Global Journal of Health Science; Vol. 9, No. 4; 2017
ISSN 1916-9736 E-ISSN 1916-9744
Published by Canadian Center of Science and Education

Applying the Theory of Planned Behavior to Correct Posture in Operating Room Staffs

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Received: January 17, 2015 Accepted: August 4, 2016 Online Published: August 10, 2016

doi:10.5539/gjhs.v9n4p122 URL: http://dx.doi.org/10.5539/gjhs.v9n4p122

Abstract

Objective: Ergonomic risk factors such as prolonged and awkward postures increase the risk of work related musculoskeletal disorders (WRMSDs) in operating room staffs. Understanding the factors influencing the prevalence of the WRMSDs is an essential step in any targeted health promotion interventions. This research aimed to determine the factors associated with correct posture maintenance based on the theory of planned behavior (TPB) among the operating room staffs from educational hospital affiliated to Qazvin university medical sciences, in 2013.

Methods: A total of 130 subjects with mean ages of 31.2±6.38 years participated in this study. Demographic data and TPB constructs were assessed using reliable and valid scales. Path analysis, based on TPB components, was applied to determine specific factors that most contribute to and predict actual behavior toward correct posture maintenance.

Results: Psychometric properties of the model were consistent with the recommendations and results showed that variables were fit to the data. 58% of the variance in behavioral intention (BI) was described by the TPB constructs ($P<0.05$). Also, attitude (AT), subjective norms (SN), perceived behavioral control (PBC) and BI explained 39% of the variance in maintenance of a correct posture ($P<0.05$). Consistent with predictions from the TPB, AT ($\beta_i=0.44$, $P<0.05$) were the major predictors of BI. In addition, PBC ($\beta_i=0.52$, $P<0.05$) and BI ($\beta_i=0.41$, $P<0.05$) were the important factors that influence the maintenance of a correct posture in the operating room staffs.

Conclusion: As a conclusion, TPB is a useful model to determine and to predict maintenance of a correct posture in the operating room staffs.

Keywords: musculoskeletal disorders, health behavior, operating room, posture, psychological theory

1. Introduction

Musculoskeletal disorders refer to a condition in which the muscles, tendons and nerves are damaged and lead to chronic symptoms such as pain, discomfort and numbness in the extremities. WRMSDs are the serious cause of loss of working time, increased workers' compensation costs and labor damages (Hagberg et al., 2012). These disorders are responsible for more than half of absenteeism in the workplace. In terms of prevalence, severity, and prevention ability, WRMSDs are the second commonest occupational diseases after occupational respiratory diseases in world (Zechinatti et al., 2012). These disorders are responsible for 40 percent of compensations related to workplace injuries and causes loss of working time by more than 600,000 employees in the United States annually. Also, WRMDs imposes cost $ 45 million to healthcare system (Spector et al., 2011). In addition, about 11.6 WRMSDs per 10,000 workers registered in developing countries and the total estimated cost for these disorders is equal to $ 171.7 million (Piedrahita, 2006). Also, WRMSDs are responsible for 14% of medical visits and 19% hospital admissions (Kulin & Reaston, 2011).

There is significant association between workplace ergonomic factors and the increasing prevalence of

WRMSDs. Poor or awkward posture, excessive force and repetitive movements have a major contribution in the WRMSDs prevalence (Waters et al., 2011). Among the risk factors associated with the prevalence WRMSDS, awkward posture is one of the major modifiable risk factors. The correct posture is a state of musculoskeletal balance that imposes the least amount of stress on the body. In contrast, awkward posture can cause damage to the joints and connective tissues and eventually leads to disability (Yip et al., 2008). In addition to the positive effect of correct posture on reducing job stress and discomfort, maintenance a correct posture plays an important role in job productivity and efficiency. Studies have shown that correct posture has positive effects on the musculoskeletal system and leads to a reduction in occupational accidents in the workplace (Trask et al., 2012; Prins et al., 2008). However, working with prolonged fixed and awkward postures is an inherent part of some jobs (Meijsen & Knibbe, 2007).

