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On the relationship between safety climate and occupational burnout in healthcare organizations

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Abstract

The important concepts of safety climate and occupational burnout and have been widely addressed by healthcare professionals. However, few researchers conducted a comprehensive and more detailed study to investigate independently relationship between safety climate and burnout and their effects on each especially in healthcare organizations yet. The purpose of the study is therefore to investigate and establish a relationship between safety climate and occupational burnout. In addition, the relationship between job and socio-demographic characteristics (JSDC) with both safety climate and burnout is examined. In the present study a cross-sectional design was conducted using questionnaires to measure safety climate, occupational burnout and JSDC of nurses while descriptive, inferential statistics, path analysis and structural equation modeling (SEM) were applied to test the relationships between the three parameters. The findings show a significant relationship between safety climate and unit type, job satisfaction, job interest, and stress. Likewise, there is a strong relationship between the lack of personal accomplishment and job satisfaction, job interest and stress. Also, safety climate has a strong correlation with both the frequency and the severity of occupational burnout dimensions. The results of the SEM also support a negative correlation between occupational burnout and safety climate, where a decrease in the latter is associated with an increase in the former.

Key words: Occupational burnout; Safety climate; Hospital nurses; Path analysis; Structural equation modeling.

1. Introduction

1.1. Occupational burnout

Occupational burnout was introduced by Freudenberger (1974) as the consequence of long term stress at work. The symptoms of burnout appear when the capability of an individual no longer fits the demands of the job (Freudenberger, 1974; Walston et al., 2010). The term occupational burnout is usually used to describe negative changes in attitude, spirit, and behavior in dealing with mental pressure. It is a reaction of the body to the failure of defensive strategies that people adopt to handle stress at work (ElBardissi et al., 2008). Occupational burnout can be physical, emotional, or psychological fatigue caused by long term engagement in demanding situations; in general, occupational burnout is attributed to emotional exhaustion (e.g., the depletion of emotional energy), depersonalization (e.g., negative emotions and attitudes), and lack of personal achievement (e.g., the feeling of job dissatisfaction, decrease of motivation, and falling commitment) (Schmitz et al., 2000; Khamisa et al., 2013).

Occupational burnout can be developed in a wide variety of professions; however, it is more common among physicians, nurses, health consultants, and in general, among employees who directly deal with service takers (Ahmadpanah et al., 2014). Among the above-mentioned professions, nurses are highly susceptible to burnout as on the one hand they are subject to physical and psychological pressures and on the other hand they should remain motivated at the same time (Okwaraji and En, 2014). Galea (2014) showed that gradual effects of occupational burnout first appear in personality and behavior of nurses and eventually in their health and attitudes of the individual. Regarding nurses, it is worthy to note that burnout has a dual effect: (i) it can influence psychological health of the nurse and develops physical/mental symptoms which in turn can lead to the absence from or change of job; (ii) it can degrade quality of services provided by the nurse, causing service dissatisfaction as well as delay in diagnostic and treatment services and most importantly patient disappointment. Thus, detecting and dealing with occupational burnout is of great importance in improving the psychological health of nurses, their quality of services, and patients' level of satisfaction with medical services (Garrosa et al., 2010).

1.2. Safety climate

Safety climate within an organization is defined as how the employees perceive the organization's approach towards safety. Safety climate is a measure of the current situation of the organization, depending on time and place and being relatively unstable as it changes with the situation (Lin et al., 2008). Thus, safety climate is to a large extent influenced by organizational and individual factors and may influence safety behavior of the staff (Gatien, 2010).

1.3. Relationship between occupational burnout and safety climate

Many studies have been conducted to investigate the factors affecting safety climate and occupational burnout in different countries (Walston et al., 2010; Radzaz and Bahari, 2013; Akbari et al., 2015; Sarsangi et al., 2014, 2015; Jafari et al., 2013; McCaughey et al., 2013; AbuAlRub et al., 2012; Hu et al., 2015; Idris and Dollard, 2014).

Several studies indicate that Psychosocial Safety Climate (PSC) is related to several aspects of psychological health such as burnout, depression (Dollard and Bakker, 2010; Idris and Dollard, 2014; Idris et al., 2011; Law et al., 2011) Idris et.al conducted a study in private sector businesses/organizations in Malaysia. He show PSC has an effects on psychological problems such as burnout, depression and finally, his results suggest that PSC lead to reduce employee psychological problems in the workplace, via working conditions (Idris and Dollard, 2014).

Dollard et.al reveal that PSC can predict psychological health problems such as emotional exhaustion in the Australian education workers, through its effect on work pressure and emotional demands. However, PSC is largely determined by first-line managers, and is stating of management priority for worker psychological health in Organizational context (Dollard and Bakker, 2010).

Nahrgang et al., (2011) et.al conducted a meta-analytic investigation and he found that burnout was negatively related to working safely. The results indicate that burnout was significantly related to accidents and injuries in the workplace. Profit et.al reveal NICUs with more burnout had lower safety climate (Profit, 2014). However, very few of researchers have studied the effects of these factors on both safety climate and occupational burnout altogether in healthcare organizations. In addition, in spite of a general agreement on the three-dimensional space of occupational burnout, most researchers have focused on only one dimension, such as emotional exhaustion (Stordeur et

al., 2001; Idris et al., 2012) or depersonalization without considering lack of personal accomplishment (Jaworek et al., 2010).

Moreover, much of previous work has attempted to identify the structural factors of safety climate or to examine the relationships between safety climate and unsafe behaviors and near misses (Mark et al., 2007). However, few researchers conducted a comprehensive and more detailed study to investigate independently relationship between safety climate and burnout and their effects on each especially in healthcare organizations yet.

