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Does the Three-shift Work Change the Relationship between Work Environment and Turnover Intention?

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Abstract:

This study examines the relationship between work environment and turnover intention, with a specific focus on the impact of three-shift work. Using survey data from a large hospital in South Korea and the job demands-resources model, we investigate whether three-shift work exacerbates the negative association between work environment and turnover intention. The findings indicate that a positive work environment can mitigate turnover intention, whereas three-shift work is associated with increased turnover intention. Notably, we found no evidence to suggest that nurses working in three-shifts perceive a weaker relationship between work environment and turnover intention. These results have implications for addressing the global nursing shortage and high turnover rates, suggesting that three-shift work may be a viable flexible work pattern. Furthermore, our study provides empirical support for the impact of three-shift work on employee perception, highlighting the need for managers to redesign work types, including three-shift schedules, to improve performance.

Keywords:
Work environment,
Turnover intention,
Three-shift work rotation,
The job demand-resource model,
Nursing industry

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三班制工作会改变工作环境与离职意愿的关系吗？

摘要：

本研究旨在调查工作环境是否与离职意向存在负相关关系，以及三班倒工作是否会加剧这种关系。在本研究中，我们试图确定三班倒工作对员工的负面影响是否仍然存在。为了实现我们的研究目标，通过使用韩国一家大型医院的调查数据和工作需求-资源模型，我们发现工作环境可以降低离职意向，而三班倒工作会增加离职意向。同时，我们找不到任何统计证据表明三班倒工作的护士对工作环境与离职意向之间的负相关关系的感知较少。本分析的含义是，三班倒的护士并不认为他们的三班倒工作会降低他们的工作绩效。根据研究结果，护士短缺和护士的高离职率是一个全球性问题，三班倒工作可以成为一种新的灵活工作模式，我们可以寻求解决护士短缺和护士高离职率的新方法。因此，本研究可以提供三班倒工作的任何共识，即三班倒工作对离职意向有负面影响。从研究目标和科学创新性来看，本研究的意义在于能够为三班倒工作制对员工三班倒工作感知的影响提供实证支持，未来管理者将尝试重新设计包括三班倒在内的各类工作类型，以实现更好的绩效。

关键词：工作环境、离职意愿、三班轮岗、工作需求-资源模型、护理行业

1. Introduction

The nursing shortage and high turnover rate among nurses has become a global issue (Kingma, 2011). With the outbreak of COVID-19, the nursing shortage has been aggravated so bad that many countries are facing the collapse of their medical system. Nurses are generally overworked and expensive to replace (Gess et al., 2008). Consequently, insufficient staffing can endanger patients' safety and healthcare quality (Aiken et al., 2014; Stalpers et al, 2015). In addition, the loss of nurses has a negative impact on the job satisfaction and the organizational commitment of the remaining nurses (Lynn & Redeman, 2005). Thus, it is important to retain the level of nursing maintenance in order to keep the medical system working.

Even though it is important to prevent the collapse of the medical system, nurses should provide medical service to their patients for 24 hours. In order to do that, some nurses have to work a unique three-shift work which can be categorized in terms of day, evening, or night schedule (Wilson, 2002). However, the three-shift work has long been considered to have a negative impact on non-work life because of the irregular working schedule (Iskra-Golec et al., 2017). The irregular work schedule may cause problems with mental and physical health (Ingre & Akerstedt, 2004; Coffey, 1998). Finally, nursing workers have avoided the three-shift work because the poor working conditions can lead to nursing shortage and a high turnover rate.

Even though there is a consensus that nurses consider the three-shift work as a negative work format, the perception of three-shift work has recently changed. In particular, since the outbreak of COVID-19, workers have begun to experience flexible work schedules in terms of location or time and to realize that the three-shift work can give them flexible off-duty schedule. In addition, as the number of three-shift workers has increased, nurses are more willing to choose three-shift work voluntarily. Thus, whether three-shift workers think that this has had a negative effect on them has been a big issue.

In this research, we explore whether the negative perception of three-shift work has changed and how three-shift work can affect the relationship between work climate and the intention to leave. Based on the results of this study, we can expect that we can provide any empirical background changing how to manage shift pattern revolutionary.