Hospital staffs in comparison with other sectors, such as mining, manufacturing and construction are at higher risk for developing WRMSDs (Rambabu & Suneetha, 2014). According to department of labor (2010), highest number of patients with WRMSDs is dedicated to hospital staffs in the United States. Statistical facts indicate that the operating room staffs due to the nature of the particular job are at a higher risk for WRMSDs. For example, the study of Choobineh et al. (2010) showed WRMSDs prevalence in nurses who work in the operating room was 60%. Operating room staff performed most of their tasks with the static and upright posture. Operating room staff's daily workload can impose a great physical pressure on her or his body due to the fixed standing postures during lengthy operations. Postural balance control while standing is a critical task during performing surgery. Some of the most common poor postures during surgery include: working with neck in flexion/tilted to one side, shoulders elevated, side bending to left or right, excessive twisting, forward bending/overreaching at waist, shoulders flexed and abducted, elbows flexed greater than 90°, wrists flexed/deviated in grasping, thumb hyperextension, position maintained for 40+ minutes per patient (Savoie et al., 2007). The key principle for correct posture is maintaining a "neutral spine". Retaining a small hollow at the neck and low back, as well as small roundness at the middle back is essential to achieve a neutral spine. For this purpose, operating room staffs should attempt to always maintain an erect posture, avoid forward bending/excessive leaning over the patient, keep feet flat on the floor, position instrument tray close to self, minimize excessive wrist movements, try to keep facing each other and shoulder width apart with wrists straight, avoid excessive finger movement, alternate work positions between sitting, standing, and side of patient (Savoie et al., 2007). Because of the high prevalence of WRMSDs among Iranian hospital staffs, prevention of WRMSDs is considered as major priorities of the Ministry of Health and is emphasized as the main objective of workplace health promotion programs.

Understanding the factors influencing the prevalence of the WRMSDs among operating room staffs is an important first step in any targeted interventions to tackle WRMSDs. The use of behavior change theories to describe and identify factors influencing the health behavior is a reasonable, effective and frugal approach (Prestwich et al., 2014). Systematic review of health behavior theories by by Armitage and Conner (2000) revealed that TPB is an appropriate model for understanding health behavior. The basic assumption of the TPB is that behavioral intention is the main determinant of target behavior. In turn, AT, SN and PBC influence on BI.

The fundamental difference between TPB and theory of reasoned action (TRA) is the addition of PBC construct to TPB in order to optimize the theory's power in dealing with volitional and involuntary behaviors. The central assumption of TPB is that BI is the major important factor directly influencing behavior. In turn, BI is derived from three factors: AT (an inner tendency to respond positively or negatively to a topic, person, place, object, etc.), SN (an individual's belief or opinion about what significant others think that the individual should do) and PBC (extent to which a person feels able to enact the target behavior in spite of presence of factors that may facilitate or impede performance of a behavior) (Ajzen, 2011a). Characteristics such as number of constructs, high predictive power, use of intention as a mediator between beliefs and behavior, using PBC instead of self efficacy has made TPB to become a good model for describing the health behavior (Topa & Moriano, 2010). TPB is widely used to understand underlying determinants of health behavior in the field of occupational health and safety. For example, TPB framework was applied by Johnson and Hall (2005) to determine the underlying factors of safe lifting among workers at large plants. Their findings revealed that the main determinant of safety lifting was PBC. Zeidi et al., (2008) used TPB to determine the main factors influencing the postural habits and concluded that is AT and PBC was the major underlying causes of correct sitting posture in assembly line workers. Choi et al. (2013) indicated that postural management program based on the TPB constructs for adolescents with scoliosis leading to increased AT, SN, and PBC and improved flexibility and muscle tension and reduced curvature of the spine. Despite the application of TPB in various studies to predict correct posture, TPB didn't apply to determine the factors influencing adherence to correct posture by operating room staffs. Therefore, the aim of current research was to determine the factors underlying maintenance of a correct posture

using TPB framework among operating room staffs.

2. Methods and Materials

2.1 Design and Participants

In this cross-sectional research conducted from April 2014 to September 2014, data were gathered using self administrative questionnaires from operating room staffs in Qazvin city, Iran. Qazvin is a large town with a population of around 500000 in the northwestern of Iran and is the capital of the province.

The study population consisted of all staffs who worked in the operating room of educational hospitals affiliated to Qazvin University of medical sciences (QUMS). Because of the small number of hospitals, all six hospitals were selected to participate in this study. Then, using convenience sampling methods, 130 subjects out of 165 operating room staffs were selected to complete research tools. Inclusion criteria were: voluntary participation, more than one year of working experience in the operating room, and lack of WRMSDs. Samples with pregnancy, severe systemic diseases or mental disorders, major surgery or restricting physical activity in the past year were excluded from the study. There were no significant differences between selected samples and omitted samples in terms of the main variables. All samples were invited by formal letter from the hospital administration to involve in the project. Questionnaires were completed in the presence of author assistants to respond the possible ambiguities and to ensure the accuracy of the responses.

