Low Back Pain Preventive Behaviors Among Nurses Based on the Health Belief Model Constructs

Naser Sharafkhani¹, Mahboobeh Khorsandi¹, Mohsen Shamsi¹, and Mehdi Ranjbaran¹

Abstract
The nursing profession is physically demanding as it is ranked second from the viewpoint of physical activity, following industrial occupations. Nursing is considered a profession with high musculoskeletal disorders, specifically low back pain. This article evaluated the nurses’ educational needs based on the Health Belief Model (HBM) with focus on the low back pain and adoption of preventive behaviors. This analytical cross-sectional study was conducted on 133 nurses who were selected randomly from three public educational hospitals affiliated with Arak University of Medical Sciences. Data collection was performed with a questionnaire, which included demographic characteristics, questions on HBM constructs, and a checklist for explaining the performances. The collected data were analyzed using descriptive and analytical tests and Pearson’s correlation coefficient. In this study, among the HBM constructs, the cues to action and the perceived barriers were the main predictors of optimal performance among the sample subjects (β = 0.09, p < .01). Moreover, there was a significant relationship between the nurses’ performance on adopting the preventive behaviors and the scores of perceived barriers, self-efficacy, and cues to action (p < .05). However, no significant relationship was observed between the nurses’ performance and perceived susceptibility, severity, and benefits. In this study, as for behavior barriers, the nurses complained about unfamiliarity with the workplace ergonomics and inappropriate conditions based on ergonomic principles, which requires educational planning with the aim of overcoming perceived barriers, improving managerial activities, and enhancing the working place conditions.

Keywords
health belief model, low back pain, educational needs assessment, musculoskeletal disorders

Introduction
Low back pain is among the most prevalent problems of workers in various communities and the second top factor for absence from work after upper respiratory system disorders (Houglum & Perrin, 2005; Prentice, 2004). Fujishiro, Weaver, Heaney, Hamrick, and Marras (2005) reported that 12% of health employees in the United States suffered from occupational injuries mostly in the back and shoulders. As a result of such injuries, 600,000 workers miss work annually, 45 to 54 billion dollars are spent, and work efficiency decreases (Malone, 2000; Maul, Läubli, Klipstein, & Krueger, 2003). Increasing the prevalence of low back pain in a period of 14 years from 3.9% in 1992 to 10.2% in 2006 reveals a total of 16.2% and 11.6% annual increase. The prevalence of low back pain is higher in nurses than other occupational groups as it is reported to be about 73% to 90% (Ajimsha, Daniel, & Chithra, 2014; Knibbe & Friele, 1996; Maul et al., 2003). According to some studies, the prevalence of low back pain among Iranian nurses ranges from 59.6% (Mohseni-Bandpei, Fakhr, Ahmad-Shirvani, Bagheri-Nessami, & Khalilian, 2005) to 78.3% (Simozar, Derakhshan, Sadeghi, & Zare, 1999). Nursing is physically demanding and is ranked second following industrial occupations, in this regard (Engels, Landeweerd, & Kant, 1994). Although the causes of low back pain have not been determined thoroughly, physicians believe that inappropriate work conditions, incorrect body positions, and environmental factors as well as physical activities in such conditions, exposing to daily routine activities, bending, frequent rotations, carrying heavy loads, performing repetitive activities, weak abdomen muscles, and muscle shortening are some causes of low back pain (Bernard, 1997). Most nurses mention that patient transfer, standing for a long time, and activities that are physically demanding are the main causes of their low back pain (Mohseni-Bandpei et al., 2005). According to earlier studies, more than 40% of the nurses’ injuries result from patient

¹Arak University of Medical Sciences, Arak, Iran

Corresponding Author:
Mahboobe Khorsandi, Associate Professor of Health Education and Promotion, Health Faculty, Arak University of Medical Sciences, Arak, Iran.

