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Article

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Assessing the Risk of Turnover Intention among Hospital Workers

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Solving the shortage of hospital workers has become an increasingly urgent priority in recent decades. Understanding the turnover problem remains a major scientific challenge. The objective of this study was to assess the risk intention for hospital workers based on the probabilistic risk assessment concept. A cross-sectional study was conducted. The survey samples included nursing staff and hospital workers from one regional teaching hospital in Taiwan. Participants completed a questionnaire with measures of emotional labor, job stress (JS), internal marketing (IM), organizational citizenship behavior, and the perception of turnover intention (TI) in order to assess a risk-based model of the perception of TI based on a dose-response relationship. The results showed that employees' perceptions of JS influenced their perception of TI, and organizational commitment was a mediator between IM and the perception of TI. To represent the current knowledge of the predictive model, the present study was the first to incorporate the probabilistic and risk assessment concepts to assess the perception of TI. The proposed dose-response scheme may enable the early identification of the perception of TI among individuals, and help to maintain workflow stability in hospital environments.

Keywords: Turnover intention, hospital workers, risk, job stress, healthcare management

A shortage of hospital workers has become an increasingly urgent problem in recent decades and it has brought a series of challenges to hospital administration (Manzano-García and Ayala-Calvo, 2014). Hospitals need to invest additional time and money to fill the vacancies and to train newly hired nurses; as a result, the quality of the patient care they deliver is often reduced (Gieter *et al.*, 2011). Therefore, explaining the turnover problem remains a major scientific challenge. The purpose of this research was to assess the risk of turnover intention (TI) among hospital workers.

LITERATURE REVIEW

Most previous research into the perception of TI has focused on the influence of personality or attitude among hospital workers, such as the predictors of organizational commitment or job satisfaction (Gieter *et al.*, 2011; Lu *et al.*, 2002; Tsai and Wu, 2010). However, to prevent turnover, hospital administrations tend to avert the leaving behavior before the perception of turnover and turnover behavior develops. Therefore, to explain the risk of TI among hospital workers, the present study instead incorporates more key predictors in a survey questionnaire, such as emotional labor (EL), job stress (JS), internal marketing (IM), and organizational citizenship behavior (OCB).

EL, which is “the management of emotions as part of the work role” (Diefendorff and Richard, 2003), is believed to influence a company’ s well-being through customer satisfaction (Kim, 2008). A healthcare worker’ s emotions and expressiveness will greatly influence a patient’s feelings and experiences. Although the employees become emotional, they must hide their true emotions during healthcare delivery. Additionally, many healthcare workers have died from overwork and the numbers are still increasing (Allegra *et al.*, 2005). Under high JS, many employees want to leave, which increases the turnover rate and damages the healthcare service quality. These reasons justify the inclusion of an employee’s EL and JS as predictors of the perception of TI.

IM is one tool that can motivate employees in the service industry. Almost all hospitals in Taiwan try to enhance their efficiency, and cost control is one of the targets when hospital administrators want to sustain operation during changes in the National Health Insurance Policy. When hospitals feel intense pressure to control their operating costs, many administrators resort to staff reduction and redesigning other organizational structures. However, both solutions decrease employee morale and indirectly affect operating efficiency in the short term. Administrators should look for a more suitable approach that will not only maintain employee morale but also improve efficiency despite limited human resources (Tsai and Wu, 2010).

OCB, which characterized by individuals voluntarily extending contributions that surpass their respective job duties, is regarded as a factor that influences an organization’s effectiveness (Organ, 1990). OCB is generally considered a positive behavior in organizations. OCB and the perception of TI influence employees’ service attitudes (Chan *et al.*, 2009), and the employees play a crucial role (González and Garazo, 2006) in the process of creating customer service value. Almost all of the past empirical studies

about the perception of TI have explored the influence of negative employee behavior. Tsai and Wu (2010) found that positive employee behavior affects the perception of TI in the medical industry. The results also demonstrated a significant negative correlation between OCB and the perception of TI.

Many published papers use theoretical models (Gao *et al.*, 2014; Tourangeau *et al.*, 2014) or structural equation models (Gursoy *et al.*, 2011) to measure the complex relationships between different variables. However, a new concept was developed to understand the perception of TI. The United States Environmental Protection Agency uses risk assessments to characterize the nature and magnitude of health risks to humans and ecological receptors from chemical contaminants and other possible environmental stressors [14]. In general, the amount of risk depends on the following three factors: (i) how much of a chemical is present in an environmental medium, (ii) how much contact a person or ecological receptor has with the contaminated environmental medium, and (iii) the inherent toxicity of the chemical (The United States Environmental Protection Agency, 2016).