The research protocol and tools was approved by the ethics committee of the QUMS. Before responding to the questionnaires, the purpose and methodology of the research were explained to all participants. The questionnaires were anonymous and confidential and withdrawal of samples from the study was completely voluntary.

2.2 Measurement and Psychometric Properties

The research tool was composed of the background information and the TPB Questionnaire. Section 1, background information was used to collect participants' demographic and biographic details.

Section 2, The TPB Questionnaire consisted of 30 items were divided into eight sub scales that measure the components of TPB. Questionnaire was designed using Ajzen (2011b) and Francis et al. (2010) guidelines for TPB scale development. Definition the target behavior, maintenance a correct posture during daily surgery process, with respect to variables such as target, action, context and timing was the first step in the research process. Correct posture characteristics for operating room staffs include: "You should have your feet roughly shoulder width apart. Your knees should be in line with the middle of your feet and your hips should be about the same. Your knees should always be slightly bent. Your torso should be balanced over your hips neither leaning forward nor backwards. Your shoulders should be back and your chest held out. You head should be upright with your chin slightly elevated. Arms should be held in a controlled manner at your side. Don't let them hang limply. Your muscles should always be in control and holding your body strong. If you place your hands on your waist you will end up raising your shoulders and that can be a bad thing if prolonged or done repeatedly. Instead place your hands inside pockets or fold place your hands into the small or your back. When you've achieved this posture remember to move from it. If you are supposed to be standing still make small deviations when able otherwise move a lot". This behavior was selected due to similar and homogenous understanding of of correct posture in the operating room staff. The basic wording was applied to all TPB components to ensure compatibility between each scale, and, to maximize the relationship between the components and the target behavior.

Step 2 involved the item generation or extracting silent beliefs regarding maintenance of a correct posture and developing direct and indirect scale to measure TPB constructs. Behavioral beliefs were elicited by (i) asking the operating room staffs to state the Pros (benefits) and Cons (costs an) of maintenance of a correct posture, and (ii) from the researcher's opinions were aware of the relevant literature. Normative Beliefs were elicited by asking the operating room staffs to identify the individuals or groups (i.e., the supervisor) who their beliefs about maintaining correct posture was important for the operating room staffs. Control beliefs were generated by asking the staffs to list the factors that were hindering or facilitating the maintenance of a correct posture.

In step 3, items for the direct measures of AT, SN, PBC and BI were generated and selected on the basis of group consensus. Three items, with bipolar adjectives as end points, were chosen to measure AT (i.e., the "maintaining correct posture while performing operation is (good/bad, foolish/wise, harmful/beneficial, scary/enjoyable) for me". All responses are rated on a 1-7 unipolar scale. In addition, three items were applied to measure behavioral beliefs and also, 3 items were used to assess corresponding outcome evaluation. Participants were asked to respond to them by a 5 point Likert response scale (from 1=extremely unlikely, extremely bad to 5=extremely likely,

extremely good).

Three items were applied to measure SN directly (i.e., I believe that important others would want me to maintain correct posture during daily operation). Also, normative belief and motivation to comply was measured by the 3-item scale. Samples responded to normative belief questions with a 5-point Likert scale (1=extremely unlikely to 5=extremely likely). Moreover, the operating room staffs were asked to respond to scale of motivation to comply using 5-poing likert response scale (1=not at all to 5=very much).

PBC is measured by the direct and indirect methods. Four items were used to measure PBC directly. For example, "Whether or not I maintain correct posture during daily surgery task is entirely up to me". Three items were chosen to measure control beliefs and perceived power as indirect method to assess PBC. The sample were asked to respond to control belief items using 5-poing likert scale (1=very rarely to 5=very frequently). A 5-point likert scale was applied to measure the sample answers to the questions perceived power related items (1=strongly agree to 5=strongly disagree).

The two items were used to direct measure BI. For example, "I plan to maintain correct posture during daily surgery task in the next 30 days". These types of questions are commonly used to measure BI. The samples responded to BI questions using 5 point likert scale 1=strongly disagree to 5=strongly agree).