Email: dr.khorsandi@arakmu.ac.ir
transfer of which 75.9% cause low back pains (Fujishiro et al., 2005). Studies in other countries show that the control and treatment of low back pain are not similar in different countries, and physicians and health experts adopt different treatment methods. One of these methods is back health education programs or Back School, which consists of programs such as education and increasing awareness about chronic low back pain, structure and function of the spine, preserving the correct posture of the spine, and performing special back exercises (Heymans, van Tulder, Esmail, Bombardier, & Koes, 2005). A few studies have focused on the nurses’ physical conditions, workplace ergonomics, received instructions, and their effects on work problems and musculoskeletal and occupational injuries (Alexandre, de Moraes, Corrêa Filho, & Jorge, 2001; Menzel, Brooks, Bernard, & Nelson, 2004; Nakhaei et al., 2006). The value of health education programs depends on the above-mentioned programs, and their efficiency depends on appropriate application of the existing models and programs of health education; in other words, health education models and programs are more efficient when they possess appropriate theoretical support and required basic facilities (Ewles & Simnett, 2003). Among these models is Health Belief Model (HBM), which is a valuable and efficient educational assessment model (Figure 1). It is in fact a behavioral model, which shows the relationship between health belief and behavior and is based on the principle that preventive behaviors depend on the individuals’ beliefs including their vulnerabilities to the disease, the effect of the disease on their lives, and the effect of health activities on reducing the disease severity and susceptibility. The change behavior strategy may be planned using HBM (Harrison, Mullen, & Green, 1992; Karimi, Ghofranipour, & Heydarnia, 2009). The model constructs are perceived susceptibility, severity, benefits, and barriers as well as self-efficacy. Another construct is cues to action, which refers to internal and external events, which may stimulate and prepare an individual to conduct an appropriate behavior (Glanz, Rimer, & Viswanath, 2008; Rosenstock, 1974). The aim of the present study was to determine the nurses’ performance and preventive behavior concerning chronic low back pain and its causes, based on the HBM constructs. The results may be applied in planning for the health promotion of the nurses and other medical staff.

**Method**

The minimum sample size was a calculated 126 persons considering a study conducted by Zakerian et al. (2012), using the following formula:  
\[ n = \frac{Z^2 \times SD^2}{d^2} \]  
\( SD = 1, \ d = 0.175, \) and a confidence interval [CI] of 95%, but we included 133 individuals in the study. The sample included the nurses working in three educational hospitals in Arak including Valiasr, Amiralmomenin, and Amirkabir Hospitals. The nurses were selected with regard to the inclusion criteria using a simple random method without imputation and according to each ward’s nurses list proportionate to the whole number. Inclusion criteria were having an academic degree (BS or higher), full-time employment, at least 1 year experience as a clinical nurse, no musculoskeletal disorder in past, and no surgical operation in musculoskeletal limbs, and providing written consent for participation in the research. The exclusion criterion of the study was no back pain during the study.

In this study, the data collection instrument was a questionnaire consisting of five sections. Section 1 covered demographic characteristics. Section 2 included some questions regarding perceived susceptibility such as “nurses are at a higher risk of suffering chronic low back pain than other labor groups,” and perceived severity such as “In case of
suffering chronic low back pain, all the aspects of my life will be changed negatively.” The combination of perceived seriousness and perceived susceptibility is referred to as perceived threat (Glanz et al., 2008), perceived benefits such as “I can prevent the effects of chronic back pain through observing ergonomic principles in my workplace,” and perceived barriers such as “I do not conduct necessary measures to prevent low back pain because I am not familiar with the related principles.” Nineteen questions about low back pain were prepared on a 5-point Likert-type scale (5 = I totally agree, 4 = I agree, 3 = no comment, 2 = I disagree, 1 = I totally disagree). Section 3 consisted of six questions regarding the various internal and external cues to action such as “have you ever studied about chronic low back pain on the Internet?” on a 5-point Likert-type scale (5 = very high, 4 = high, 3 = low, 2 = very low, and 1 = never). The fourth section with six questions addressed the nurses’ self-efficacy in low back pain preventive behaviors. The fifth section included a checklist with the aim of measuring the nurses’ performance in adoption of low back pain proper preventive behaviors.

To evaluate the checklist questions, a 4-point Likert-type scale was utilized (0 = never, 1 = seldom, 2 = often, 3 = always). The questionnaire was prepared based on reviewing valid resources (Berthelette, Leduc, Bilodeau, Durand, & Faye, 2012; Janz & Becker, 1984; Nelson, Motacki, & Menzel, 2009; Occupational Safety Health Administration, 2010). The validity of the questionnaire was confirmed through evaluating the clarity, simplicity, and relevance of the questions (content validity). The questions’ necessity was also evaluated through receiving feedback from an expert’s panel consisting of specialists and experts in occupational medicine, ergonomics, professional health, and health education as well as experienced faculty members. Cronbach’s alpha was calculated in 30 nurses with demographic characteristics similar to those of the sample population to measure the reliability of the questionnaire, which was 0.75 for HBM, 0.73 for self-efficacy, and 0.72 for the performance checklist. The collected data were analyzed with SPSS-20 using descriptive statistical tests and Pearson correlation coefficient.

