for producing innovators among nurses is formed when they

are students. The following hypotheses will be tested according to the conceptual framework in Fig. 1.

H1- Knowledge sharing behavior is positively and significantly associated with innovative work behavior.

H2- Tacit and explicit forms of knowledge have positive and significant relationships with idea generation.

H3- Participating in knowledge sharing activities has positive and significant relationships with all stages of innovative work behavior.

H4- Self-leadership mediates the relationship between participation in knowledge sharing activities and opportunity exploration.

H5- Self-leadership mediates the relationship between participation in knowledge sharing activity and idea championing.

## 2. Methods

### 2.1. Study design, setting and sample

In this cross-sectional study, we analyzed previously collected data (Asurakkody & Kim, 2019). This study was conducted in a state nursing school located in the southern region of Sri Lanka. The minimum sample size was 138 based on our calculation, using G\* Power 3.1.9.2 Program. The power was 0.95, and the medium effect size was 0.15. A nominal *p*-value of 0.05 was set for the 10 predictors. To account for potential dropout, the convenience sample consisted of 159 nursing students. Among them, 155 participants returned the questionnaires. Therefore, the responding rate was 97.4%. We discarded seven questionnaires due to incomplete responses; ultimately, 148 were used for the analysis. Our inclusion criteria were that the students had been in nursing school for at least six months and were enrolled in clinical practice at the hospital. The students were not given the exclusion criteria.

### 2.2. Ethical considerations

The study proposal was approved by Inje University's Institutional Review Board (IRB; Approval number. 2019-01-018-001) and