Based on these concepts, we reconsider our approach and construct a dose-response curve for understanding social issues, such as the perception of TI among hospital workers. In this study, “dose” represents the external characteristics, job content, work environment, organizational support, and personal characteristics. “Response” represents the risk of TI. In other words, the most significant factor for assessing the risk model of the perception of TI is investigated. Hence, the two objectives of this study are (i) to conduct a cross-sectional study via a survey questionnaire and consider the key predictors of EL, JS, IM, and OCB to explain the risk of TI, and (ii) to assess the risk model of the perception of TI based on the dose-response concept.

METHODOLOGY

-Study Design and Data Collection

A cross-sectional study was conducted between September 1 and September 30, 2015. The survey samples included nursing staff from one regional teaching hospital in Taiwan. At the beginning of the questionnaire, participants were asked to provide information regarding their sex, marital status, age, education, job position, and seniority. Fifty questionnaires were distributed, and 44 valid questionnaires were received, yielding a response rate of 88.0%. The questionnaire contained a range of closed statements. Respondents

were asked to rate their level of agreement on a five-point Likert scale. The response options from 1-5 represented “strongly disagree”, “disagree”, “neutral”, “agree” and “strongly agree”, respectively. For JS, a modified 35-question version of England’s Health and Safety Executive’s Management Standards Indicator Tool (Health and Safety Executive, 2001) was used (Edwards *et al.*, 2008). For EL, Wu’s scale that was modified to include 13 items (Wu and Cheng, 2006) was used. For IM and OCB, Tsai and Wu’s (2011) 14-item and 8-item scales were used, respectively. Tsai and Wu’s (2010) 7-item self-reporting instrument was used to measure the perception of TI. This survey questionnaire was approved by the institutional review board of the Committee of Kaohsiung Armed Forces General Hospital (KAFGHIRB 105-031).

-Data Analysis

The data were analyzed using SPSS 19.0, with descriptive statistics indicating the demographics of the sample. To understand the relationships between the demographic characteristics of the hospital workers and their perceptions of EL, JS, IM, OCB, and TI, a one-way analysis of variance was conducted with equal variance assumed (Macnee and McCabe, 2007). Furthermore, Scheffe’s post-hoc comparison was conducted, focusing on results with statistically significant differences. Linear regression was used to model the relationship between the perception of TI and predictors of JS, IM, OCB, and EL. Cronbach’s α was also used to measure the internal consistency (reliability) and it was most commonly used with multiple Likert questions in the questionnaire. All Cronbach’s coefficients exceeded 0.70, which is regarded as acceptable (DeVellis, 2011).

-Probabilistic Density Functions for the Variables

Figure 1 illustrates the model framework for constructing the predictive model in this study. Briefly, based on the survey questionnaire, the mean and standard deviation for each item among the five variables (IM, OCB, JS, EL, and TI) were analyzed (Figure 1A). Probabilistic density functions (PDFs) for each variable were constructed using the following equation:

$$P(TI) = \sum_{i=1}^{i=7} P(TI_i) \quad (\text{Eq. 1})$$

Where $P(TI_1)$ to $P(TI_7)$ represent the PDFs for item 1 and item 7 in the perception of TI section, respectively.

After calculating each score, the total score, in conjunction with a Monte Carlo (MC) analysis, was used to

incorporate variability among the different participants. To explicitly quantify the uncertainty/variability of the data, a MC simulation was performed and repeated 10,000 times via the random sampling method (stability condition) to obtain a 95% confidence interval (CI). The process of repeatedly sampling from probability distributions was used to derive a distribution of outcomes. The MC simulation was implemented using the Crystal Ball software (version 2000.2, Decisioneering Inc., Denver, CO, USA). Log-normal (LN) distributions were also assigned for total items, since the estimation must be positive. The PDFs for IM, OCB, JS, and EL were constructed using the same method as for the PDF for each variable (Figure 1B).