**Ethical Considerations**

The project was approved by the Research Committee (numbered 854) as well as the Ethics Committee (numbered 91-137-5) of Arak University of Medical Sciences. All participants participated in the study voluntarily after receiving necessary explanations on its objective and method.

**Results**

In this study, the mean age of the participants was 32.1 ± 5.3. Moreover, 8.3% of the participants were male and 91.7% were female with a mean work experience of 5.38 ± 3.6 years. Other demographic characteristics are presented in Table 1.

The results of the study revealed that the mean score of the nurse performance was 1.48 ± 0.27 out of 3. Performance means the proper posture and observing ergonomic principles at work including refraining from turning around the waist axis during patient transfer or lifting loads, refraining from bending on the load (or patient), refraining from holding the arms higher than shoulders for some minutes, observing the principles of patient transfer and lifting loads (including lifting instruments, trolleys, sinks, buckets, and baskets), refraining from keeping a long distance between the patient and the nurse when moving a patient, placing the instruments on a place not higher than the waist level, using a ladder or stool to get access to objects on high shelves, and refraining from lifting heavy loads (e.g., moving sedentary patients). The mean score of nurses in observing the principles of sitting and standing was 1.16 ± 0.35 out of 3. The principles included refraining from excessive bending forward or backward, refraining from turning around, and observing the correct principles regarding sitting on the chair. The nurses’ mean score in observing managerial principles for adopting low back pain preventive behaviors was 1.66 ± 0.35 out of 3. The principles included reducing the frequency of patients’ transfer and lifting objects to less than 20 times during a work shift, asking for help when moving patients who are unable to keep their balance, refraining from performing activities beyond one’s ability, and regarding work time limitations (not working in short interval work

| Table 1. Demographic Characteristics. |
|--------------------------------------|
| Personal information                | Characteristics | Number | Percent |
| Gender                              |                |        |        |
| Male                                |                | 11     | 8.3    |
| Female                              |                | 122    | 91.7   |
| Age                                 |                |        |        |
| Below 35 years                      |                | 106    | 79.7   |
| 35 years and older                  |                | 27     | 20.3   |
| Ward                                |                |        |        |
| Emergency                           |                | 28     | 21.1   |
| Obstetrics and gynecology           |                | 4      | 3      |
| Operating room                      |                | 18     | 13.5   |
| Dialysis                            |                | 2      | 1.5    |
| Surgical–internal                   |                | 29     | 21.8   |
| CCU                                 |                | 18     | 13.5   |
| Angiography                         |                | 3      | 2.3    |
| ICU                                 |                | 10     | 7.5    |
| NICU                                |                | 6      | 4.5    |
| Psychology                          |                | 3      | 2.3    |
| Infectious diseases                 |                | 4      | 3      |
| Neurosurgery                        |                | 3      | 2.8    |
| Orthopedics                         |                | 2      | 1.5    |
| ENT                                 |                | 3      | 2.8    |

Note. CCU = critical care unit; ICU = intensive care unit; NICU = neonatal intensive-care unit; ENT = ear, nose, and throat.
Table 2. The Mean Scores of Perceived Susceptibility, Severity, Benefits, Barriers, and Self-Efficacy, Concerning Chronic Low Back Pain Preventive Behaviors.

| Variables            | Average | SD   | Maximum | Minimum |
|----------------------|---------|------|---------|---------|
| Perceived susceptibility | 3.52    | 0.29 | 4.4     | 2.6     |
| Perceived severity    | 3.55    | 0.32 | 4.25    | 2.75    |
| Perceived benefits    | 3.84    | 0.36 | 4.75    | 2.75    |
| Perceived barriers    | 3.87    | 0.4  | 5       | 2.8     |
| Perceived self-efficacy | 2.79    | 0.53 | 4       | 1.40    |