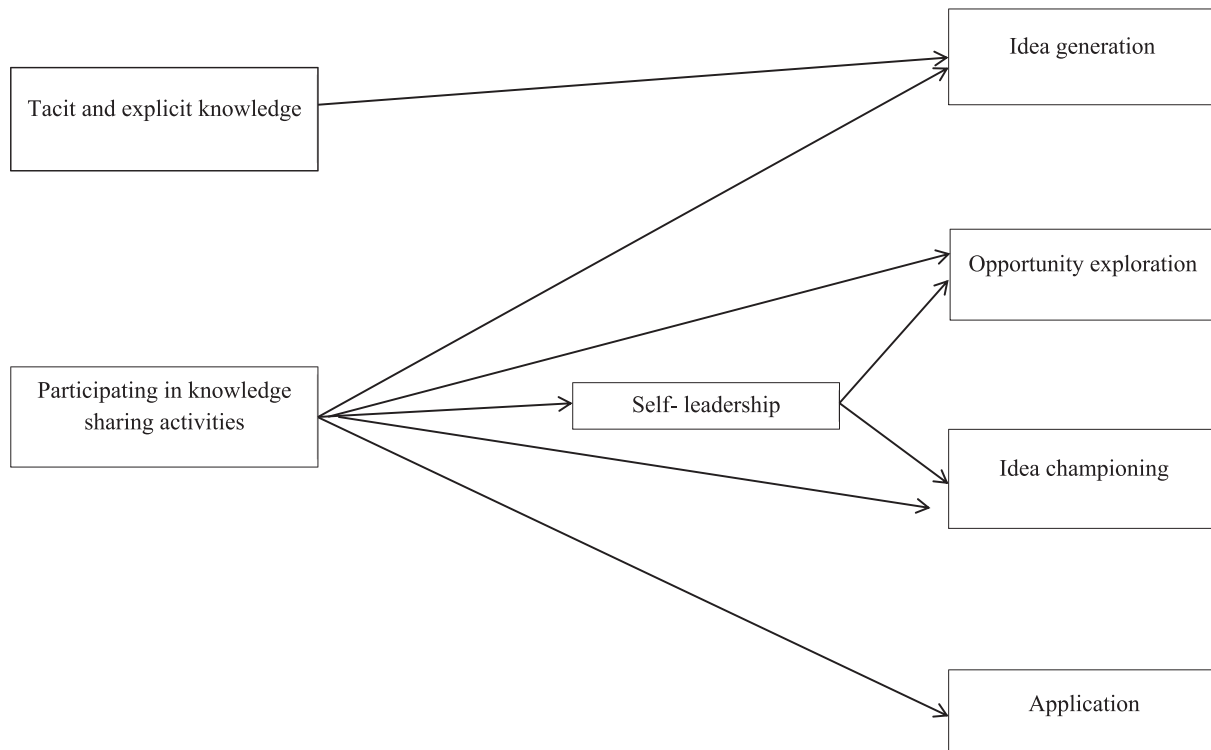


Fig. 1. Conceptual frame work for relationship between knowledge sharing behavior and innovative work behavior and fully mediating effect on that.

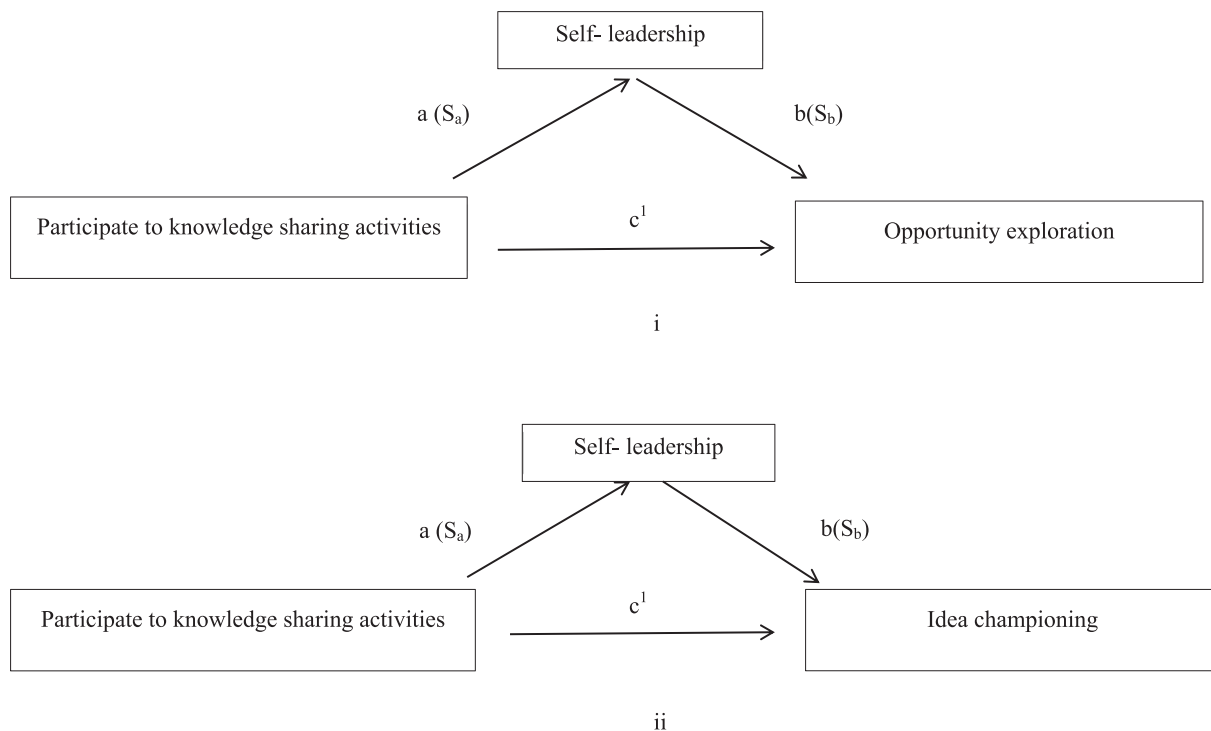


Fig. 2. Mediating effect of self-leadership on the relationship between participating in knowledge sharing activities and opportunity exploration and idea championing.

permission for data collection was granted by the Ministry of Health Sri Lanka. A research assistant recruited students for participation. All information was handled anonymously and confidentially. A research assistant explained the purpose, and students were free to withdraw from the research at any stage. They were informed that they would not be at a disadvantage if they did not participate. Voluntary participation was appreciated.