Therefore, the present study is an attempt to investigate such a relationship, with a particular emphasis on the six dimensions of safety climate (according to a study of Sarsangi et al. 2015) , that is, 1) accumulative fatigue, 2) training of nurse, 3) communication with physicians, 4) nurses' relationships, 5) attitude of supervisors and 6) reporting of errors) and the three dimensions of occupational burnout, that is, 1) Emotional exhaustion, 2) Depersonalization, and 3) Lack of personal achievement. The present study is based on a survey conducted in hospitals in the Northeast of Iran. The relationship among the job and demographic variables of participants and the safety climate and occupational burnout is also examined.

2. Material and methods

A cross-sectional study was conducted across four hospitals in the North East of Iran in 2015. The participants consisted of all qualified nurses (N=295) who are working at four hospitals in the Northeast of Iran.

The inclusion criteria comprise being a registered nurse (at least one year) in the hospital, and the willingness to participate while the exclusion criteria consist of having a record of psychiatric drugs, or experiencing severe stresses and mental illness in the last six months (e.g., due to the death of family members, divorce, serious accidents). In this study 295 participants were asked to participate. However, a number of participants (questionnaires) were excluded because of using psychiatric drugs (7 cases) or experiencing severe stresses in the last six month (38 cases). Finally, 250 participants were analyzed. There are two questions in the JSDC questionnaire and participants were asked whether they have a history of using psychiatric drugs or they experienced extreme stress in the last six month. We clearly explained the objectives of the study for the participants by attending in study settings and informed consent obtained from each participant.

Three types of questionnaires were used for data gathering, including Job and Socio-Demographic Characteristics (JSDC), Maslach Burnout Inventory (MBI), and Safety Climate of Nurses (SCN). The first questionnaire comprised 30 questions about job and personal information.

The MBI comprised 22 questions to measure the frequency and severity of burnout based on the three dimensions of emotional exhaustion (9 questions), depersonalization (5 questions), and personal accomplishment (8 questions). These questions are scored based on frequency (never: 0; few times per year:1; few times per month: 2; once a week: 4; few times per week: 5; every day: 6) and severity (never: 0; very low: 1; low: 2; average: 3; above average: 4; high:5; very high: 6). Reliability and validity of the MBI were determined (from the literatures) using Test-Retest Reliability Coefficient (as a measure of how consistent the results of a test are over time) and Cronbach's alpha (as a measure of internal consistency) and all data are available in the related literatures (Maslach et al., 1997; Maslach and Goldberg, 1999; Najafi and Forouzbakhsh, 2000).

No valid cut-off points have been provided in the literature in order to determine the presence of occupational burnout. However, high scores for emotional exhaustion and depersonalization and low scores for professional accomplishment suggest the presence of this syndrome (Portero de la Cruz and Vaquero Abellán, 2015). To analyze the scores obtained on the three scales, the following cut-off points were applied (Maslach C et al., 1997; Portero de la Cruz and Vaquero Abellán, 2015)

Emotional exhaustion is $\begin{cases} low\ if\ score < 15 \\ medium\ if\ 15 < score < 24 \\ high\ if\ score > 24 \end{cases}$

Depersonalization is $\begin{cases} low\ if\ score < 4 \\ medium\ if\ 4 < score < 9 \\ high\ if\ score > 9 \end{cases}$

Personal accomplishment is $\begin{cases} low\ if\ score < 33 \\ medium\ if\ 33 < score < 39 \\ high\ if\ score > 39 \end{cases}$

The lack of personal accomplishment was used instead of personal accomplishment to make the interpretation of the result easier (Jenkins and Elliott, 2004;Garrosa et al., 2010).

SCN questionnaire is comprised of 22 questions and has been designed to measure safety climate of nurses. The safety climate was assessed using the 5-point likert-type scales ranging from 1 (completely disagree) to 5 (completely agree) with six sub-dimensions, which are, attitude of supervisors (4 questions), relationship among nurses (4 questions), communication with physicians (4 questions), accumulative fatigue (5 questions), reporting of errors (4 questions), and nursing training (5 questions). Sarsangi et.al, (2015) conducted a study at aimed to development and psychometrics of "nurses' safety climate assessment questionnaire" in Iran. Finally, he developed a credible questionnaire with above mentioned sex dimensions to safety climate assessment in Iranian nurses. In the present study we used this questionnaire. Face and content validity of the SCN are obtained using expert judgment and Lawshe's method (Lawshe, 1975) respectively and to evaluate the questionnaire reliability, the internal consistency and test-retest reliability methods were used by Sarsangi, et.al. More information for validity and reliability of the SCN questionnaire is provided by Sarsangi, et.al .2015.

According to central limit theorem (CLT), if the number of observations are equal to or greater than 30, therefore the mean of observations will be normally distributed (Ross, 2009). In the present study the number of observations (participants) are 250. Also we used Graphical Techniques ("Chi-by-Eye") as a complementary approach to check normality distribution of data. In this graphical approach we create a histogram of the sample data and used the histogram to make a subjective appraisal as to whether normality seems reasonable. Therefore, the data of the present study were normally distributed. Additionally, the data were checked for multicollinearity using tolerance and the variance inflation factor (VIF) (Kleinbaum et al., 1988). VIF values greater than 10 and tolerance-values smaller than 0.10 may show multicollinearity. There were no collinearity problems among the independent variables in the present study.