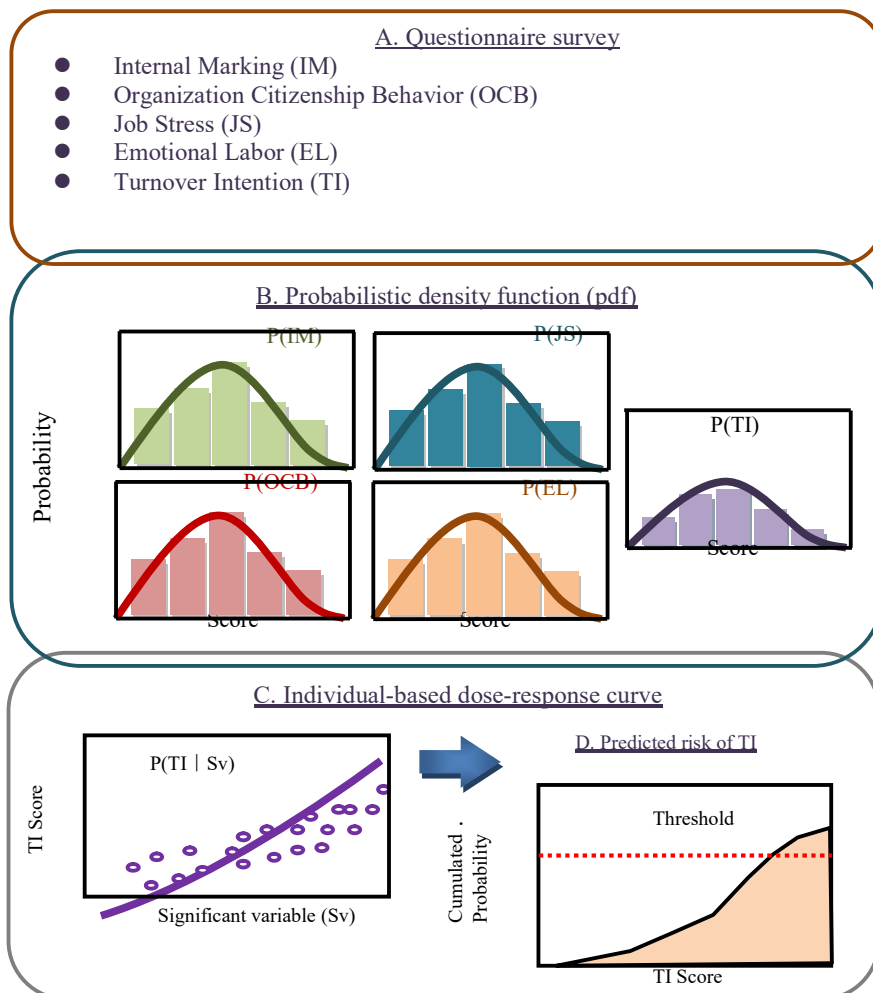


Figure 1. Study Framework and Illustration Explanation used in this Study

-Risk Model of the Perception of Turnover Intention

Based on the cross-sectional study and statistical analysis, the best significant variable (Sv) of TI was chosen to construct the best-fitting dose-response curve. Dose and response were used to illustrate the Sv and TI, respectively. The TableCurve 2D software (version 5.01, SYSTAT Software Inc.) was used to perform the curve fitting techniques. TableCurve 2D provided the best-fitting model with coefficients of determination and 95% CIs (Figure 1C).

Therefore, the joint probability technique was used to connect the PDF of the Sv and the dose-response curve, employing the following equation:

$$R(TI) = P(Sv) * P(TI | Sv) \quad (\text{Eq. 2})$$

where $R(TI)$ represented the predicted risk of TI at a specific score and $P(Sv)$ represented the PDF of the Sv. The relationship between a one-unit estimation of the Sv and the estimation of TI could be expressed as $P(TI | Sv)$. Finally, the cumulative probability function was used to express the predicted risk of TI (Figure 1D).

RESULTS

-Descriptive Statistics

The majority of the participants were female (88.6%). Of the participants, 59.1% were married, 31.8% were between the ages of 36 and 40 years, 79.5% had a college or university education, 43.2% held positions as general employees, and 56.8% had seniority over 10 years (Table 1, Appendix-II). The mean value of the employees' EL responses ranged from 3.05 to 3.98. The mean value of employees' JS, IM, OCB, and TI ranged from 2.75– 4.02, 3.41– 4.00, 3.77– 4.30, and 2.39– 3.00, respectively.