2. Literature Review

2.1. Job Demands-Resources Model

To explain the relationship between the job environment, turnover intention, and the effectiveness of shift work rotation, the job demands-resources model can be useful (Schaufeli & Taris, 2014). According to this model, employees are motivated to reduce their stress and improve their well-being (Demerouti & Bakker, 2010). It can explain the work-related characteristics that can result in high turnover. Two types of characteristics are related to work performance: job demands and job resources (Brauchli et al., 2013).

Job demands are "physical, psychological, social or organizational characteristics of the job that requires physical and effort" (Molino, et al., 2016, p.401). Job demands motivate employees to improve their performance (challenging job demands) and prevent them from attaining goals by involving undesirable and excessive constraints (hindering job demands) (Quratulain & Khan, 2015). Job resources represent physical, psychological, social, or organizational perspectives of the job that can be functional in fulfilling job requirements and may stimulate personal development (Brauchli et al., 2013). Job resources can be spread at the organizational level (career opportunity, job security), interpersonal relationship (supervisor support), or among tasks (performance feedback, autonomy) (Bakker & Demerouti, 2007).

According to the model, an increase in job resources

may enhance employee engagement and organizational outcomes (Schaufeli & Taris, 2014). Job resources such as the work environment help employees achieve their work goals and reducing job demands (Bakker & Demerouti, 2007). The job demands-resources model can propose the effectiveness of the interactional relationship between job demands and job resources (Bakker et al., 2003). The model can explain that job resources can buffer the impact of job demands, thereby reducing the job strain resulting from high work pressure. Consequently, based on the dual and comprehensive impact of both aspects on job performance, we can predict important organizational outcomes. This has been proven in many empirical studies (Bakker, et al., 2003).

2.2. Job Demands: Work Shift

According to the job demands-resources model, job strain is the result of an imbalance between job demands and job resources (Karasek, 1979). Job strain is at its highest when job demands are high and job resources are limited (Bakker & Demerouti, 2007). Work shift as an aspect of job demands consumes much energy (Bakker, 2015). Work shift refers to a work type scheduled in addition to regular daytime (McMenamin, 2007). It is necessary to maintain a certain level of service from daytime to night-time by succeeding each other at the workplace (International Labor Office, 1995). Many industries, including medical services and call centers, employ shift workers (Henderson, 2013). For example, nurses are scheduled for normal daytime work, two or three shifts including day, afternoon, and night shifts.

Previous studies postulate that three-shift work has a negative impact on the physical, psychological, social or organizational aspects of the job. We support Chang and Chang (2019), who proved that female shift workers have more problems with sleep quality than other workers. Consequently, due to the imbalance in sleep-wake cycles, three-shift workers are more vulnerable to continuous fatigue (James et al., 2017). Shift workers report serious fatigue resulting from insufficient rest between shifts (Barker & Nussbaum, 2011). Many previous studies found a relationship between fatigue from shift rotation and health problems such as cancers and cardiovascular diseases and diabetes (Gan et al., 2014; Torquati et al., 2019; Yousef et al., 2020). The health problems resulting from work shift rotation are negatively associated with employees' work behavior and job performance (Ki & Choi-Kwon, 2022).

Three-shift work can also have a negative relationship with social relationships with co-workers and family members (Grosswald, 2003). The three-shift work can interfere with the quality of marriages because shift workers and their spouses are on different schedules. Finally, the three-shift work pattern can create difficulties in family roles and other relationships (Iskra-Golec et al., 2017; Mills & Täht, 2010). More comprehensively, the negative effects of physical or social (family, workplace) problems can lead to poor professional development or peer cohesion, causing emotional exhaustion or burnout (Bambra et al., 2008; Kikuchi et al., 2010; Parkes, 2003; Whale, 1993).