Discussion

The findings of the study revealed a reverse correlation between perceived barriers and the nurses’ performance, a positive correlation between cues to action and performance, and a positive correlation between self-efficacy and performance. The results demonstrate that the nurses’ performance in terms of adopting low back pain preventive measures was weak, regarding both ergonomic principles’ conformity with the workplace conditions and observing the preventive principles such as preserving the proper body posture while sitting or standing in work time. Cilliers (2007) claimed that the perceived risk factors for suffering from low back pain among nurses were as follows in order: moving heavy patients, moving patients without asking for help, performing repetitive movements, moving patients to bed, and letting them have the appropriate position (Cilliers, 2007). Despite the reports on the above-mentioned risk factors, the nurses in this study had a weak performance regarding the adoption of low back pain preventive behaviors. Moreover, their mean score of perceived susceptibility was 3.52 out of 5, which demonstrates that most of the nurses agreed that they were exposed to the risk of low back pain at work, but they did not take the proper measures. Therefore, one may conclude that awareness does not lead to behavior change and many different factors are effective in this regard. Hignett (2003) reported that musculoskeletal disorders were one of the most prevalent problems in health care employees. His findings were confirmed in a study by Li et al in 2004 (Hignett, 2003; Li, Wolf, & Evanoff, 2004). Moreover, Erikson, Bruusgaard, and Knardahl (2004) introduced low back pain as one of the prevailing musculoskeletal disorders among nurses. The nurses’ obtained scores in perceived severity were above the average, which shows that they were very well aware of the serious effects and consequences of low back pain on their life. Cilliers quoted from Berlute that about 80% of the employees suffer from severe low back pain and the related consequences in their lifetime. Low back pain is an important reason for specialist visits (Cilliers, 2007). Therefore, low back pain incurs heavy burdens on individuals and the society; however, there appears to be no significant relationship between perceived severity and susceptibility with the nurses’ performance in adoption of low back pain preventive behaviors.

According to the literature, the nurses’ mean score of the perceived benefits of preventive behaviors was above the average, which is satisfactory. The concerned benefits were the ability to conduct daily tasks, prevention of economic burdens resulting from back pain, being physically fit, and having a pleasant life.

The mean score of perceived barriers was 3.87 out of 5. According to the participants, the most important barriers against adopting back pain preventive measures were lack of shifts). Finally, the nurses’ performance score in performing exercises to strengthen back muscles was equal to 0.71 ± 0.55, which was too low; 33.8% of the nurses did not exercise at all, 60.9% seldom exercised, and only 5.3% exercised most of the time. Other findings of the HBM constructs are shown in Table 2.

According to Table 3, there was no correlation between perceived susceptibility and severity with the performance and between perceived benefits and performance. However, there was a reverse correlation between self-efficacy and performance, a positive correlation between cues to action and performance, and a positive correlation between the cues to action and self-efficacy.

The main barriers that the nurses confronted in adopting preventive low back pain behaviors were reported as lack of access to proper hospital equipment, inappropriate workplace conditions, high work load, excessive fatigue, and lack of knowledge on chronic low back pain prevention principles.

Linear regression using stepwise methods was applied to predict the nurses’ optimal performance based on HBM constructs. Regression analysis revealed that among these components, only perceived barriers and cues to action were capable of predicting adoption of chronic low back pain preventive behaviors.

The results of multiple linear regressions are presented in Tables 4 and 5.

Regarding external cues to action, Respectively from highest to lowest rating, are presented in Table 6. The recommendations of the nurses with low back pain and the booklets and educational journals have been mentioned concerning their adoption of low back pain preventive behaviors.

The nurses also reported that the internal cue to action was fear of suffering from back pain (85.5%). Table 6 shows a mean score of 2.79 out of 5, which indicates low self-efficacy of the nurses in performing daily exercises for 30 min, controlling Body Mass Index (BMI), reducing unnecessary expenses for providing an appropriate mattress and bed for themselves, preserving the correct body posture at work, and confronting the risk factors of back pain through observing ergonomic principles.
sport facilities and appropriate places, very busy schedule of the nurses, lack of a safe workplace, and lack of knowledge about work conditions, ergonomic principles, and safety issues to prevent low back pain. Other studies have introduced lack of knowledge about long-time sitting and workplace ergonomic principles, lack of proper equipment at work, inappropriate social places, shortage of lifting equipment, and lack of physical exercise as the main causes of low back pain (Berthelette et al., 2012; Lønnberg, Pedersen, & Siersma, 2010; Samad, Abdullah, Moin, Tamrin, & Hashim, 2010). Our study showed that perceived barriers were predictive of the nurses’ optimal performance, and that their reduction would promote the nurses’ optimal performance. Meanwhile, as for the nurses’ performances, cue to action was the most powerful predictive construct among all HBM constructs. In the present study, the internal cue to action to encourage the nurses to adopt low back pain preventive behavior was reported to be the fear of suffering from low back pain, and the most important external cues to action were recommendations of the nurses with low back