Finally, one item was used to measure maintenance of a correct posture during daily surgery task in last 30 day as past behavior. "In the last 30 days, I Never/rarely/sometimes/most of the time/always maintain correct posture during daily surgery task". The operating room staffs were asked to respond to a self report question using 5 point likert scale (1=never to 5=always). According to Ajzen (2001) measurement of the past behavior using only one question is an acceptable approach and is consistent with the several studies (Zeidi et al., 2009; Daigle et al., 2002; Hrubes et al., 2001). In addition, pilot study in a random sample of operating room staffs showed the same interpretation.

The fourth step of the developmental process involved confirming that the wording of each item was appropriate for the population of interest and randomly assembling the 31 items into a combined questionnaire.

Each predictive component (AT, SN, PCB and BI) has a direct measure scale-the sum of each scale's items forming that scale's score. AT, SN and PBC also have an indirect, belief-based measure-the total score of each scale being the sum of the multiplicative composites of the ratings given to individual belief items and the corresponding outcome evaluation (i.e., $A=\Sigma be$, $SN=\Sigma$ nm, $PBC=\Sigma cp$).

The step 5 was allocated to evaluate psychometric properties of the TPB scales and validate default model. Ajzen (2011b) recommendation for evaluating TBP component scales and the associated model were followed.

A total of the 80 operating room staffs (with similar demographic and biographic details to those participating in the study) completed the TPB measurement scales once regarding validation process. The sample's features indicated that it was representative of the population of Iranian operating room staffs. There were no significant differences between the this samples with main samples in terms of age, gender, marital status, level of education, percent disease or disability, history of previous injury, or occupation. These samples were selected using convenience sampling from hospitals that did not participate in the final study. A subsample of 15 cases from operating room staffs who selected conveniently completed the scales in two week interval to gain data for a test-retest stability analysis. According to these procedures, Cronbach's alpha coefficient was used to evaluate the internal consistency of direct scales and the test-retest stability of the indirect scales. Scale validity is shown if (a) the factor structure of the direct scales meets theoretical requirements (content validity) and (b) the indirect and direct scales are positively correlated (construct validity). The model is validated if the predictive relationships between the components are significant. These analyses are reported in the results section.

2.3 Statistical Analysis

The data were entered into the SPSS 20.0 and LISREL 8.80 software. Characteristics of the samples were analyzed using descriptive statistics. Quantitative and qualitative variables between two independent such as participants and non-samples were compared using Chi-square and independent t-test.

Exploratory factor analysis was used to assess the content validity of the TPB indirect scales and was analyzed by means of Principle Components Analysis (PCA) with Varimax Rotation and Kaiser Normalization. Components with an Eigen value greater than one were extracted. Path analysis was used to investigate fitness of the default model and the proportion of variance coverage between BI and behavior. In general, the model fitness is evaluated by several fit indexes. The chi-square goodness of fit is considered as one of the the most basic fit index. Since the chi-square goodness of fit is greatly influenced by sample size and violation multivariate normality, relative chi-square is used by some researchers. Relative chi-square is the ratio of chi-square to

degrees of freedom (χ^2/df). Relative chi-square less than 3 are preferred, but some researchers have recommended values 4.00 or even 5.00 as good fit index (Munro, 2005). Typically, Normed Fit Index (NFI); Non-Normed fit index (NNFI); Comparative fit index (CFI) and Goodness of fit index (GFI) greater than 0.90 are considered indicators of good fit. A 0.05 value of RMSEA (Root Mean Square Error of Approximation) is considered as good fit, 0.08 as reasonable fit, and 0.10 or greater as poor fit. According to Marsh et al. (2004) value less than 0.08 for SRMR (standardized Root Mean Square Residual) indicate a good fit index.

3. Results

The mean (SD) age of participants was 31.2±6.4 years. Of all participants, 101 persons (77.7%) were male and 29 persons (22.3%) were female. The mean (SD) BMI (body mass index) of samples was 23.8±3.3 kg/m^2. Other demographic characteristics for all samples are presented in Table 1.