Finally, the data were analyzed by an independent sample t-test, one-way ANOVA as parametric tests and Kruskal Wallis Test as a non-parametric teste along with Pearson correlation using SPSS software (V.20; IBM Inc., Armonk, USA) at 5% significance level. Path analysis and structural equation modeling (SEM) were performed via AMOS 20.0 (2011 Amos Development Corporation) and were finalized using Stata 13.0 software (Stata Corporation, College Station, TX). The model fit is considered to be good if (i) the goodness of fit (GFI), the Comparative Fit

Index (CFI), and the Tucker-Lewis index (TLI) are greater than 0.90; (ii) if RMSEA is less than 0.08, and (iii) if the normed chi-square index (v2/df ratio) is less than 3.0.(Browne and Cudeck, 1992; Hu and Bentler, 1999).

3.Results

3.1. Descriptive results

Table 1 shows demographic and job characteristics of participants. The average age of participants was 31.20 ± 7.69 years while their average job experience was 7.28 ± 6.58 years. Out of the participants, 56.8% were less than 30 years old 73.6% were female, 69.4% were single, and 89.6% with academic degrees. Regarding the type of shift work, most of the nurses had rotational shift (66.4%) whereas the rest of them worked in one of three fixed work shifts (morning, afternoon or night). 90% and 68% of the nurses expressed interest and stratification in their job, respectively, while 68.4% of them worked overtime (Table 1).

Table 1- Demographic and job characteristics of participant nurses

Table 2 shows the mean for the safety climate and its dimensions. As it can be seen, the nurses' relationships has the highest (3.38 ± 0.97) whereas the accumulative fatigue has the lowest (2.67 ± 0.97) mean. The total average of safety climate of nurses was 3.01 ± 0.63.

Table 2- Descriptive statistics of safety climate dimensions in nurses

Table 3 shows the descriptive statistics of the dimensions of occupational burnout in nurses. More than half of nurses reported high level of emotional exhaustion (56.8%) and depersonalization (66.4%), while nearly all nurses reported a high level of lack of personal accomplishment (98.0%). The mean score of the dimensions were high in terms of both frequency and severity.

Table 3- Descriptive statistics of occupational burnout in nurses

3.2. Analytical results

The relationship between safety climate and occupational burnout with demographic characteristics is shown in Table 4. Although participants with a higher age and a lower educational degree had higher safety climate compared to those with a lower age and a higher educational degree, the relationship between safety climate and all demographic characteristics does not seem to the significant ($P > 0.05$). The gender variable has a significant relationship with emotional exhaustion ($P < 0.05$) while the education level of participants has a significant relationship with all dimensions of occupational burnout ($P < 0.05$ in Table 4).

Table 4- Relationship of safety climate and occupational burnout with demographic characteristics

As can be seen from Table 5, there is a significant difference between safety climate levels in different units of hospitals ($P = 0.010$) in both the parametric and non-parametric tests. In addition, the results indicate that nurses of the surgery unit (3.03 ± 0.59) and the operational room unit (2.72 ± 0.57) have the highest and lowest perception of safety climate. The results also indicate a significant relationship between safety climate and job satisfaction ($P = 0.0001$), job interest ($P = 0.019$), and stress ($P = 0.0001$). As a result, nurses with higher job satisfaction, higher job interest and no stress have a better perception of safety climate (Table 5).

The results show that the dimensions of occupational burnout have a significant relationship with the type of hospital units ($P < 0.05$) in both the parametric and non-parametric tests (Table 5). The lack of personal accomplishment had a significant relationship with job satisfaction, job interest and stress ($P < 0.05$). In other words, nurses with higher job satisfaction and job interest yet no stress had better personal accomplishment (lower mean score) compared to ones with the reverse condition (Table 5).

Table 5- Relationship of safety climate and occupational burnout with job characteristics

A further survey is conducted to investigate the correlation between safety climate and occupational burnout in terms of frequency and severity, as shown in Table 6.

Results show that the total safety climate has a significant negative correlation with the frequency and severity of all the burnout dimensions ($P < 0.01$) whereas regarding the severity of emotional exhaustion and depersonalization the correlation is only negative but not significant.

This correlation means by decreasing the safety climate, all dimensions of burnout (emotional exhaustion, depersonalization and personal accomplishment) will be increased, which in turn increases the occupational burnout. Nevertheless, the correlation between emotional exhaustion (in term of severity) and safety climate (both total safety climate and its individual dimensions) is not significant. Similarly, the correlation between training of nurses and the dimensions of occupational burnout - both in terms of severity and frequency - is not significant ($P > 0.05$).

Among the dimensions of occupational burnout, the (lack of) personal accomplishment - both in terms of severity and frequency - has a higher correlation with the dimensions of safety climate.

Table 6 - Correlation between dimensions of safety climate and occupational burnout

3.3. Occupational burnout and safety climate model: Multiple Equation Models

Multiple equation modeling, a regression technique, is used to examine the causal pathways from the independent variables to the dependent variable. There are two main types of multiple equation models; path analysis and structural equation modeling.

3.3.1. Path analysis

Path analysis is a straightforward extension of multiple regression. Its aim is to provide estimates of the magnitude and significance of hypothesized causal connections among a set of variables. This can best be explained by considering a path diagram showing the independent, intermediate, and dependent variables. A single-headed arrow shows the causal relationship while a double-headed arrow shows the covariance between the two variables. Path analysis distinguishes three types of effects: direct effects, indirect effects and the total effect. The direct effect is the influence of one variable on another, not influenced by another variable in a model. The indirect effects of a variable are mediated by at least one intervening variable, while the sum of both direct and indirect effects is the total effect.