The Cronbach's α for JS, EL, IM, OCB, and TI was 0.874, 0.830, 0.913, 0.877, and 0.850, respectively. All Cronbach's coefficients exceeded 0.70, which means that the questionnaire had acceptable reliability.

-Inferential Statistical Analysis

Male individuals displayed stronger perceptions regarding JS than the female individuals. Age was found to affect employees' perceptions of IM and TI. Participants between the ages of 36 and 40 years scored significantly higher on IM than employees aged 31-35 years. This study also found that employees aged 31-35 years have markedly higher perceptions of TI than those aged 36-40 years.

Seniority was found to influence employees' perceptions of TI. Those who had worked in the profession for 5-10 years showed stronger perceptions of TI than those who had worked in the field for over 10 years. Seniority was also found to influence employees' perceptions of IM. Those who had worked in the profession for over 10 years showed stronger perceptions of IM than those who had worked in the field for 5-10 years.

Employee position influenced their perceptions of JS, TI, IM, and OCB. Those positioned as frontline employees showed stronger perceptions of JS than those who were general employees, followed by first line managers and middle managers. First line managers showed stronger perceptions of IM and OCB than frontline employees (Table 2, Appendix-III). According to the linear regression analysis, employees' perceptions of JS influenced their perceptions of TI ($\beta = 0.823$, $p = 0.000$) (Table 3).

	β (t value)	R^2	Adjusted R^2	F value	freedom
EL→JS	-0.053(-0.409)	0.004	-0.021	0.167	1,40
EL→TI	0.186(0.766)	0.014	-0.010	0.586	1,41
JS→TI	0.823(3.070***)	0.191	0.170	9.424	1,40
IM→TI	-0.181(-1.165)	0.033	0.009	1.357	1,40
IM→OCB	0.648(4.924)	0.377	0.362	24.242	1,40
OCB→TI	-0.032(-0.204)	0.001	-0.023	0.042	1,42

Note. † $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

Table 3. Linear Regression Analysis

-Probability Distribution Function of the Five Variables

The PDFs for the five variables are presented in Appendix-I (A-E) using the MC simulation technology. Independent runs with 10,000 iterations for each parameter sampled were conducted independently from the LN distribution. Hence, the median scores for TI, IM, OCB, EL, and JS were estimated to be 18.42, 51.65, 32.34, 47.20, and 88.92, respectively, whereas the scores ranged from 7-35, 14-70, 8-40, 13-65, and 35-175. A box-and-whisker plot was used to represent the uncertainty with 95% CIs for the five variables. The ranges were calculated by multiplying the number on the five-point Likert scale and the item numbers of each variable.

-Perception of Turnover Intention

Based on the statistical analysis, JS was the most Sv correlating to TI compared to the other variables. Hence, the dose-response profile was implemented as $P(TI | JS)$ in Figure 2 using TableCurve 2D. The adequate fit model for the data points of employees were shown as:

$$TI = a + b(JS)^2 \quad (r^2 = 0.133) \quad (\text{Eq. 3})$$

where the two parameters of a and b were estimated to be 11.36 ± 2.78 (mean \pm standard error [SE]) and 0.00086 ± 0.00033 (mean \pm SE), respectively (Figure 2).

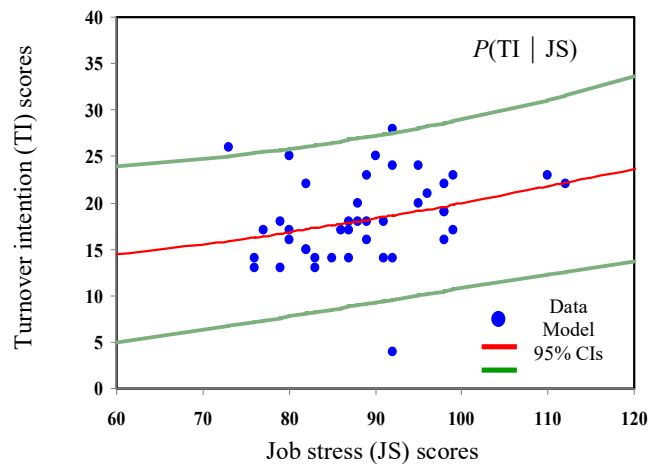


Figure 2. The dose-response profile was illustrated by Table Curve 2D. Original data and fitting model with a 95% confidence interval are shown

Figure 3A (Appendix-IV) shows the histograms for the predicted cumulative distribution function (CDF) of the TI scores. The exceedance risk curve is shown in Figure 3B, which was estimated as 1-CDF of the TI scores (Figure 3A). The results demonstrated that the probability that 50%, 25%, 5%, and 2.5% or less of the TI is approximately 18.18, 20.25, 23.32, and 24.22, respectively.