However, three-shift work has been recognized as a new work pattern with a flexible schedule. In a flexible work schedule, "workers exercise a decision regarding the time of day they will arrive at and leave from work" (Baltes et al., 1999, p.497). If workers regard three-shift rotation as a flexible work schedule, three-shift work can affect organizational performance in terms of high level of job satisfaction or low level of turnover intention (Barney & Elias, 2010; McNall et al., 2009). Even though three-shift work is mandatory to maintain a certain level of service, it matters how rotating workers perceive their shift work. If they regard it as a part of a work pattern with a flexible schedule, they can accomplish both work-family balance and enrichment (Voydanoff, 2004). However, if work in three shifts results in a figure for job strain, it can lead to emotional exhaustion, burnout, or job stress (Glass et al., 1993).

2.3. Job Resources: Relationship between Work Environment and Turnover Intention

The work environment is an important factor in job performance (Wright & Davis, 2003). The work environment affects employees' morale, productivity, and job performance (Elnaga, 2013; Kitana & Karam, 2017; Norhasniah et al., 2018). Aiken et al. (2008) found that the work environment is negatively related to turnover intention. The effectiveness of a work environment is generalized to the nurse-to-staff or patient relationship (Letvak & Buck, 2008). In particular, much of the previous literature has proved that healthcare workers' job satisfaction is affected by career retention factors such as work environment and psychosocial factors (Berthelsen et al., 2017; Lindmark et al., 2018).

Turnover intention is defined as employees' thoughts about exiting their job (Akunduz & Eryilmaz, 2018; Park & Min, 2020, p.2). Much of the literature has focused on turnover intention rather than actual turnover (Flinkman et al., 2010) and concluded that turnover intention is the best antecedent of actual turnover (Auerbach et al., 2014; Fishbein & Ajzen, 1975). Turnover intention is perceived as "the practitioner's considered decision to leave the organization in which he or she is currently working" (Li & Shi, 2023, p. 2). In the end, a low level of turnover intention can result in reducing direct and indirect costs and maintaining the quality of patient care (O'Brien-Pallas et al., 2010; Robinson et al., 2014).

Much of the previous literature has suggested that the work environment is an important factor of job satisfaction, which is a predictor of the intent to leave among public employees (Duffield et al., 2010; Kagan et al., 2021). According to the findings, a good work environment can provide job satisfaction and is also positively related to lower turnover intention (Aiken et

al., 2008). As a result, employees can achieve a high level of job performance and innovation (Canterelli et al., 2016; Kitana & Karan, 2017). In this study, to prevent a lack of resources or employee shortage, control of turnover intention is significant for the organization and work environment is a key issue in turnover intention (Estryn-Behar et al., 2010; Leone et al., 2015; Sellgren et al., 2009).

Based on the previous literature, this paper sets the following hypotheses:

H1: Workers with a bad work environment are more likely to leave their job than others.

H2: Three-shift workers are more likely to leave their jobs than others.

H3: Workers with three shifts are more likely to recognize that a bad work environment can lead them to leave their job than others.

3. Data and Methodology

3.1. Data and Measurement

To investigate the effectiveness of the work environment on turnover intention and the moderating effect of three-shift work, this study collected data using a survey in October 2022. The questionnaire was administered by nurses in a large hospital in South Korea, and participants were selected at random. The survey measured the nurses' work environment, their intention to leave, and other demographic and educational factors. Based on the survey data, a series of ordinary least square (OLS) regression model is used to examine the hypotheses.

3.2. Dependent Variable

In the analysis, the model used the turnover intention as a dependent variable. Responses to four questions were collected: (1) "I want to work at another hospital." (2) "If I move to another hospital, the working condition will be better there than here." (3) "If I can choose another hospital for work, I won't choose this one." (4) If the conditions here get worse, I am willing to leave this hospital." Responses range from 1 to 5, with 1 representing "very dissatisfied" and 5 meaning that it is "very satisfied". To test the turnover intention variable, we ran a factor analysis with the VARIMAX rotational method. Stevens (2009) suggested that we determine the thresholds for factor loading based on a cut-off value of 0.4, which is irrespective of the sample size. Our model indicated that the initial eigenvalue is 1.530. Finally, to examine the reliability of the factor analysis, the Cronbach's alpha value for turnover intention was 0.817.