In a conventional regression analysis, only the direct effect of a variable is considered whereas the indirect effects that the variable may have through other variables are ignored, underestimating the actual effect of the variable of interest. In the present study, we apply the path analysis to investigate all effects of variables not only on the dimensions of occupational burnout in terms of both severity (Fig.1 a-c) and frequency (Fig.2 a-c) but also on the total safety climate (Fig.3). Path analysis is performed in determining total safety climate with considering

all dimensions of occupational burnout in terms of both severity and frequency. However for the sake of brevity, only one state (emotional exhaustion in terms of severity) is presented in Fig.3.

In the hypothesized path models all path coefficient values (PCV) are shown on the arrows. For example, according to Figure 1(a), the PCV of the direct effect of job satisfaction on the severity of emotional exhaustion is -0.13, while the indirect effect is equal to -0.07(-0.35×-0.21=-0.07)) and the overall effect of job satisfaction on emotional exhaustion (in terms of severity) is equal to -0.20 (-0.13 -0.07 = -0.2).

Fig. 1. Hypothesized path model (a)

Fig. 1. Hypothesized path model (b)

Fig. 1. Hypothesized path model (c)

Fig. 2. Hypothesized path model (a)

Fig. 2. Hypothesized path model (b)

Fig. 2. Hypothesized path model (c)

Fig. 3. Hypothesized path model

3.3.2. Structural equation modeling

Structural equation modeling (SEM) is a strong and comprehensive method to evaluate the relationships among observed and latent variables, enabling one to examine a series of dependencies simultaneously (Guo et al., 2016). In the present study, we employed AMOS 20 software for SEM to evaluate the overall fit of the model investigating the relationship between safety climate and occupational burnout. In SEM, the fit indices indicate whether there is a fit between the specified model and the data as well as overall validity of the model. The model (Fig.4) was evaluated using GFI, CFI, TLI, RMSEA and the normed chi-square indices.

The results of the SEM are presented in Figure 4, illustrating a good to very good data fit: chi-square = 488.68 ($p < 0.001$, df = 53), GFI= 0.74, TLI= 0.67, RMSEA= 0.045, R^2=0.98, and SRMR=0.082. The structural model path of occupational burnout factors and safety climate was significant ($\beta = -0.22$, $p = 0.005$). All paths in the measurement model were significant ($p < 0.001$).

Fig. 4. Model for occupational burnout and safety climate. emotion_f: emotional exhaustion frequency; depresena_f: depersonalization frequency; lackper_f: lack of accomplishment frequency; emotion_s: emotional exhaustion severity; depersnal_s: depersonalization severity; lackper_s: lack of personal accomplishment severity; A_F: accumulative fatigue; T-N: training of nurse; C_Ph: communication with physicians; N_R: nurses relationship; A_S: attitude of supervisors; R_E: reporting of errors. ** p=0.005.

The results of the model support the hypothesis concerning the mediating role of occupational burnout factors in relation to safety climate. However, only a partially mediating effect was observed. Both occupational burnout and safety climate seem to have direct effects on each other (Fig.4).

4. Discussion

Our results revealed that the mean of safety climate was 61.68 ± 12.9 with nurses' relationships and accumulative fatigue having the highest and the lowest mean, respectively, among all the dimensions of safety climate. Similar studies have resulted in 77.66 ± 28.89 in Cyprus (Raftopoulos and Pavlakis, 2013), 90.58 ± 6.28 in the US (Mark et al., 2007), 47.99 ± 8.67 in Australia, and 28.49 ± 4.19 in Malaysia (Idris et al., 2012). The results of the present study show that neither socio-demographic variables such as age, gender, educational degree, and marital status nor job variables such as working shift, job experience, over time, and hospital type have significant correlation with safety climate, in agreement with previous work in this domain (Vasilios Raftopoulos and Andreas Pavlakis, 2013; Nerina L. Jimmieson et al., 2016)

Furthermore, the type of units has a significant correlation with safety climate as Heart and CCU units have the highest and lowest safety climate, respectively. This finding is in line with previous studies (Ballangruda et al., 2012; Raftopoulos and Pavlakis, 2013).

Since the mean scores of emotional exhaustion, depersonalization, and lack of professional accomplishment were high, it can be concluded that the nurses suffer from the burnout syndrome (Table 3). The mean scores of both the severity and the frequency of all the dimensions of burnout are also higher than defined in the questionnaire analysis guidance. Similar observations had been reported in previous studies (Ríos Risquez, 2011; Figueiredo-Ferraz, 2012; Portero de la Cruz and Vaquero Abellán, 2015).

Our study showed that there is a significant negative correlation between total safety climate and all the dimensions of occupational burnout in terms of frequency. The current research confirmed

previous results about emotional exhaustion being closely linked to safety climate (Sexton et al., 2014; Profit, 2014; Profit et al., 2014).

The present study demonstrated the negative correlation between the dimensions of safety climate such as communication with physicians and reporting of errors and all the dimensions of job burnout, expect the severity of emotional exhaustion. Thus, as pinpointed by Nahrgang et al. (2011), improvements in either communication or error reporting can significantly reduce nursing burnout. From this perspective, these results could help implement strategies to promote safety climate and prevent job burnout in nurses.