DISCUSSION

The purpose of this study is to assess the risk of TI among hospital workers. An interdisciplinary method for assessing the probability of the perception of TI is used, based on a cross-sectional study combined with a risk-based framework. The results indicate that an employees' perception of JS influences their perception of TI. However, this pilot study only has 44 valid questionnaires. A larger-scale investigation of hospital workers

would increase the power of the study.

Given that the factors of the perception of TI are investigated, these factors could be the predictors. One significant finding is that the perception of stress can positively influence an employee's perception of TI. The results show that the higher the stress, the higher the perception of TI. The high perception of TI will lead to a high turnover rate, which could decrease the service quality. Hospital administrators should, therefore, do more to ease JS.

In general, most researchers agree that organizational commitment describes a psychological state that characterizes the relationship of an employee with the organization for which they work, which has implications for their decision to remain with the organization (Allen and Griffeth, 2001). Tsai and Wu (2011) found that IM influences organizational commitment. However, the results of the present study do not support the idea that IM influences the perception of TI. This unexpected result may be because organizational commitment is a mediator between IM and the perception of TI. Future research is suggested in order to explore the relationships between IM, organizational commitment, and the perception of TI. Previous researchers have also found a positive correlation between JS and the perception of TI (Alsarairah *et al.*, 2014; Scanlan and Still, 2013). This finding is consistent with the present study because stress has a positive influence on the perception of TI. Future research that examines how job satisfaction influences stress, organizational commitment, and the perception of TI is recommended.

Alternatively, the linear regression analysis shows that JS explains 19.1% of the total variation for the perception of TI. These results also reveal that EL, IM, and OCB contribute smaller explanations for the variation (Table 3). Stepwise regression was also conducted; this step-by-step iterative construction of a regression model involves automatic selection of independent variables. The results indicate that three variables explain 19.6% of the total variation for the perception of TI ($TI = -12.43 + 0.23OCB + 0.19JS + 0.2EL$) and two variables explain 18% of the total variation for the perception of TI ($TI = -8.96 + 0.29OCB + 0.19JS$). Based on the results of the previous analysis, similarly explained levels are presented. This finding implies that some variables must still be considered in our predictive model for the perception of TI.

From a research perspective, how to validate the predicted perception of TI is still a key issue in model construction. The model validation was performed based on the actual 44-point estimates of participants,

compared to the predicted point estimates by a fitted equation (Eq. 3). The results show that the r^2 estimation was 0.18, which indirectly expresses the performance of the prediction ability. To represent current knowledge of the predictive model, the present study is the first to incorporate the probabilistic and risk assessment concepts to assess the perception of TI. The proposed dose-response scheme will hopefully enable the early identification of the perception of TI in individuals, and help to maintain workflow stability in hospital environments.

CONCLUSION

Assessing and predicting the perception of TI among hospital workers is indeed a critical issue. In this study, a new concept is provided for understanding the perception of TI. A cross-sectional study was conducted via a survey questionnaire, in which the key predictors of EL, JS, IM, and OCB were considered to explain the risk of TI, and the risk model of the perception of TI was assessed. The results may provide valuable practical data and have more policy implications than other methods.

LIMITATIONS AND FUTURE DIRECTIONS

The results indicate that three variables explain 19.6% of the total variation for the perception of TI and two variables explain 18% of the total variation for the perception of TI. The R^2 of the two regression models were all below 20%. Cole and Bruch (2006) proposed that organizational identity and organizational commitment may influence employees' TI. The authors suggest that researchers could add other variables in order to increase the R^2 .