Table 1. Demographic characteristics of operating room staffs participating in the study

Variable	N (female)=101	N (male)=29	Total=130
Age (years)			
M±SD	31.3±6.5	30.9±6.02	31.2±6.38
Min-max	22-48	24-47	22-48
Weight (kl)			
M±SD	62.67±9.17	70.11±10.03	64.35±9.8
Min-max	48-86	44-90	44-90
Height (cm)			
M±SD	162.9±4.8	171.9±9.7	164.2 ±7.3
Min-max	150-175	157-185	147-185
BMI (kg/m^2)			
M±SD	23.9±3.59	23.7±2.3	23.87±3.34
Min-max	16.96 -32.41	15.59-27.7	16.96 -32.41
Job history (years)			
M±SD	8.13±6.00	7.67±6.13	7.98±6.01
Min-max	1-28	1-24	1-28
Daily work hours			
M±SD	9.80±3.1	11.24±2.75	10.3±3.0
Min-max	4-20	6-20	4-20
Marital status			
Single	(31.68) 32	(41.38) 12	(33.85) 44
Married	(68.32) 69	(58.62) 17	(66.15) 86
Physical activity			
Yes	(25.74) 26	(58.62) 17	(33.08) 43
No	(74.26) 75	(41.38) 12	(66.92) 87
Working system			
Fixed	(82.18) 83	(75.86) 22	(80.77) 105
Shift	(17.82) 18	(24.14) 7	(19.23) 25

The results of the EFA and psychometric properties of the TBP component are shown in Table 2. The AT scale, consisting of three items, shows good internal consistency (α=0.87). In addition, results indicate internal consistency for SN (α=0.92), PBC (α=0.83) and BI scale (α=0.94). Also, Table 2 shows intra-class correlation coefficient (ICC) for the indirect scale of TPB. The ICC coefficients were satisfactory. The mean of ICC value for the indirect scale of the TPB ranged between 0.78 and 0.89. These values indicate good coefficients of agreement.

The content validity was assessed by PCA yielded a seven-component solution, which is consistent with the TPB theoretical requirements. Behavioral beliefs and outcome evaluation explained 14.2% and 12.3% of the variance in AT, respectively.

Table 2. The wording and PCA loadings for the indirect measures of AT, SN and PBC

Items	Question content	Components and factor loading						
		1	2	3	4	5	6	7
Attitude (α=0.87)								
Behavioral beliefs (*ICC*=0.80)								
BB1	Reduce the pain and discomfort	**0.80**						
BB2	Increase work efficiency and Productivity	**0.77**						
BB3	Reduce medical costs and absenteeism	**0.75**						
Outcome evaluation (*ICC*=0.84)								
OE1	The importance of pain reduction		**0.85**					
OE2	The importance of work efficiency		**0.82**					
OE3	The importance of medical costs and absenteeism		**0.79**					
Subjective norms (α=0.92)								
Normative Beliefs (ICC=0.86)								
NB1	Family member confirmation			**0.79**				
NB2	Co-workers and supervisor			**0.79**				
NB3	Supervisors, managers and Heads			**0.65**				
Motivation to Comply (ICC=0.82)								
MC1	The importance of confirmation by family members and friends				**0.82**			
MC2	The importance of confirmation by Co-workers				**0.78**			
MC3	The importance of confirmation by Supervisors				**0.74**			
PBC(α=0.83)								
Control Beliefs (ICC=0.89)								
CB1	Encounter unanticipated events					**0.75**		
CB2	Feel ill, tired or listless					**0.73**		
CB3	Other priorities and stressors					**0.66**		
Perceived Power (ICC=0.78)								
PP1	More difficult to maintain correct posture when encounter unanticipated events						**0.72**	
PP2	More difficult to maintain correct posture when feel ill, tired or listless						**0.69**	
PP3	More difficult to maintain correct posture when other priorities and stressors exist						**0.58**	
Intention (α=0.94)								
IN1	I plan to maintain correct posture…							**0.88**
IN2	I want to maintain correct posture…							**0.86**
Eigen value		**4.48**	**3.92**	**3.19**	**2.75**	**2.31**	**2.09**	**1.59**
% of predicted variance		**14.2**	**12.3**	**10.6**	**9.8**	**9.2**	**7.9**	**6.1**
Cumulative % of predicted variance		**14.2**	**26.5**	**37.1**	**46.9**	**56.1**	**64.0**	**70.1**

Note. BB=behavioral briefs; OE=outcome evaluation; SN=subjective norms; NB=normative beliefs; MC=motivation to comply; PBC=perceived behavioral control; CB=control beliefs; PP=perceived power; IN=intention.