Relationship among nurses and attitude of supervisors, as two dimensions of safety climate, are negatively correlated with all the three dimensions of job burnout in terms of frequency and with the lack of personal accomplishment also in terms of severity. Therefore, in order to reduce occupational burnout among nurses, personnel planning should be in such a way to improve the gap between nurses and supervisors, with an emphasis on travel tours, team camps, etc. Leadership Walk Rounds (WRs) have been widely used as an effective tool to improve safety culture in healthcare organizations (Simpson, 2006). WR is a structured process to bring senior supervisors and front line staff together to have quality and safety conversations with to the aim of preventing, detecting and mitigating patient/staff harms. In a study of NICUs settings in the US, researchers showed that more WR feedbacks are associated with better safety climate results and thus lower burnout rates in staff (Sexton et al., 2014).

In the present study a path analysis was applied to present the effects of important variables on both occupational burnout and safety climate (Figures1-3) and also to estimate the magnitude and significance of hypothesized causal connections thereof. A SEM analyses was also employed to present and validate the model of occupational burnout and safety climate, illustrating the relation between higher occupational burnout and lower level of safety climate.

5. Conclusions

In the present study we investigated the relationship between safety climate and occupational burnout in healthcare originations. We took into account a variety of influential factors such as job satisfaction, job interest, and stress as well as job and socio-demographic characteristics. Our results demonstrate a significant negative correlation between accumulated fatigue (as a safety climate dimension) and the lack of personal accomplishment in terms of both frequency and severity, implying that by reducing accumulated fatigue the individuals' personal accomplishment

can be improved. It was also shown that factors such as job satisfaction, job interest, and job stress have the highest effect on safety climate. The present study highlighted the mutual relationship between safety climate and occupational burnout while the improvement of the former can significantly reduce the latter.

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Table 1- Demographic and job characteristics of participant nurses

Characteristic	Group	Percentage	Frequency
Age (31.20 ± 7.69) (range 21-54 years)	20-30	56.8	142
	30-40	30.8	77
	40-50	10.8	27
	> 50	1.6	4
Gender	Male	26.4	66
	Female	73.6	184
Marital status	Married	26.4	67
	Single	69.4	173
Education degree	Diploma	5.6	14
	Associates' degree	4.8	12
	Bachelors	89.6	224
Job Experience (yr.) (7.28 ± 6.58) (range 1-28 years)	1-5	46.4	116
	5-10	28.8	72
	10-15	13.6	34
	>15	11.2	28
Working shift	Morning	12.8	32
	Afternoon	9.2	23
	Night	11.6	29
	Rotational	66.4	166
Job satisfaction	Yes	68	173
	No	32	77
Work overtime	Yes	68.4	171
	No	31.6	79
Job interest	Yes	90	225
	No	10	25

Table 2- Descriptive statistics of safety climate dimensions in nurses

Dimension	Mean ± SD	Min	Max
Accumulative fatigue	2.67 ± 0.97	1.00	5.00
Training of nurse	2.88 ± 1.03	1.00	5.00
Communication with physicians	3.01 ± 0.79	1.00	5.00
Nurses' relationships	3.38 ± 0.97	1.00	5.00
Attitude of supervisors	2.95 ± 0.90	1.00	5.00
Reporting of errors	3.19 ± 0.80	1.00	5.00
Total Safety climate	**3.01 ± 0.63 (61.68 ± 12.9)**	**1.00 (1)**	**4.88 (100)**

Table 3- Descriptive statistics of occupational burnout in nurses

Dimensions	Mean ± SD	Low	Moderate	High
		N (%)	N (%)	N (%)
Emotional exhaustion				
Frequency	25.03 ± 15.59	67 (26.8)	41 (16.4)	142 (56.8)
Severity	26.21 ± 15.56			
Depersonalization				
Frequency	13.04 ± 8.85	51 (20.4)	33 (13.2)	166 (66.4)
Severity	14.12 ± 9.38			
Lack of personal accomplishment				
Frequency	13.18 ± 8.20	1 (0.4)	4 (1.6)	245 (98.0)
Severity	13.68 ± 8.45			

Table 4- Relationship of safety climate and occupational burnout with demographic characteristics

	Safety climate		Emotional exhaustion		Depersonalization		Lack of personal accomplishment	
Characteristics	**Mean ± SD**	**P value**	**Mean ± SD**	**P value**	**Mean ± SD**	**P value**	**Mean ± SD**	**P value**
Age(yr.)								
20-30,	3.01 ± 0.62		25.73 ± 15.42		13.89 ± 8.82		13.64 ± 7.85	
30-40	2.98 ± 0.64	0.557	24.88 ± 15.65	0.722	12.91 ± 8.51	0.370	13.26 ± 9.03	0.378
40-50	2.96 ± 0.72		22.33 ± 16.56		11.74 ± 9.79		11.18 ± 7.68	
> 50	3.44 ± 0.51		21.25 ± 15.59		11.00 ± 9.69		9.00 ± 6.21	
Gender								
Male	3.09 ± 0.67	0.210	21.61 ± 16.77	0.037	11.76 ± 9.65	0.172	12.00 ± 8.67	0.172
Female	2.97 ± 0.63		26.26 ± 15.00		13.49 ± 8.52		13.61 ± 8.01	
Education degree*								
Diploma	3.13 ± 0.415	0.302	17.64 ± 18.09	0.028	8.57 ± 9.77	0.040	8.68 ± 5.37	0.002
Associate diploma	2.96 ± 0.82		33.50 ± 15.33		19.25 ± 5.28		17.62 ± 4.27	
Bachelor degree	2.99 ± 0.63		25.51 ± 15.23		13.24 ± 8.72		13.32 ± 8.20	
Marital status								
Single	3.00 ± 0.68	0.910	26.29 ± 15.82	0.563	13.08 ± 8.43	0.698	14.48 ± 8.81	0.118
Married	3.01 ± 0.60		24.98 ± 15.58		13.13 ± 9.04		12.62 ± 7.97	