### 2.3. Measurement

We obtained permission to use the scales for this research from the each developer of the scales. Reliability of the scales was tested before we analyze the data and draw conclusions.

### 2.4. Innovative work behavior

De Jong and den Hartog's Innovative Work Behavior Scale was applied to measure the participants' innovative behaviors (De Jong & Den Hartog, 2007). This tool includes 10 items that are organized into four stages: idea generation (3 items), opportunity exploration (2 items), idea championing (2 items), and application (3 items), and Cronbach's alpha for these four stages were 0.90, 0.88, 0.95, and 0.93, respectively. Each question was measured by five points on a Likert scale, which was arranged from 1 to -5, including; strongly disagree, disagree, neutral, agree, and strongly agree. In this study, total Cronbach's alpha was 0.87.

### 2.5. Knowledge sharing behavior

Two subscales were used to measure knowledge sharing behavior; Huang developed one subscale for "tacit and explicit knowledge" (Huang, 2009), and Xue et al. developed another scale for "participating in knowledge sharing activities" (Xue, Bradley, & Liang, 2011). Cronbach's alpha for tacit and explicit knowledge and participating in knowledge sharing activities were 0.77 Likert scale, which was

arranged from 1 to -5, including; strongly disagree, disagree, neutral, agree, strongly, and agree. In this study, total Cronbach's alpha was 0.86.

### 2.6. Self-leadership

Houghton and Neck's Self-leadership questionnaire, which consists of 35 items, measures self-leadership skills (Houghton & Neck, 2002). This scale had nine subscales, including; visualizing successful performance, self-goal setting, self-talk, self-reward, evaluating beliefs and assumptions, self-punishment, self-observation, focusing on natural rewards, and self-cueing. Cronbach's alpha for these subscales were 0.85, 0.84, 0.92, 0.93, 0.78, 0.86, 0.82, 0.74, and 0.91, respectively (Houghton & Neck, 2002). In this study, total Cronbach's alpha was 0.90.

### 2.7. Data collection

The data collection for this research was conducted from February 26 to March 15, 2019. The aim of the study was described to the nursing students, and they were invited to participate. A research assistant collected data from those who consented to participating in the research. Nursing students completed the questionnaires at a meeting place in the school 30 min on average.

### 2.8. Data analysis

We analyzed the data with SPSS 25.0. For all tests, the significance level was set at 0.05 in a two-tailed. The general characteristics of the participants were analyzed with descriptive statistics, using means and standard deviations. The participants' degrees of knowledge sharing behavior, innovative work behavior, and self-leadership were described using means and standard deviations. Scale reliability was tested using Cronbach's alpha coefficients.

Differences in innovative work behavior according to general

characteristics were assessed using independent *t*-tests and one-way ANOVA with Scheffé’s method and the Post hoc test. Pearson correlation coefficient was used to measure the correlation between knowledge sharing behavior, innovative work behavior, and self- leadership. Stepwise multiple regression analysis was performed to analyze the independent associations between the sub-dimensions of knowledge sharing behavior with innovative work behavior. Finally, Baron and Kenny’s 3-step regression analysis and the Sobel test were completed to test the mediating effect of self- leadership, opportunity exploration, and idea championing in innovative work behavior (Fig. 2; Baron & Kenny, 1986; Pardo & Román, 2013).

**3. Results**

The age range of the participants was 21 to 30 years, and the mean age was 23.12 ± 1.14 years. The majority was female (90.5%). In terms of the high school level science-related education of the participants, the most commonly studied area was the biosciences (83.8%). Most of the participants had a relationship with the interdisciplinary team (98.6%). The majority of the participants had leadership experiences (85.1%); however, the majority had no experiences with experimental activities (64.9%). A high percentage (83.9%) of participants were willing to engage in experiments.