Results from analysis of the SN items met the theoretical requirement of TPB that yielded a two-component solution, which accounted for 20.4% of the variance in SN. Analysis of the PBC items yielded a two-component solution, which was consistent with the TPB requirement that PBC should represent factors that either facilitate or inhibit behavioral performance. These components, named 'control beliefs' and 'perceived control' explained 9.2% and 7.9% of the variance in PBC, respectively.

Table 3. Correlation coefficients between TPB construct and maintenance of a correct posture in the operating room staffs

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Attitude	1.00										
2. Behavioral belief	0.46**	1.00									
3. Outcome evaluation	0.43*	0.37*	1.00								
4. Subjective norms	0.39*	0.28*	0.21*	1.00							
5. Normative beliefs	0.26*	0.23*	0.11	0.49**	1.00						
6. Motivation to comply	0.14	0.12	0.15*	0.45**	0.41**	1.00					
7. Perceived behavioral control	0.35*	0.24*	0.13	0.19*	0.15*	0.16*	1.00				
8. Control belief	0.20*	0.23*	0.08	0.26*	0.10	0.12	0.41**	1.00			
9. Perceived control	0.22*	0.18*	0.14*	0.24*	0.11	0.09	0.33**	0.49**	1.00		
10. Intention	0.36**	0.24*	0.21*	0.40**	0.33*	0.28*	0.39*	0.29*	0.25*	1.00	
11. Behavior	0.24*	0.20*	0.08	0.29**	0.23*	0.19*	0.38*	0.35**	0.29*	0.49*	1.00

Note. *P<0.05, **P<0.01.

The construct validity of the indirect and direct TPB scales was determined by the correlation between these measures of AN, SN, PBC, BI and behavior. Moderate and large correlations were found between the measures of AT (r=0.46, p<0.01), SN (r=0.49, p<0.01) and PBC (r=0.41, p<0.01). The finding of Table 3 shows the correlation between the constructs and components of the TPB and their relationship with the target behavior, maintenance of a correct posture, in operating room staffs. There is a medium and positive correlation between different constructs of TPB with each other (P<0.05). The BI was positively correlated with all components of the TPB. Except evaluation outcomes, all variable in table 3 were positively correlated with maintenance of a correct posture by the operating room staffs. The correlation between BI-behavior (r=0.49, P<0.05), PBC and behavior (r=0.38, P<0.05), CB and behavior (r=0.35, P <0.01) was stronger than others associations.

Figure 1 shows the path coefficients between constructs and components of TPB regarding maintenance of a correct posture. The results show that AT, SN, and PBC can predict 58% of the variance in BI (P<0.05). In addition, BI and PBC can predict 39% of variance in maintenance of a correct posture in operating room staffs (P<0.05). The most important factor influencing BI is AT (β_i=0.44, P<0.05). Moreover, there are positive path coefficients between AT and SN (β_i=0.27, P<0.05), AT and PBC (β_i=0.25, P<0.05), SN and PBC (β_i=0.20, P<0.05).

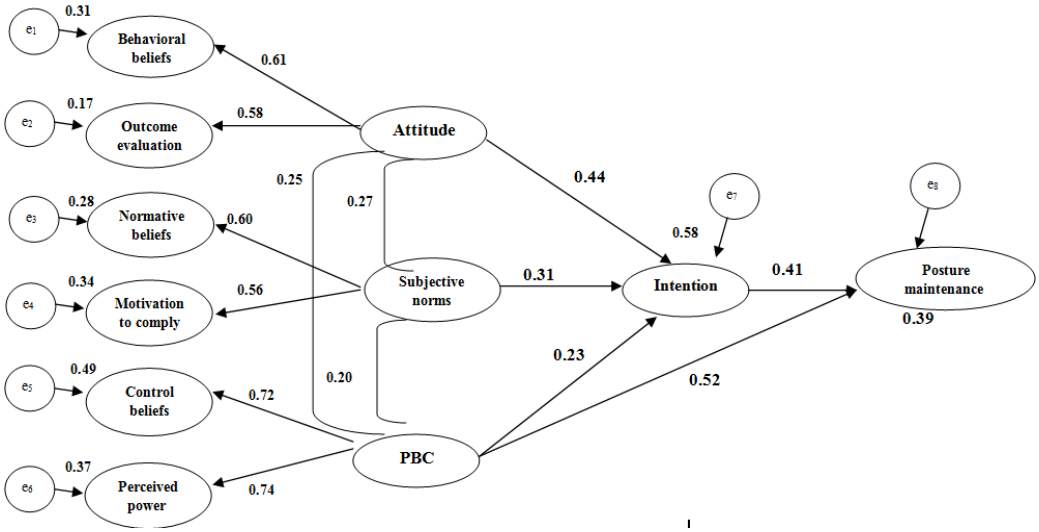

Figure 1. The TPB and the path coefficients specified for its constructs (n=130)