* Kruskal Wallis Test

Table 5- Relationship of safety climate and occupational burnout with job characteristics

Job characteristics	Safety climate		Emotional exhaustion		Depersonalization		Lak of personal accomplishment	
	Mean±SD	**P value**	**Mean±SD**	**P value**	**Mean±SD**	**P value**	**Mean±SD**	**P value**
Type of unit								
Emergency (N=38)	2.88±0.50		29.18±14.71		15.14±8.62		17.14±8.50	
Dialysis (N=15)	3.24±0.43		26.00±18.70		13.93±10.23		13.93±8.75	
Surgery (N=30)	3.03±0.59		21.07±16.15		10.56±8.90		11.28±7.12	
Heart (N=15)	3.30±0.58		20.42±15.59		9.08±8.03		9.83±8.36	
ICU (N=26)	3.02±0.67	0.010[a]	21.89±14.83	0.027[a]	10.44±8.57	0.022[a]	10.25±6.98	0.004[a]
Internal (N=22)	3.02±0.71		20.83±16.13		11.21±9.65		11.75±10.53	
OR* (N=19)	2.72±0.57	0.008[b]	30.11±13.79	0.026[b]	16.63±7.20	0.023[b]	16.53±5.64	0.001[b]
Radiology (N=16)	3.00±1.34		31.00±16.34		18.20±10.50		15.20±3.63	
CCU (N=18)	2.67±0.43		30.13±16.23		17.63±8.23		11.38±6.72	
NICU (N=17)	2.70±0.97		31.83±5.53		14.33±1.37		17.67±8.59	
Pediatric (N=19)	3.01±0.83		29.20±16.92		17.80±8.80		12.60±8.03	
Maternity (N=15)	3.02±0.61		23.00±9.97		11.60±5.50		17.80±9.09	
Working shift								
Morning	3.23±0.64		24.28±16.28		12.47±9.18		12.34±8.29	
Afternoon	2.95±0.62	0.139	25.00±14.23	0.901	12.96±8.64	0.984	11.65±7.65	0.645
Night	3.09±0.73		23.28±15.02		13.10±8.65		12.83±6.82	
Rotational	2.96±0.62		25.49±15.84		13.14±8.93		13.63±8.50	
	3.00±0.68		26.00±15.41		14.08±8.76		7.91±0.73	
Job Experience (yr.)	3.00±0.55	0.764	25.19±16.07	0.543	12.52±8.68	0.295	8.00±0.94	0.307
	2.93±0.64		21.55±14.43		11.05±8.35		10.51±1.80	
	3.10±0.65		21.78±16.60		12.39±10.04		6.38±1.20	
Overtime								
Yes	3.01±0.64	0.867	24.05±15.72	0.142	12.49±8.92	0.148	12.98±7.90	0.561
No	3.00±0.65		27.16±15.18		14.23±8.63		13.63±8.87	
Job satisfaction								
Yes	3.14±0.61	0.0001	24.66±16.45	0.519	13.05±9.40	0.947	11.35±7.03	0.0001
No	2.73±0.60		26.04±13.56		13.01±7.62		17.30±9.19	
Job interest								
Yes	3.04±0.62	0.019	25.12±15.76	0.800	12.84±8.96	0.306	12.35±7.28	0.0001
No	2.73±0.74		24.28±14.23		14.76±7.79		20.72±11.75	
Hospital								
A	3.03±0.66		22.77±15.82		11.77±8.78		12.64±8.25	
B	2.95±0.59	0.389	30.75±13.49	0.0001	16.24±8.24	0.0001	14.56±7.98	0.095
C	3.05±0.67		21.65±16.19		10.61±8.73		11.89±8.33	
D	2.99±0.61		29.13±12.17		15.33±7.38		13.54±6.99	
Stress								
Yes	2.57±0.63	0.0001	27.18±15.94	0.350	14.37±9.02	0.318	17.18±10.63	0.001
No	3.09±0.61		24.61±15.56		12.81±8.84		12.46±7.51	

- a and b indicate results of ANOVA Test (parametric test) and Kruskal Wallis Test (non-parametric test) respectively.
- * Operational room.

Table 6 - Correlation between dimensions of safety climate and occupational burnout

Occupational burnout	**Frequency**			**Severity**		
Safety climate	**EE**	**Dep**	**LPA**	**EE**	**Dep**	**LPA**
1. Accumulated fatigue	-0.033	-0.062	-0.246**	0.070	0.036	-0.214**
2. Training of nurses	-0.084	-0.109	-0.106	-0.042	-0.082	-0.060
3. Communication with physicians	-0.202**	-0.231**	-0.234**	-0.080	-0.148*	-0.207**
4. Relationships among nurses	-0.188**	-0.186**	0.234**	-0.097	-0112	-0.170**
5. Attitude of Supervisors	-0.130*	-0.153*	-0.283**	-0.022	-0.069	0.251**
6. Reporting of errors	-0.137*	-0.205**	-0.246**	-0.033	-0.134*	-0.233**
Total safety climate	-0.177**	-0.216**	-0.326**	-0.045	-0.116	-0.261**

* P< 0.05, ** P< 0.01. Note: Pearson coefficient values are indicated in the table.