3.3. Independent Variable

As an independent variable, we include the work environment by using factor analysis. The level of nurses' perception of the work environment was revealed by responses to seven statements: (1) "I have enough opportunity to discuss with my colleagues about problems related to our work." (2) "Nurses can participate in nursing committee about their hospital or organization." (3) "Nurses can participate in decision making processes." (4) Nursing managers have both administrative ability and leadership." (5) "I work with able colleagues." (6) Job training programs are regularly open in order for consistency of nurses." (7) Nurses take charge of their patients at the same time." Participants responded to each of the seven statements on a scale from 1, meaning "strongly disagree," to 5, representing "strongly agree." Similar to the method to determine a dependent variable, we perform factor analysis with the VERIMAX rotational method to obtain the reliability of the variable. The initial eigenvalue is 5.803, which is over the cut-off value of 0.4, and Cronbach's alpha, which indicates the reliability of the factor analysis, is 0.884.

3.4. Control Variable

In terms of the control variables, among the many potential confounding variables, we selected seven categories that are important to control our model: gender, age, work department, work type, marriage, education level, and job rank. Gender is included as a dichotomous variable set to 1 if a nurse is female and 0 otherwise. Age is set as a series of dichotomous variables. Each variable can be divided into subgroups. The general ward, intensive care, emergency room and others are combined and described as a work department. For the job position variable, we set a series of dummy variables representing senior level, unit manager (UM), and others.

To examine the differences in the relationship between the work environment and turnover intention, the work type variable was set as an important independent and control variable. Even though there are a variety of work types in the nursing industry, we divided it into three groups: two shifts, three shifts, and others. In particular, three-shift work is one of the major variables that affect the relationship between work environment and turnover intention (Barker & Nussbaum, 2011; Iskra-Golec et al., 2017). In terms of social factors, the marriage variable is included as a dichotomous variable representing one that he/she is married and 0 otherwise.

Finally, the participants' education level is set as a series of dichotomous variables: college and graduate, setting others as a basic group.

Survey questions on both work environment and turnover intention and factor analysis are shown in Table 1.

The basic descriptive statistics are listed in Table 2.

Table 1. Factor analysis results (compiled by the authors)

Variables	Factor Loading
Dependent Variable: Turnover Intention	
(1) I want to work in another hospital.	0.757
(2) If I move to another hospital, the working conditions will be better than they are here.	0.751
(3) If I can choose another hospital for work, I won't choose this one.	0.747
(4) If any conditions worsen, I am willing to leave this hospital.	0.629
Initial Eigenvalue	1.530
Cronbach's Alpha	0.817
Independent Variable: Work Environment	
(1) I have enough opportunity to discuss problems related to our work with my colleagues.	0.807
(2) Nurses can join the nursing committee at their hospital or organization.	0.795
(3) Nurses can participate in the decision-making processes.	0.785
(4) Nursing managers have both administrative ability and leadership.	0.690
(5) I work with able colleagues.	0.660
(6) Job training programs are regularly open in order for consistency of nurses.	0.648
(7) Nurses take charge of their patients at the same time.	0.626
Initial Eigenvalue	5.803
Cronbach's Alpha	0.884

Table 2. Descriptive statistics (compiled by the authors)

Variables	Mean	Std. Dev.	Min	Max	Unit
Turnover Intention	0.00	1.00	-2.94	2.55	Factor score
Work Environment	0.00	1.00	-3.13	2.99	Factor score
Female	0.97	0.18	0	1	Female=1, Male=0
Ages 20-29	0.48	0.50	0	1	Ages 20 to 29 = 1
Ages 30-39	0.19	0.38	0	1	Ages 30 to 39 = 1
Age 40-49	0.11	0.31	0	1	Ages 40 to 49 = 1
General Ward	0.54	0.50	0	1	Working in General Ward = 1
Intensive Care	0.13	0.34	0	1	Working in Intensive Care = 1
Emergency Room	0.00	0.00	0	1	Working in the Emergency Room = 1
Two Shifts	0.07	0.25	0	1	Two Shifts=1
Three Shifts	0.67	0.47	0	1	Three Shifts=1
Married	0.35	0.48	0	1	Married=1
College	0.79	0.41	0	1	College Graduate=1
Graduate	0.11	0.31	0	1	Graduate=1
Senior	0.20	0.40	0	1	Position as Senior Level = 1
UM	0.14	0.34	0	1	Position as Unit Manager (UM) = 1