**3.1. Differences in innovative work behavior based on socio-demographic characteristics**

Among the socio-demographic characteristics of the participants, only gender showed a significant difference. Female participants demonstrated a higher score than male participants in innovative work behavior (*t* = -0.77, *p* = .043).

**3.2. Relationships among the variables**

The mean degrees of overall knowledge sharing behavior (4.11 ± 0.62), innovative work behavior (3.76 ± 0.57), and self- leadership (3.84 ± 0.45) were higher than average. Table 1 shows the correlations between the sub-dimensions of knowledge sharing behavior, innovative work behavior, and self- leadership. As shown in Table 1, all sub-dimensions were significantly correlated.

**3.3. Predictive Factors for Sub- dimensions of innovative work behavior**

The overall relationship between knowledge sharing and innovative work was positive and significant (*r* = 0.51, *p* < .001). Furthermore, knowledge sharing was positively and significantly associated with self- leadership (*r* = 0.61, *p* < .001). Table 2 shows the predictive factors for each stage of innovative work behavior. Tacit and explicit knowledge and participating in knowledge sharing activities were predictors for idea generation, explaining 34.5% of the total variance of idea generation; the prediction was significant (*F* = 42.57, *p* < .001; Table 2- a).

Only participating in knowledge sharing activities predicted the

other remaining stages (opportunity exploration, idea championing, and application. It explained 7.6% of the total variance of opportunity exploration; the, prediction was significant (*F* = 13.15, *p* < .001; Table 2- b); It explained 11.6% of the total variance of idea championing; prediction significant (*F* = 20.22, *p* < .001; Table 2- c). It explained 17.9% of the total variance of application with a significant prediction, (*F* = 33.10, *p* < 0.001; Table 2- d).

**3.4. The mediating effect of self- leadership**

Table 3 shows the mediating effect of self- leadership on the relationship between knowledge sharing activities and the stages of innovative work behavior, opportunity exploration, and idea championing. According to Table 3- a, the *B* value of step 3(*B* = 0.15) was smaller than it was in step 1 (*B* = 0.30) on the relationship between knowledge sharing activities and opportunity exploration. Further, β<sub>1</sub> was significant (*p* < .001) in step 1, and β<sub>3</sub> was not significant in step 3 (*p* = .134). These results indicate the full mediation of self- leadership on the relationship between knowledge sharing activities and opportunity exploration. These results were tested with the Sobel test (*z* = 3.84, *p* < .001) which confirmed the full mediating effect of self- leadership on the relationship between knowledge sharing activities and opportunity exploration.

According to Table 3- b, the *B* value of step 3 (*B* = 0.11) was smaller than that of step 1 (*B* = .34) on the relationship between knowledge sharing activities and idea championing. Further, β<sub>1</sub> was significant (*p* < .001) in step 1, and β<sub>3</sub> was not significant (*p* = .210) which indicates the full mediation of self- leadership on the relationship between knowledge sharing activities and idea championing. These results were assessed with the Sobel test (*z* = 5.39, *p* < .001), which confirmed the full mediating effect of self- leadership on the relationship between knowledge sharing activities and idea championing. Finally, we confirmed that self- leadership has a full mediating effect on the relationships between knowledge sharing activities and opportunity exploration and idea championing, respectively, as shown in Fig. 2.

**4. Discussion**

This study aimed to determine whether knowledge sharing behavior idea generation, opportunity exploration, idea championing, and application, all of which are stages of employee innovative work behavior, among nursing students. This study also sought to identify the mediating effect of self- leadership on the relationship between the sub-dimensions of knowledge sharing and innovative work behaviors. The rationale was to investigate how knowledge sharing and self- leadership interact with nursing students’ innovative work behavior in the ever developing health care systems of the modern world.

First, we hypothesized that knowledge sharing behavior would be positively and significantly associated with innovative work behavior. The Pearson correlation results supported this proposition, indicating positive and significant values on the relationship between knowledge sharing and innovative work behaviors. The study of Hu and Zhao has also recognized the positive effect of knowledge sharing behavior on

**Table 1**  
Correlations Between sub dimensions of Knowledge Sharing Behavior, Innovative Work Behavior and self- leadership (*N* = 148).