EE: Emotional Exhaustion; Dep: Depersonalization; LPA: Lack of Personal Accomplishment

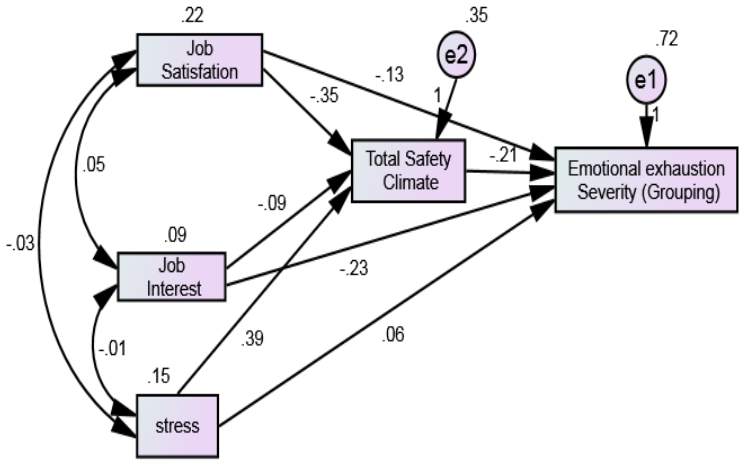

Fig. 1. Hypothesized path model (a)

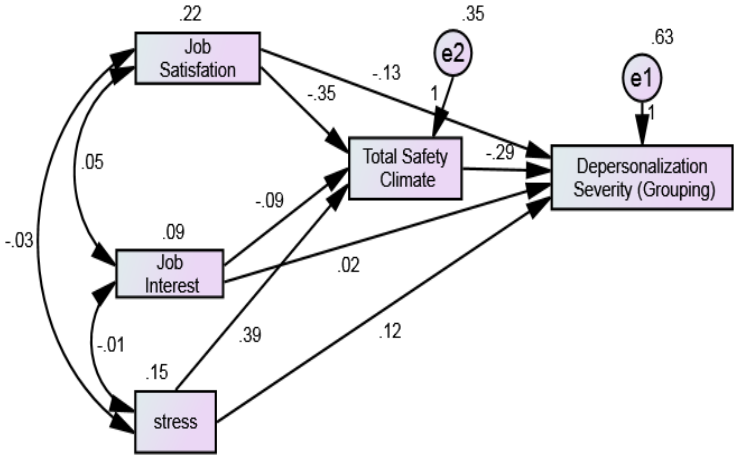

Fig. 1. Hypothesized path model (b)

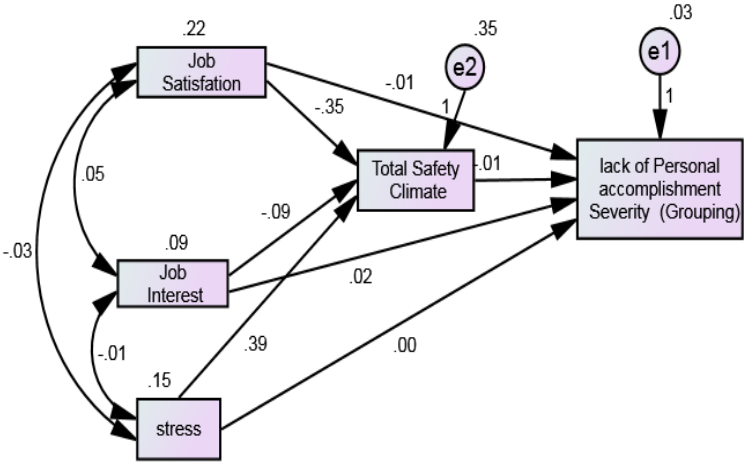

Fig. 1. Hypothesized path model (c)

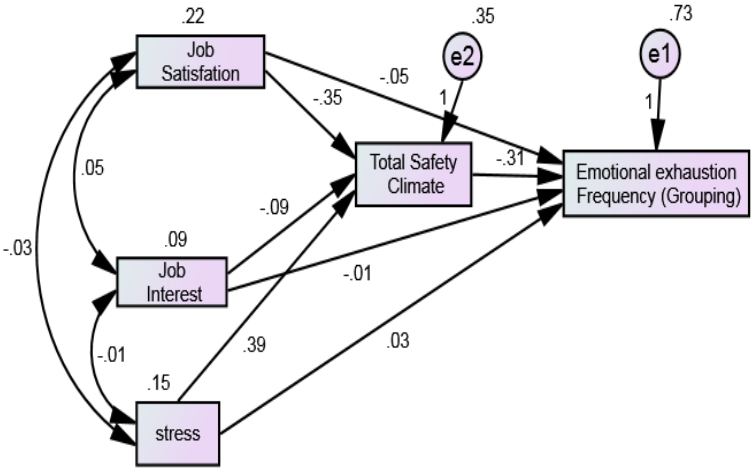

Fig. 2. Hypothesized path model (a)

Fig. 2. Hypothesized path model (b)

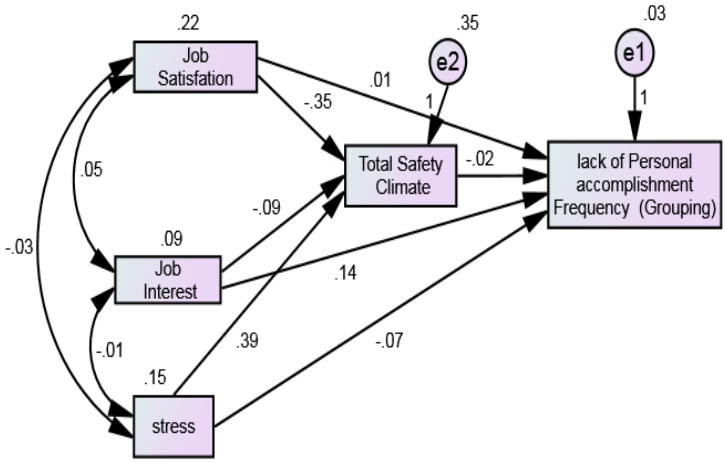

Fig. 2. Hypothesized path model (c)