4. Discussion

The present study investigated the factors influencing maintenance of a correct posture in Iranian operating room staffs by applying TPB. Results showed that TPB can explain behavioral factors influencing maintenance of a correct posture in Iranian operating room staffs as well. The high prevalence of WRMSDs and prevention capabilities in the health care setting as operating room has caused the prevention of these disorders to become a national health priority in different sectors of health ministry. Therefore, it is important to identify a sound theory for maintaining a correct posture behavior. Results of this study provided initial but important evidence supportive of the utility of TPB to explain how Iranian operating room staffs engage in correct posture maintenance behavior.

At first glance, one of the main findings of the present study was a significant positive correlation between silent beliefs, AT, SN, PBC and BI of operating room staffs to maintain a correct posture during daily operation ($P<0.05$). Previous studies have emphasized on the role of behavioral and psychological factors and their associations with the occurrence of WRMSDs. In other words, the relationship between perceived high workload, time pressure, low control over job tasks, poor social support and WRMSDs have been confirmed by Choobineh et al. (2010) and Bongers et al. (2002). Despite the application of the TPB for various health issues, but its application has been limited to describe postural habit in health care system setting. However, limited studies have shown that a positive attitude toward maintenance of a correct posture, strong social support and the high level of self efficacy are positively associated with maintenance of a correct posture (Zeidi et al., 2009; Dunstan et al., 2013). Furthermore, PBC (β_i=0.52, $P<0.05$) and BI (β_i=0.41, $P<0.05$) were the important factors that influence maintenance of a correct posture in the operating room staffs in current study. According to the Bandura (1997) Self efficacy, as a major part of the PBC, is the primary factor influencing behavior. Several authors emphasize the importance role of self efficacy in the work related disability prevention program (Labriola et al., 2007; van Oostrom et al., 2008). The association between poor physical health, depressive symptoms and self efficacy in workers with MSDs is confirmed by Lötter et al. (2006). Many of health care workers such as nurses and operating room staffs underestimate the risk of developing WRMSDs. Personal belief about the vulnerability to WRMSDs can help to change behavior and implement preventive measures as maintenance of a correct posture (Whysall et al., 2007). Indeed, the combination of vulnerability with perceived ability to take actual control leads to a higher probability of preventive behavior occurrence. Operating room staffs with a lower degree of perceived power, self efficacy and authority to determine the job content are more exposed to the risks for developing the WRMSDs. Obviously; limitations to determine job content, workload, role expectations may influence the development of self efficacy. Handling most situations at operating room, adjusting WRMSDs related factors and tasks, being honored for the safety and ergonomics principles during operations and peer support can help operating room staffs to overcome difficulties related to maintenance of a correct posture during daily surgery process. In addition, ergonomic training course can enable operating room staffs to overcome workplace ergonomic obstacles.

Another significant finding of this study was the strong correlation between AT and BI (β_i=0.44, P<0.05). Findings previous studies have shown that attitude directly and indirectly affects health behaviors. In fact, three major reasons are mentioned for non-compliance with safety instructions in the workplace; 1) Workers are not familiar with the safety procedures, 2) Workers do not feel the necessity to do job in a safe manner, 3) employees think that unsafe work aren't harmful to them (Zambon & Hasselberg, 2006). Therefore, the beliefs system must be considered the center of the model explaining safety and ergonomic behavior (Kouabenan, 2009). Operating room staff's belief about the consequences of upright posture maintenance influences on his or her commitment and motivation to adopting and maintaining correct posture during daily surgery process. Emphasizing the perceived benefits of maintenance of a correct posture during daily work can create incentives for initiating and continuing preventive behavior of WRMSDs. Prevention of financial burden of WRMSDs, ability to perform daily tasks, vitality and lack of ill health, enjoyment of physical fitness and strength body can be perceived benefits to maintain correct posture by operating room staffs. Moreover, perceived barriers can be included lack of lifting equipment, heavy work schedule of the operating room staffs, lack of knowledge about ergonomic principle, Inappropriate workstation, unfamiliarity with the correct way of long-term standing or sitting, lack of specific exercise program. The operating room staffs that perform daily work in a sitting or standing positions always faced with situations that are forced to maintain awkward or fixed posture for a long time. Considering the perceived benefits and barriers to maintain correct posture is essential when designing training programs. Of course, employee participation in ergonomics training procedure creates more positive attitude towards ergonomic and posture education program.