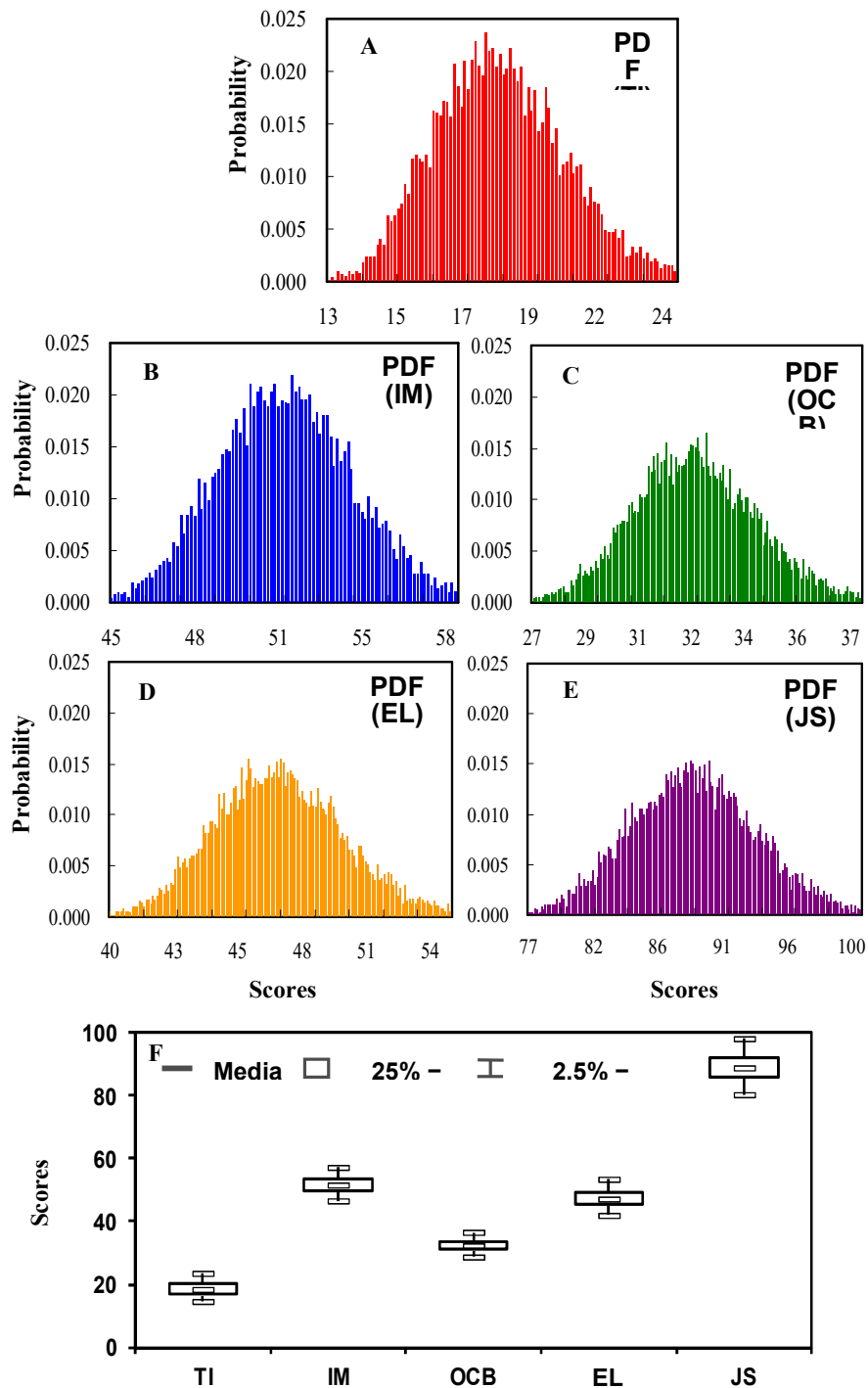
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Probabilistic Density Functions (pdf) for Five Variables including (A) Perception of turnover intention (TI), (B) Internal marketing (IM), (C) Organization citizenship behavior (OCB), (D) Emotional labor (EL), and (E) Job stress (JS). (F) A box-and-whisker plot for the five variables is shown.