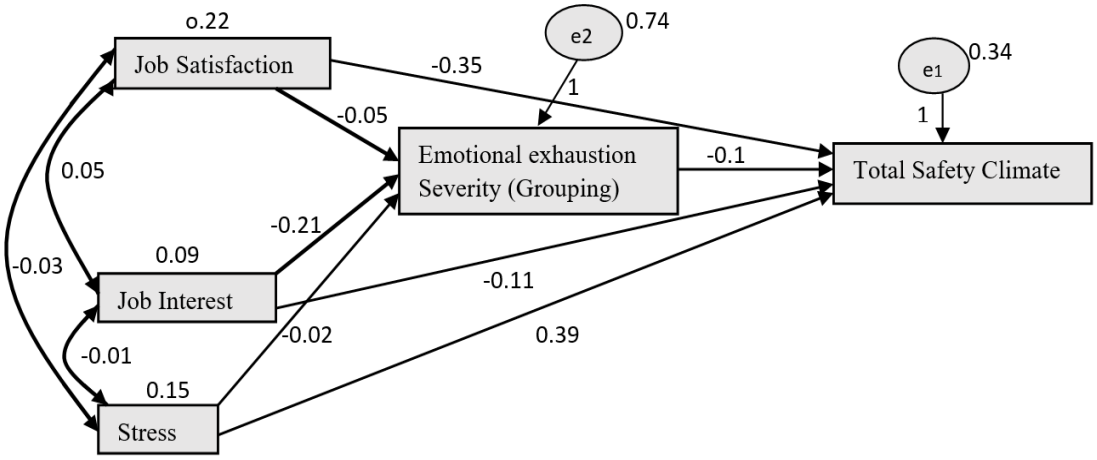

Fig. 3. Hypothesized path model

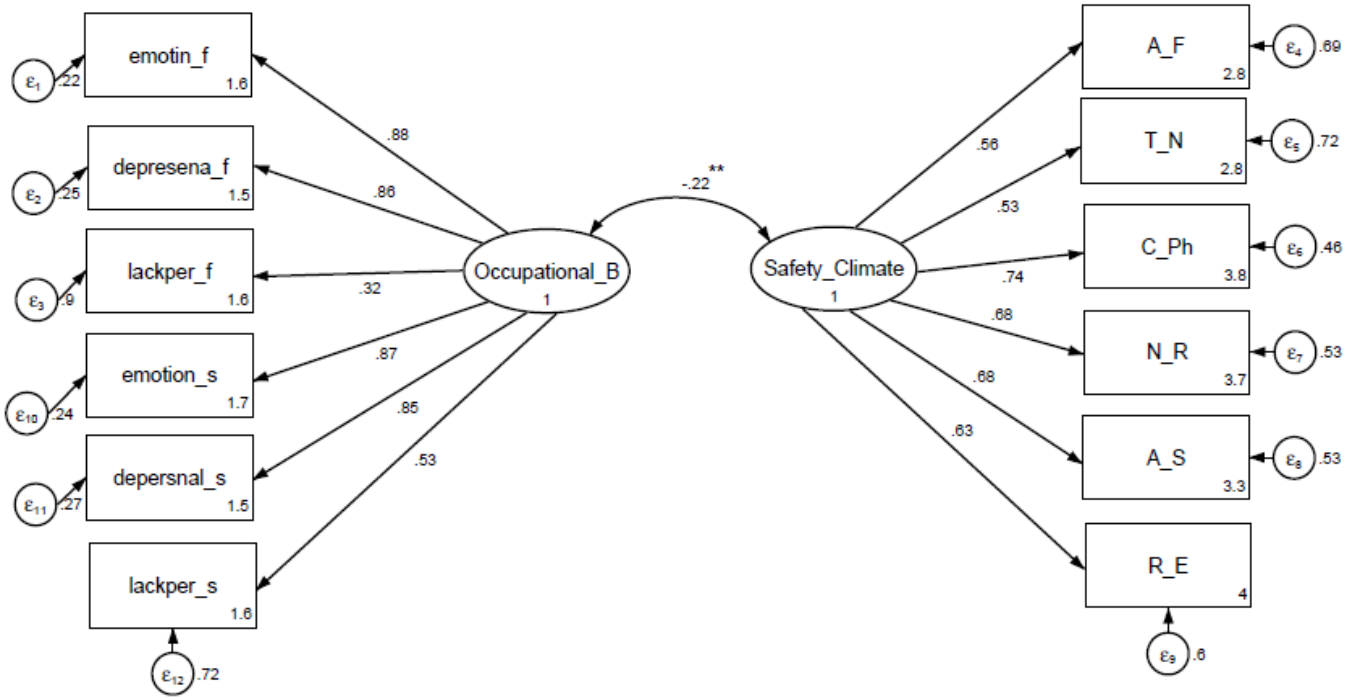

Fig. 4. Model for occupational burnout and safety climate. emotion_f: emotional exhaustion frequency; depresena_f: depersonalization frequency; lackper_f: lack of accomplishment frequency; emotion_s: emotional exhaustion severity; depersnal_s: depersonalization severity; lackper_s: lack of personal accomplishment severity; A_F: accumulative fatigue; T-N: training of nurse; C_Ph: communication with physicians; N_R: nurses relationship; A_S: attitude of supervisors; R_E: reporting of errors. ** p=0.005.