Table 3. Pearson Correlation Coefficient Among the HBM Constructs.

|                  | Perceived susceptibility | Perceived severity | Perceived benefits | Perceived barriers | Perceived self-efficacy | Cues to action | Performance |
|------------------|--------------------------|--------------------|--------------------|--------------------|--------------------------|----------------|-------------|
| Perceived severity | r  | .226**                |                    |                    |                          |                |             |
| p                |    | .009                 |                    |                    |                          |                |             |
| Perceived benefits | r  | .144                | .263**             |                    |                          |                |             |
| p                |    | .098                 | .002               |                    |                          |                |             |
| Perceived barriers | r  | -.085               | .054               | .052               |                          |                |             |
| p                |    | .098                 | .002               |                    |                          |                |             |
| Perceived self-efficacy | r  | .161               | .077               | .012               | -.126                    |                |             |
| p                |    | .64                  | .379               | .890               | 1                        |                |             |
| Cues to action | r  | .091                | -.106              | .119               | -.014                    | .377**         |             |
| p                |    | .299                 | .226               | .171               | .874                     | .000           | 1           |
| Performance | r  | .059                | -.073              | -.051              | -.209*                   | .191*          | .217*       |
| p                |    | .497                 | .405               | .536               | .016                     | .027           | .012        |

Note. HBM = Health Belief Model.
*Correlation is significant at the .05 level (2-tailed). **Correlation is significant at the .01 level (2-tailed).

Table 4. Multi-Variable Regression Analysis Procedures in Prediction of a Nurse’s Optimal Performance.

| Criterion variable | Predictive variables | Correlation (R) | R² | Adjusted R² |
|--------------------|----------------------|------------------|----|-------------|
| HBM construct      | Cues to action       | .217             | .047 | .040        |
|                    | Cues to action and the perceived barriers | .301 | .09 | .076 |

Note. HBM = Health Belief Model.

Table 5. Regression Coefficient of the Nurses’ Performance Prediction, With Regard to Their Scores in Cues to Action and the Perceived Barriers (Separate Procedures; N = 133).

| Procedure | Changes source | Non-standard coefficients | Standard coefficients | Meaningfulness level (α) |
|-----------|---------------|--------------------------|-----------------------|--------------------------|
| 1         | Constant value | 22.94 2.42               | 9.47 0.000***         |                          |
|           | Cues to action | 0.41 0.16                | 0.217 2.54 0.012*     |                          |
| 2         | Constant value | 32.08 4.37               | 7.33 0.000***         |                          |
|           | Cues to action | 0.41 0.61                | 0.216 2.58 0.011**     |                          |
|           | Perceived barriers | -2.35 0.94               | -0.208 -2.48 0.014*    |                          |

Note. SE = standard error.
*Correlation is significant at the .05 level. **Correlation is significant at the .01 level. ***Correlation is significant at the .001 level.

Table 6. Absolute and Relative Frequency Distribution and Internal and External Cues to Action Among the Nurses, Concerning Their Adoption of Low Back Pain Preventive Behaviors.

| Cues to action | Type                          | Number (individual) | Percent |
|----------------|-------------------------------|---------------------|---------|
| External cues to action | Holding educational workshops | 6                    | 4.6     |
|                    | Recommendations of the nurses with low back pain | 123                | 96.4    |
|                    | Internet                      | 35                  | 26.3    |
|                    | Booklets and magazines        | 55                  | 41.4    |
|                    | Educational posters           | 15                  | 11.3    |
| Internal cues to action | Fear of suffering from low back pain | 119                | 89.5    |

Note. SE = standard error.
*p < .05. **p < .001.
pain, and related booklets and magazines. However, according to the nurses, the least important external cues to action were educational workshops and posters because the workshops were held infrequently and there were no such posters.