Variables	Idea generation	Opportunity exploration	Idea championing	Application	Knowledge sharing activities	Tacit and explicit knowledge
Idea Generation	1					
Opportunity exploration	0.39***	1				
Idea championing	0.52***	0.60***	1			
Application	0.59***	0.59***	0.62***	1		
Knowledge sharing activities	0.59***	0.28***	0.34***	0.43***	1	
Tacit and explicit knowledge	0.50***	0.23**	0.33***	0.29***	0.68***	1
Self- leadership	0.64***	0.32***	0.46***	0.44***	0.58***	0.55***

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

**Table 2**  
Predictive Factors for Sub Dimensions of Innovative Work Behavior.

a. Predictive Factors for Idea Generation							
Predictor variable	B	SE	$\beta$	t	p	Tolerance	VIF
Tacit and explicit knowledge	0.20	0.09	0.19	2.18	0.030	0.53	1.86
Participate to knowledge sharing activities	0.43	0.08	0.45	5.07	< 0.001	0.53	1.86
	$R^2 = 0.34$	$AdjR^2 = 0.345$	$F = 42.57$	$p < .001$		Durbin-watson = 1.87	
b. Predictive Factors for Opportunity Exploration							
Predictor variable	B	SE	$\beta$	t	p	Tolerance	VIF
Participate to knowledge sharing activities	0.30	0.08	0.28	3.62	< 0.001	1	1
	$R^2 = 0.08$	$AdjR^2 = 0.076$	$F = 13.15$	$P < .001$		Durbin-watson = 1.99	
c. Predictive Factors for Idea Championing							
Predictor variable	B	SE	$\beta$	t	p	Tolerance	VIF
Participate to knowledge sharing activities	0.34	0.31	0.34	4.49	< 0.001	1	1
	$R^2 = 0.12$	$AdjR^2 = 0.116$	$F = 20.22$	$p < .001$		Durbin-watson = 2.05	
d. Predictive Factors for Application							
Predictor variable	B	SE	$\beta$	t	p	Tolerance	VIF
Participate to knowledge sharing activities	0.40	0.07	0.43	5.75	< 0.001	1	1
	$R^2 = 0.18$	$AdjR^2 = 0.179$	$F = 33.10$	$p < .001$		Durbin-watson = 1.86	

**Table 3**  
Mediating effect of Self-Leadership on the Relationship between Knowledge Sharing behavior and Innovative Work Behavior.

a. Mediating Effect of Self leadership on the Relationship between Knowledge sharing activities and Opportunity Exploration (N = 148)									
Step	Independent Variable	Dependent Variable	B	$\beta$ (p)	t	Adjusted R <sup>2</sup>	F	p	
Step 1	Knowledge sharing activities	Opportunity exploration	0.30	$\beta_1 = 0.08 (< 0.001)$	3.62	0.07	13.15	< 0.001	
Step 2	Knowledge sharing activities	Self-leadership	0.37	$\beta_2 = 0.04 (< 0.001)$	8.81	0.34	77.71	< 0.001	
Step 3	Knowledge sharing activities	Opportunity exploration	0.15	$\beta_3 = 0.10 (0.134)$	1.50	0.10	9.93	< 0.001	
	Self-leadership	Opportunity exploration	0.40	$\beta_4 = 0.16 (0.014)$	2.49				
b. Mediating Effect of Self leadership on the Relationship between Knowledge Sharing Activities and Idea Championing (N = 148).									
Steps	Independent Variable	Dependent Variable	B	$\beta$ (p)	t	Adjusted R <sup>2</sup>	F	p	
Step 1	Knowledge sharing activities	Idea championing	0.34	$\beta_1 = 0.07 (< 0.001)$	4.49	0.11	20.22	< 0.001	
Step 2	Knowledge sharing activities	Self-leadership	0.37	$\beta_2 = 0.04 (< 0.001)$	8.81	0.34	77.71	< 0.001	
Step 3	Knowledge sharing activities	Idea championing	0.11	$\beta_3 = 0.09 (0.210)$	1.26	0.21	21.07	< 0.001	
	Self-leadership	Idea championing	0.62	$\beta_4 = 0.14 (< 0.001)$	4.40				

innovative work behavior (Hu & Zhao, 2016).