Another key finding of the study was positive correlation between SN and BI (β_i=0.31, P<0.05). Javadi et al. (2013) reported that normative beliefs have greatest an effect on nurses' intention to perform the behavior is related to patient safety. Finding of Dunstan et al. (2013) study showed that SN associated with other constructs was able to explain 76% of variance in behavioral intention. They have highlighted the role of perceived co-worker support as being crucial to their return to work (RTW) success. The finding of Quick et al. (2008) study showed that SN was antecedents to intentions to wear hearing protection devices among coal miners. In addition, previous studies highlighted the role of non-medical staffs in preventing the WRMSDs (Carter & Birrell, 2000; McLellan et al., 2001). For example, supervisors are most familiar with employment problems in the operating room and have the authority for handling equipment and shifting work conditions. Manager's commitment and multiple interventions are necessary to prevent of WRMSDs and encourage operating room staffs to maintain correct posture (Morken et al., 2002).

Totally, AT, SN, and PBC could predict 58% of the variance in intention to maintain correct posture in current study (P<0.05). This value is very close to the predicted variance in Zeidi et al. (2009).The findings of their study in workers of porcelain factory showed that AT, SN and PBC predicted 60% of the variance in BI toward maintenance of a correct posture. Also, the findings of Johnson and Hall (2005) research indicated that TPB constructs predicted a lower percentage of the variance in BI toward safety behavior in construction workers. In addition, Ko et al. (2011) showed TPB constructs had a direct effect on intention and 54% of variance in nurses' intention to adherence management instructions after occupational exposure was explained by TPB constructs. The nature of research issues, the samples characteristics, and/or methodological features of each research may account for the differences in the TPB related construct's power to predict the BI variance. Antecedents of BI, AT, SN and PBC may vary depending on their application in various setting. In fact, there is nowhere stated that all constructs involved equally in predicting behavior or BI (Hackman & Knowlden, 2014; Armitage & Conner, 2000). In addition to predicting the variance of intention, TPB related constructs were able to explain 39% of the variance in target behavior or maintenance of a correct posture while working in operating room that were similar at the appropriate level in comparison with the previous study (Zeidi et al., 2009; Johnson & Hall, 2005).

Some limitations of this study should be considered: the sample size of current study was the first notable limitation. While the size of the total and sub-samples was comparable to those used in other TPB studies (Hardeman et al., 2002), and sufficient to perform the analyses undertaken, caution must be exercised if generalizing the findings to the wider population of interest. Another limitation of this study was use of convenience sampling method. Therefore, it is not possible to generalize the results to outside hospitals. Finally, this study relied on self-report of past behavior as a substitute for the actual behavior that may cause some bias in the responses of the participants. Of course, this approach is acceptable according to the guidelines for the application of TPB and is consistent with some of the previous studies (Daigle et al., 2002; Ajzen & Driver, 1992).

5. Conclusion

This study demonstrated that the TPB is an appropriate theoretical framework for understanding the factors

influencing maintenance of a correct posture in operating room staffs. The results showed that 58% of the variance in BI was described by AN, SN, PBC. Furthermore, BI and PBC explained 39% of the variance in maintenance of a correct posture. PBC ($\beta i=0.52$, $P<0.05$) and BI ($\beta i=0.41$, $P<0.05$) were the important factors that influence the maintenance of a correct posture in the operating room staffs. It is recommended that TPB to determine the factors influencing the adoption of WRMSDs preventive behaviors in other health care workers such as nurses, housekeeping employees, paramedical workers.

Acknowledgements

The study was funded by the Tarbiat Modarres University. The authors acknowledge with appreciation the following persons and organizations who participated in current research: hospital managers, supervisors, surgeons and operating room staffs of hospital affiliated to Qazvin university of medical sciences includes Boali, Shahid Rajaee, Shahid Bahonar, Qods, Kosar, Velayet hospitals.

Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

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