Cilliers (2007) reported that the nurses’ sources of information regarding low back pain treatment were physicians (34%), physiotherapists (25%), nursing faculty members (20%), mass media (13%), in-service training (6%), and schools (2%).

Limitations
Because the present research was conducted in governmental and educational hospitals, the results cannot be generalized to the staffs in other medical centers.

Conclusion and Suggestion
Although the nurses’ perceived susceptibility and severity were considerable, they were far from adopting appropriate preventive behaviors. Therefore, it is necessary to increase safety instructions at the hospitals with the aim of overcoming the barriers of adopting such behaviors. The participants mentioned that one of the main barriers of adopting preventive behaviors was lack of knowledge about the workplace. It is recommended to conduct interventional studies to promote the nurses’ preventive behaviors regarding back pain.

Authors’ Contribution
Mahboobeh Khorsandi, Naser Sharafkhani, and Mohsen Shamsi designed the study; Naser Sharafkhani collected the data; Naser Sharafkhaniand Mehdi Ranjbara analyzed the data; and Mahboobeh Khorsandi and Naser Sharafkhani wrote the manuscript.

Authors’ Note
All authors have read and approved the content of the article.

Acknowledgments
The authors appreciate the honorable Research Deputy of the Arak University of Medical Sciences for approving and financial support of this project as a post-graduate thesis in Health Education course. They also appreciate all nurses who participated and helped them in this project.

Declaration of Conflicting Interests
The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
The author(s) disclosed receipt of the following financial support for the research and/or authorship of this article: This research was part of a post-graduate thesis on health education, which was funded by the research deputy of Arak University of Medical Sciences.