Demographics	Number	%
Sex		
Female	39	88.6
Male	5	11.4
Marital status		
Not married	16	36.4
Married	26	59.1
Others	2	4.5
Age		
Under 25	1	2.3
26-30	7	15.9
31-35	11	25.0
36-40	14	31.8
41-50	10	22.7
Over 51	1	2.3
Education		
High School	1	2.3
College and University	35	79.5
Master and PhD	8	18.2
Position		
Frontline employee	15	34.1
General employee	19	43.2
First line manager	6	13.6
Middle manager	3	6.8
Top manager	1	2.3
Seniority		
1-2 years	5	11.4
3-4 years	5	11.4
5-9 years	8	18.2
Over 10 years	25	56.8
Missing data	1	2.3

Table 1. Participant Demographics (n=44)

Dependent Variables	Independent Variables	F value (P value)	Scheffé's post hoc
Emotional Labor (EL)	Gender	2.137(0.151)	
	Marital Status	0.722(0.492)	
	Age	0.174(0.913)	
	Educational level	0.474(0.495)	
	Position	0.283(0.838)	
	Seniority	0.211(0.888)	
Job Stress (JS)	Gender	5.772(0.021*)	Male>Female
	Marital Status	0.839(0.440)	
	Age	0.889(0.455)	
	Educational level	1.336(0.255)	
	Position	6.089(0.002**)	Frontline employee > General employee, First line manager, Middle manager; General employee > First line manager
	Seniority	1.400(0.258)	
Internal Marketing (IM)	Gender	0.564(0.457)	
	Marital Status	0.263(0.770)	
	Age	1.569(0.13)	36-40>31-35
	Educational level	0.034(0.855)	
	Position	2.374(0.085†)	First line manager > Frontline employee
	Seniority	1.923(0.143)	More than 10years>5-10years
Organisational Citizenship Behaviour (OCB)	Gender	2.716(0.107)	
	Marital Status	0.199(0.821)	
	Age	0.058(0.982)	
	Education level	1.676(0.202)	
	Position	2.829(0.051†)	First line manager > Frontline employee
	Seniority	0.119(0.948)	
Perception of turnover intention (TI)	Gender	1.129(0.294)	
	Marital Status	0.184(0.833)	
	Age	2.301(0.092†)	31-35>36-40
	Education level	1.317(0.258)	
	Position	2.322(0.09†)	Frontline employee > First line manager
	Seniority	3.726(0.019*)	5-10 years>More than 10 years

Note: † $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

Table 2. One-Way ANOVA and Scheffé's Post Hoc Analysis

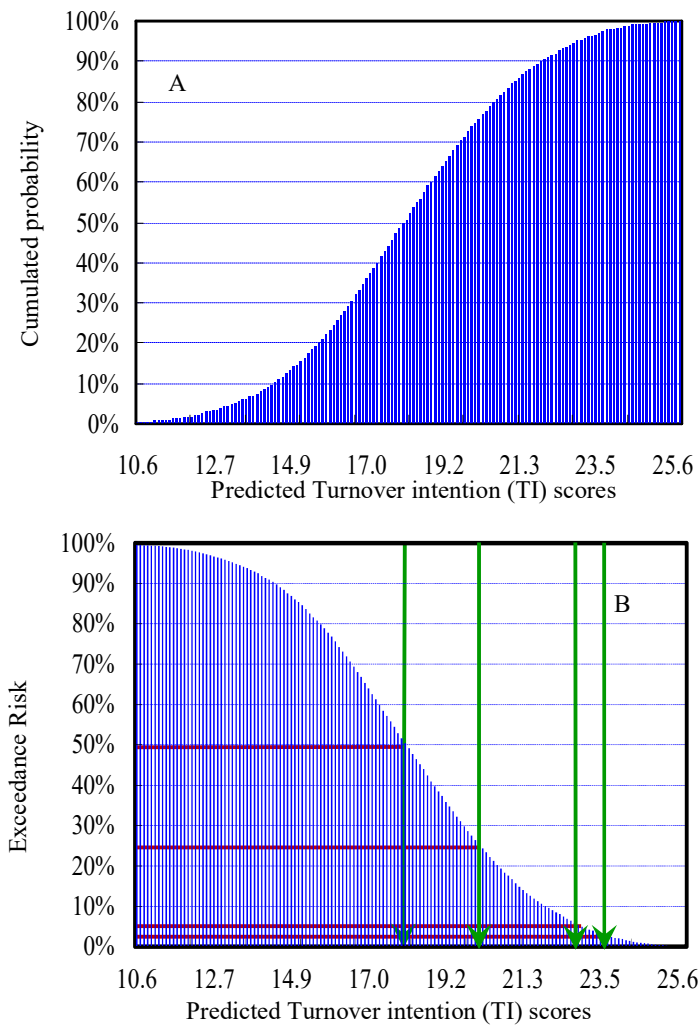


Figure 3. (a) Cumulative Probability and (b) Exceedance Risk for Predicted Perception of Turnover Intention Scores