3.5. Model Specification

According to the variables, we tested the hypotheses using the OLS regression model. The regression models can find any statistically implacable relationship between the independent and dependent variables. To investigate the relationship between the work environment and turnover intention and the effectiveness of the three-shift work type, our models are developed into three steps. The first step is "the basic model" which tests the effectiveness of the control variables. Then, to examine whether the work environment is negatively related to turnover intention, the second model, the "work environment model," contains the work environment as a main independent variable. The last step is "the interaction model" which includes the interaction term between the work environment and the three-shift variables. The interaction model can provide the result of testing the third hypothesis on how employees (nurses) with three shifts perceive the relationship between work environment and turnover intention.

4. Results

Table 3 shows that the results of the F-tests confirm that the three models are statistically significant. The F-test values show statistical significance at the level of 1%. The F-value of the basic model is 6.391 and the work environment model, in which the work environment variable is included in the model, has an F-value of 9.045.

The final interaction model, including the interaction term between the work environment and the three shifts, has an F-value of 8.461.

The model fit results of the three models are provided in Table 3.

Table 3. Summary of the model fits (by the authors)

Model	F	R^2	Change in R^2
1	6.391***	0.201	
2	9.045***	0.279	0.078
3	8.461***	0.279	0.000

Table 4 provides the results of the three models. The first model proves that nurses in their 20s and 40s are more likely to leave their hospital, while those in their 30s are less likely to leave their hospital. They are statistically significant at the level of 1% (age between 20 and 29), 10% (age between 40 and 49), and 5% (age between 30 and 39). In terms of work department, emergency room nurses are more likely to leave their hospital, and this is statistically significant at the level of 5%. The three-shift variable, our main independent and control variable, was positively associated with turnover intention at the level of 5% significance.

Turning to the work environment model in which the work environment variable is included as an independent variable, other control variables show a similar result as the basic model. For example, nurses aged 20 to 29 and 40 to 49 years are more likely to leave their hospital and are statistically significant at 1% and 5% levels, respectively. In contrast, nurses in their 30s are less likely to leave their job. Regarding the work department, the emergency room variable was positively related to turnover intention, and the three-shifts variable was also associated with turnover intention. They are statistically significant at the level of 10% and 5%. The work environment is negatively related to turnover intention, which is statistically significant at the level of 1%.

Table 4. Regression model results (compiled by the authors)

Variables	Basic		Work Environment		Interaction	
	Coefficient (Std. Err.)		Coefficient (Std. Err.)		Coefficient (Std. Err.)	
Female	0.257 (0.286)		0.250 (0.274)		0.250 (0.274)	
Ages 20-29	1.048 (0.349)	***	1.032 (0.334)	***	1.027 (0.335)	***
Ages 30-39	-0.090 (0.040)	**	-0.097 (0.038)	**	-0.097 (0.038)	**
Age 40-49	0.479 (0.261)	*	0.491 (0.249)	**	0.489 (0.250)	*
General Ward	-0.102 (0.187)		-0.167 (0.179)		-0.167(0.179)	
Intensive Care	-0.066 (0.222)		-0.211 (0.214)		-0.211 (0.214)	
Emergency Room	0.545 (0.244)	**	0.403 (0.239)	*	0.402 (0.239)	*
Two Shifts	0.146 (0.231)		0.243 (0.225)		0.241 (0.225)	
Three Shifts	0.367 (0.163)	**	0.372 (0.158)	**	0.377 (0.160)	**
Married	0.068 (0.146)		0.043 (0.140)		0.044 (0.141)	
College	-0.115 (0.175)		-0.035 (0.168)		-0.040 (0.169)	
Graduate	0.160 (0.254)		0.175 (0.243)		0.168 (0.245)	
Senior	0.019 (0.156)		0.079 (0.152)		0.077 (0.152)	
UM	-0.385 (0.281)		-0.231 (0.270)		-0.233 (0.271)	
Work Environment (WE)			-0.292 (0.048)	***	-0.274 (0.088)	***
WE×Three Shifts					-0.025 (0.104)	
R^2	0.201		0.279		0.279	