References
Ajimsha, M. S., Daniel, B., & Chithra, S. (2014). Effectiveness of Myofascial release in the management of chronic low back pain in nursing professionals. Journal of Bodywork and Movement Therapies, 18(20), 273-281.
Alexandre, N. M. C., de Moraes, M. A., Corrêa Filho, H. R., & Jorge, S. A. (2001). Evaluation of a program to reduce back pain in nursing personnel. Revista de Saúde Publica, 35, 356-361.
Bernard, B. P. (1997). Musculoskeletal disorders and workplace factors: A critical review of epidemiologic evidence for work-related disorders of the neck, upper extremities, and low back (NASA, Document No. 19980001289). Available at http://staks.cdc.gov/view/cdc/21745
Berthelette, D., Leduc, N., Bilodeau, H., Durand, M.-J., & Faye, C. (2012). Evaluation of the implementation fidelity of an ergonomic training program designed to prevent back pain. Applied Ergonomics, 43, 239-245.
Cilliers, L. (2007). Evaluating the knowledge, attitudes and beliefs about the prevention and self-treatment principles for low back pain among nursing staff in Cecilia Makiwane Hospital, East London Hospital Complex. School of Public Health, University of the Western Cape, Bellville.
Engels, J. A., Landeweerd, J. A., & Kant, Y. (1994). An OWAS-based analysis of nurses’ working postures. Ergonomics, 37, 909-919.
Eriksen, W., Bruusgaard, D., & Knardahl, S. (2004). Work factors as predictors of intense or disabling low back pain; prospective study of nurses’ aides. Occupational and Environmental Medicine, 61, 398-404.
Ewles, L., & Simnett, I. (2003). Promoting health: A practical guide. London: Bailliére Tindall.
Fujishiro, K., Weaver, J. L., Heaney, C. A., Hamrick, C. A., & Marras, W. S. (2005). The effect of ergonomic interventions in healthcare facilities on musculoskeletal disorders. American Journal of Industrial Medicine, 48, 338-347.
Glanz, K., Rimer, B. K., & Viswanath, K. (2008). Health behavior and health education: Theory, research, and practice. San Francisco: John Wiley.
Harrison, J. A., Mullen, P. D., & Green, L. W. (1992). A meta-analysis of studies of the health belief model with adults. Health Education Research, 7, 107-116.
Heymans, M. W., van Tulder, M. W., Esmail, R., Bombardier, C., & Koes, B. W. (2005). Back schools for nonspecific low back pain: A systematic review within the framework of the Cochrane Collaboration Back Review Group. Spine, 30, 2153-2163.
Hignett, S. (2003). Intervention strategies to reduce musculoskeletal injuries associated with handling patients: A systematic review. Occupational and Environmental Medicine, 59(9), 6.
Houglum, P. A., & Perrin, D. H. (2005). Therapeutic exercise for musculoskeletal injuries. Champaign, IL: Human Kinetics.
Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. Health Education & Behavior, 11, 1-47.
Karimi, M., Ghofranipour, F., & Heydarnia, A. (2009). The effect of health education based on health belief model on preventive actions of aids on addict in Zaranideh. Journal of Guilan University of Medical Sciences, 18(70), 64-73.
Knibbe, J. J., & Friele, R. D. (1996). Prevalence of back pain and characteristics of the physical workload of community nurses. Ergonomics, 39, 186-198.
Li, J., Wolf, L., & Evanoff, B. (2004). Use of mechanical patient lifts decreased musculoskeletal symptoms and injuries among health care workers. Injury Prevention, 10, 212-216. 
Lønnberg, F., Pedersen, P. A., & Siersma, V. (2010). Early predictors of the long-term outcome of low back pain—Results of a 22-year prospective cohort study. Family Practice, 27, 609-614. 
Malone, R. E. (2000). Ergonomics, policy, and the ED nurse. Journal of Emergency Nursing, 26, 514-515. 
Maul, I., Läubli, T., Klipstein, A., & Krueger, H. (2003). Course of low back pain among nurses: A longitudinal study across eight years. Occupational and Environmental Medicine, 60, 497-503. doi:10.1136/oem.60.7.497 
Menzel, N. N., Brooks, S. M., Bernard, T. E., & Nelson, A. (2004). The physical workload of nursing personnel: Association with musculoskeletal discomfort. International Journal of Nursing Studies, 41, 859-867. 
Mohseni-Bandpei, M. A., Fakhri, M., Ahmad-Shirvani, M., Bagheri-Nessami, M., & Khalilian, A. R. (2005). Epidemiological survey of low back pain among nurses. Journal of Babol University of Medical Sciences, 7(26), 35-40. 
Nakhaei, M., Faragzadeh, Z., Tabiei, S. H., Saadatjoo, S. A., Mahmoudi, G. H., & Hoseini, M. H. (2006). Evaluation of ergonomic position during work in nurses of medical and surgical wards in Birjand University of Medical Sciences hospitals. Journal of Birjand University of Medical Sciences, 13(2), 9-15. 
Nelson, A. L., Motacki, M. K., & Menzel, N. (2009). The illustrated guide to safe patient handling and movement. New York: Springer Publishing. 
Occupational Safety Health Administration. (2010). Guidelines for nursing homes ergonomics for the prevention of musculoskeletal disorders. Available at http://www.Safetybok.org. 
Prentice, W. E. (2004). Rehabilitation techniques for sports medicine and athletic training with laboratory manual and eSims password card. New York: McGraw-Hill. 
Rosenstock, I. M. (1974). The health belief model and preventive health behavior. Health Education & Behavior, 2, 354-386. 
Samad, N. I. A., Abdullah, H., Moin, S., Tamrin, S. B. M., & Hashim, Z. (2010). Prevalence of low back pain and its risk factors among school teachers. American Journal of Applied Sciences, 7, 634-639. 
Simozar, I., Derakhshan, A., Sadeghi, H., & Zare, N. (1999). Incidence of low back pain in nursing staff of Namazi and Faghihi hospital and its relationship with their knowledge of predisposing factors in the workplace (Master’s thesis). University of Medical Sciences, Shiraz, Iran. 
Zakeriyan, S. A., Monazam, M. R., Habibi Mohraz, M., Soltani Gerdifaramarzi, R., Asghari, M., & Ghaemian, N. (2012). Relationship between knowledge of ergonomics and workplace conditions with musculoskeletal disorders among nurses of two Iranian hospitals. Community Occupational Medicine, 3(4), 19-25. 

Author Biographies
Naser Sharafkhani is student of Master Degree of Health education and promotion of Arak University of Medical Sciences. Arak, Iran. 
Mahboobeh Khorsandi is Associated professor of Health education and promotion of Arak University of Medical Sciences. Arak, Iran. 
Mohsen Shamsi is Assictant professor of Health education and promotion of Arak University of Medical Sciences. Arak, Iran. 
Mehdi Ranjbaran, M.s.c of Epidemiology, Department of Epidemiology, of Arak University of Medical Sciences. Arak, Iran.