Second, we hypothesized that tacit and explicit knowledge would positively and significantly affects the idea generation phase of innovative work. Our findings supported this proposition by indicating a positive correlation and a significant positive regression value effect for tacit and explicit knowledge on the idea generation of nursing students. Therefore, H2 was not rejected. Moreover, previous research findings revealed that tacit knowledge transfer has a positive significant effect on innovation capability (Ritala, Olander, Michailova, & Husted, 2015). Further, receiving tacit knowledge from partner organizations reduces innovation costs by taking a first-time-right approach (Janamian, Crossland, & Wells, 2016). This point of view implies to leaders of nursing practice and education that developing the knowledge sharing behavior of nurses interacting with members of other organizations can lead to better innovative performance.

The third hypothesis was that participation in knowledge sharing activities would have positive and significant relationships with all the stages of innovative work behavior. Our findings supported this hypothesis as they showed positive correlations and significant regression results between participation in knowledge sharing activities and all stages of innovative work behavior: idea generation, opportunity exploration, and idea championing; thus, H3 was not rejected. Previous research has also explored how knowledge sharing activities positively affect innovation performance in organizations (Ritala, Olander, Michailova, & Husted, 2015).

Finally, there were two hypotheses (H4 and H5) on the mediating effect of self-leadership. H4 was that self-leadership has a mediating

effect on the relationship between participation in knowledge sharing activities and opportunity exploration. It was supported by the results, which showed insignificant value in step 3 of Baron and Kenny's regression analysis, as shown in Table 3-a ( $\beta_3 = 0.10, p = .134$ ; Baron & Kenny, 1986). H5 was that self-leadership has a mediating effect on the relationship between participation in knowledge sharing activities and idea championing. This hypothesis was supported by the insignificant regression values in Baron and Kenny's three-step regression analysis, as shown in Table 3-b ( $\beta_3 = 0.09, p = .210$ ).

Previous research has highlighted the significant positive relationship between self-leadership and individual innovation (Gomes, Curral, & Caetano, 2015).

Our study identified the mean value of the nursing students' innovative work behavior as 3.76, and the standard deviation as 0.57. A higher mean score was exhibited than the median score of 2.5 on the scale, indicating a high level of innovative work behavior from the nursing students in Sri Lanka. While scanning of the literature on the innovative work behavior of nursing students, only one study was found in the English language that found higher level ( $3.45 \pm 0.39$ ) of innovative behavior among nursing students; it was conducted in China (Zhong, Hu, Zheng, Ding, & Luo, 2018). These two studies provide critical evidence that nursing students can enhance innovative behavior, achieve long-term goals and become visionaries in their fields.

The present study confirmed the close correlation between knowledge sharing behavior and innovative work behavior. The regression analysis indicated that tacit and explicit knowledge were significant predictors of idea generation. Participation in knowledge sharing

activities was the more important factor because it predicted all the stages of innovative work behavior. Further, self-leadership showed a full mediating effect on the relationships between participating in knowledge sharing activities and opportunity exploration and idea championing, respectively. Overall, these findings suggest that to improve innovative work behavior, it is essential to integrate self-leadership development courses that promote positive attitudes toward gaining and sharing knowledge among colleagues and members of other disciplines. This study was limited in that it included only one nursing school in one province. Hence, it does not represent nursing student population in all provinces of Sri Lanka. There might be differences between the facilities of nursing schools, and the findings cannot be generalized.