Finally, the interaction model, which includes both the work environment and its interaction term with the three-shift variable, shows the results in detail among the variables. Similar to the results in the basic and the work environment model, being in their 20s and 40s has a positive relationship with turnover intention in the interaction model. They are statistically significant at the level of 1 and 5 %, respectively. In contrast, being in their 30s is negatively related to turnover intention, which is consistent with the results in the other models. With respect to the work department, the emergency room variable has a positive impact on turnover intention and it is statistically significant at the level of 10%. Regarding work type, nurses with three shifts are more probable to leave their hospital, and this is statistically significant at the level of 5%. Finally, the work environment variable is negatively related to turnover intention as the same result as the basic and the work environment model. However, the interaction term between the work environment and three-shifts showed a negative but not statistically significant impact on turnover intention.

The nursing shortage and high turnover rate of nurses is a global issue and three-shift work has contributed to nurses' turnover intention. However, if we catch the trend of changing nurses' perception on three-shift work, three-shift work type is no longer a hygiene factor (Herzberg, 2017). If nurses changed their mind that three-shift work is a new way of flexible work pattern, we can seek a new solution to the nursing shortage and nurses' high turnover rate. In the future, three-shift work will be a more flexible way of working, so public organizations need to accommodate nurses' needs. Thus, many human resource managers can develop shift patterns in more flexible and various ways with less restriction.

5. Conclusion

We delve into a missing link in the relationship between the work environment and turnover intention and the effectiveness of the three-shift work type on the relationship between them. According to the results in the three models, we found that the work environment is negatively related to turnover intention; the result supports the first hypothesis and is consistent with the previous literature. In addition, we set up an assumption that the three-shift work type is believed to increase turnover intention and empirically proved that shift work in the nursing industry is perceived as one of the main factors resulting in turnover intention.

Regarding the third hypothesis that workers with three shifts are more likely to realize that a bad work environment can lead them to leave their job, we cannot find any empirical result because the interaction term between work environment and three shifts is not statistically significant. This is what is newly discovered in this analysis. Due to the previous literature, three-shift rotation is perceived badly for shift workers because many studies found bad effectiveness of shift work physically and mentally. However, since the COVID-19 pandemic, the three-shift rotation has become more widespread. Employees' perceptions have also changed. In the long run, our analysis finds that there is no clue that three-shift nurses perceive that three-shift work can have a negative effect on the relationship between work environment and turnover intention negatively.

Even though we cannot find a statistically significant result in our models, our inability to find a statistical relationship of the interaction term is important for human resource management since the COVID-19 pandemic.

Methodologically, this paper first provides any empirical clue that it investigates the effectiveness of three-shift work on the perception of employees working in three shifts. Previously, numerous publications suggest the negative impact on three-shift work physically or mentally. In this research, we found the effectiveness of three-shift work on the perceived relationship between the work environment and turnover intention.

6. Limitations and Further Studies

In this study, we have several limitations in generalizing the findings. Even though we draw some meaningful implication from our analysis, we need to find a more generalized model to prove that our findings are statistically significant. Moreover, we administered a survey to nurses in a large hospital in South Korea. To generalize our results, we need to employ a richer set of respondents. In this connection, we need to ask more questions to examine all the features and generalize the results. However, our findings can contribute to the previously accumulated literature, and we hope that they will have a new implication for human resource management with three-shift work.

Author Contributions

Conceptualization, S.K. and S.P.; methodology, S.K. and B.T.; software, S.K.; validation, S.P. and B.T.; formal analysis, S.K. and S.P.; investigation, S.P. and B.T.; resources, S.K.; data curation, S.K. and S.P.; writing—original draft preparation, S.K. and S.P.; writing—review and editing, B.T.; visualization, S.K.; supervision, S.P.; project administration, S.P.; funding acquisition, S.K. All authors have read and agreed to the published version of the manuscript."

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (HC22QISI0077).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

No new data were created or analyzed in this study. Data sharing is not applicable to this article.

Conflicts of Interest

The authors declare no conflicts of interest.

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