## 5. Conclusion

Nursing students are energetic about gaining and sharing knowledge and innovation. Thus, we found that knowledge sharing behavior was positively and significantly correlated with innovative work behavior. Furthermore, participating in knowledge sharing activities proved to be the strongest predictor of innovative work behavior, and it was mediated by self-leadership. Therefore, to improve innovative work behavior, programs must integrate self-leadership development courses and provide stimulating opportunities to gain and share knowledge. This research's results may help to organize an integrated program for enhancing self-leadership skills and increasing innovative capabilities. We suggest increasing opportunities for research project collaborations with professors from other disciplines, for sharing knowledge through conferences, discussions, and scientific paper publications at both undergraduate and graduate levels.

Our results suggest nursing education institutes or faculties can lay the foundation to produce future innovators in nursing, who can manage the challenges of the modern technological world and the demands of providing effective, rapid recovery treatment strategies. We recruited one sample in one geographic region. Therefore, we encourage other researchers in Sri Lanka and elsewhere to conduct more research on innovation in nursing and focus on nursing education.

## Authors contributions

**TAA:** Study conception and design, data collection, data analysis and interpretation, drafting of the article.

**SHK:** Data analysis and interpretation, drafting of the article, critical revision of the article

## Ethical approval

Ethical Review Board (IRB) at Inje University- South Korea (2019-01-018-001).

## Funding source

no external funding.

## 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.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijans.2020.100190>.

## References

- Asurakkody, T. A., & Kim, S. H. (2019). *Critical thinking deposition as a mediator in the relationship between self-leadership and innovative behavior: a cross-sectional study*. [Manuscript submitted for publication].
- Afsar, B. (2016). The impact of person-organization fit on innovative work behavior: the mediating effect of knowledge sharing behavior. *Int. J. Health Care Quality Assur.* 29(2), 104–122. <https://doi.org/10.1108/IJHCQA-01-2015-0017>.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J. Person. Soc. Psychol.* 51(6), 1173–1182. <https://doi.org/10.1037/0022-3514.51.6.1173>.
- De Jong, J. P. J., & Den Hartog, D. N. (2007). How leaders influence employees' innovative behaviour. *Eur. J. Innov. Manage.* 10(1), 41–64. <https://doi.org/10.1108/1461060710720546>.
- De Spiegelaere, S., Van Gyes, G., De Witte, H., Niesen, W., & Van Hootegeem, G. (2014). On the relation of job insecurity, job autonomy, innovative work behavior and the mediating effect of work engagement. *Creativ. Innov. Manage.* 23(3), 318–330. <https://doi.org/10.1111/caim.12079>.
- Edu-Valsania, S., Moriano, J. A., & Molero, F. (2016). Authentic leadership and employee knowledge sharing behavior. *Leadership Organ. Develop. J.* 37(4), 487–506. <https://doi.org/10.1108/LODJ-08-2014-0149>.
- Gomes, C., Curral, L., & Caetano, A. (2015). Better off together: a cluster analysis of self-leadership and its relationship to individual innovation in hospital nurses. *Revista da Associação Portuguesa de Psicologia*, 29(1), 45–58. <https://doi.org/10.1142/S1363919615500097>.
- Houghton, J. D., & Neck, C. P. (2002). The revised self-leadership questionnaire. *J. Manage. Psychol.* 17(8), 672–691. <https://doi.org/10.1108/02683940210450484>.
- Huang, C. Y., Weng, R. H., Wu, T. C., Lin, T. E., & Hsu, T. C. (2018). Developing and testing the patient-centered innovation questionnaire for hospital nurses. *J. Nursing Manage.* 26(2), 227–237. <https://doi.org/10.1111/jonm.12539>.
- Huang, C. C. (2009). Knowledge sharing and group cohesiveness on performance: an empirical study of technology R&D teams in Taiwan. *Technovation*, 29(11), 786–797.
- Hu, B., & Zhao, Y. (2016). Creative self-efficacy mediates the relationship between knowledge sharing and employee innovation. *Social Behav Person.* 44(5), 815–826.
- Janamian, T., Crossland, S., & Wells, L. (2016). On the road to value co-creation in health care: the role of consumers in defining the destination, planning the journey and sharing the drive. *Med. J. Australia*, 204(7), 12–14. <https://doi.org/10.5694/mja16.00123>.
- Li-Ying, J., Paunova, M., & Egerod, I. (2016). Knowledge sharing behaviour and intensive care nurse innovation: the moderating role of control of care quality. *J. Nursing Manage.* 24(7), 943–953. <https://doi.org/10.1111/jonm.12404>.
- Magnier-Watanabe, R., & Benton, C. (2017). Management innovation and firm performance: the mediating effects of tacit and explicit knowledge. *Knowl. Manage. Res. Practice*, 15(3), 325–335. <https://doi.org/10.1057/s41275-017-0058-6>.
- Mannan, A. A., Bakri, N., & Shaari, R. (2017). Personal factors effect towards nurses knowledge sharing behaviour. Retrieved from *Sains Humanika*, 9(1), 13–18. <https://sainshumanika.utm.my/index>.
- Manz, C. C. (1986). Self-leadership: Toward an expanded theory of self-influence processes in organizations. *The Acad. Manage. Rev.* 11(3), 585–600. <https://doi.org/10.2307/258312>.
- Maravilhas, S., & Martins, J. (2019). Strategic knowledge management a digital environment: tacit and explicit knowledge in fab labs. *J. Business Res.* 94, 353–359. <https://doi.org/10.1016/j.jbusres.2018.01.061>.
- Pardo, A., & Román, M. (2013). Reflections on the baron and kenny model of statistical mediation. *Anales de psicología*, 29(2), 614–623. <https://doi.org/10.6018/analesps.29.2.139241>.
- Ritala, P., Olander, H., Michailova, S., & Husted, K. (2015). Knowledge sharing, knowledge leaking and relative innovation performance: an empirical study. *Technovation*, 35, 22–31. <https://doi.org/10.1016/j.technovation.2014.07.011>.
- Rogers, J., Révész, A., & Rebuschat, P. (2015). Implicit and explicit knowledge of inflectional morphology. *Appl. Psycholinguistics*, 1, 1–32.
- Sheng, M. L., Hartmann, N. N., Chen, Q., & Chen, I. (2015). The synergetic effect of multinational corporation management's social cognitive capability on tacit knowledge management: product innovation ability insights from Asia. Retrieved from *J. Int. Market.* 23(2), 94–110. <https://www.researchgate.net/profile/>.
- Sonmez, B., Ispir, O., Onal, M., & Emiralioglu, R. (2019). Turkish psychometric properties of the innovative behavior inventory and innovation support inventory: a model analysis on nurses. *Nursing Forum*, 1–9. <https://doi.org/10.1111/nuf.12325>.
- Weng, R. H., Chen, W. P., Huang, C. Y., Hung, C. H., & Hsu, C. T. (2016). Can nurse innovation improve customer perception of service quality and experience? *J. Clin. Nursing*, 25(13), 1950–1961. <https://doi.org/10.1111/jocn.13214>.
- Widyani, A. A. D., Sarmawa, I. W. G., & Dewi, I. G. A. M. (2017). The roles of knowledge sharing in mediating the effect of self-efficacy and self-leadership toward innovative behavior. *J. Mediter. Knowl.* 19(2), 112–117. <https://doi.org/10.9744/jmk.19.2.112-117>.
- Xue, Y., Bradley, J., & Liang, H. (2011). Team climate, empowering leadership, and knowledge sharing. *J. Knowl. Manage.* 15(2), 299–312. <https://doi.org/10.1108/13673271111119709>.
- Zhang, J. (2017). Benefit model of knowledge sharing behavior. *Open J. Social Sci.* 5, 161–169. <https://doi.org/10.4236/jss.2017.58013>.
- Zhong, Z., Hu, D., Zheng, F., Ding, S., & Luo, A. (2018). Relationship between information-seeking behavior and innovative behavior in Chinese nursing students. *Nurse Educ. Today*, 63(2018), 1–5. <https://doi.org/10.1016/j.nedt.2018.01.004>.