Health Promotion Perspectives, 2014, 4(2), 221-229
doi: 10.5681/hpp.2014.029
http://journals.tbzmed.ac.ir/HPP

Risk Perception of Nonspecific Low Back Pain among Nurses: A Qualitative Approach

Sedigheh Abedini [1], *Mohammad Ali Morowatisharifabad [2], Behnaz Enjezab [3], Abolfazl Barkhordari [4], Hossein Fallahzadeh [5]

[1]*Department of Public Health, Hormozgan University of Medical Sciences, Bandar Abbas, Iran*
[2]*Department of Health Education, School of Health,Shahid Sadoughi University of Medical Science, Yazd, Iran*
[3]*Department of Nursing & Midwifery, Shahid Sadoughi University of Medical Sciences, Yazd, Iran*
[4]*Department of Occupational Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran*
[5]*Department of Biostatistics and Epidemiology, Shahid Sadoughi University of Medical Sciences, Yazd, Iran*

ARTICLE INFO

Article type:
Original Article

Article history:
Received: Jun 18 2014
Accepted: Nov 02 2014
e-published: Dec30 2014

Keywords:
Perceived severity,
Perceived vulnerability,
Nurses,
Low back pain,
Qualitative Research

***Corresponding Author:**
Mohammad Ali Morowatisharifabad
Tel: +98 35 36240691;
e-mail:
morowatisharif@yahoo.com

ABSTRACT

Background: Low back pain (LBP) is a common medical problem among nurses. A better understanding of nurses' experiences about LBP may help to develop preventative approaches. The study aimed to explore risk perceptions of nonspecific LBP among nurses in Bandar Abbas City, southern Iran.
Methods: This qualitative study conducted as directed content analysis in 2013. Private semi-structured interviews were conducted with a convenience sample of 30 nurses with minimum of 1-year working experience in hospital. The interview questions were based on perceived severity and vulnerability structures of Protection Motivation Theory. All interviews were transcribed and analyzed using thematic analysis.
Results: Perceived Severity had the following sub-themes: developing disorders in one's own life and profession, psychical and mental consequences, conflicts and problems in family life, and financial problems. Two sub-themes (problems and limitations in hospital's working system, nature of nursing profession) were identified in relation to perceived vulnerability**.**
Conclusion: Nurses reflected their concerns about the impact of LBP on their job security and their considerations about how their back pain might be interpreted by their employers and co-workers. Importance of transparent medical diagnostic procedure and clinical evidence to justify degree of LBP and its burden on the nurses' performance was also addressed.

Citation: Abedini S, Morowatisharifabad MA, Enjezab B, Barkhordari A, Fallahzadeh H. Risk Perception of Nonspecific Low Back Pain among Nurses: A Qualitative Approach. Health Promot Perspect 2014; 4(2):221-229

Introduction

Musculoskeletal disorders have been identified as one of the most common health complaints in the nursing profession.[1] Nonspecific LBP is defined as LBP not related to a pathological problem (e.g. infection, tumor, inflammation, osteoporosis, etc.[2] Less than 15% of individuals with LBP could be fit into a specific back pain category and the majority fit into nonspecific category.[3] Among nurses, LBP is a serious, costly and prevalent disease.[4] It causes their absence at work, becomes an incremental risk of a chronic disease and could pose major economic costs both to nurses and health care system.[5,6] LBP could also result to expert workforce lose.[7] In Iran, the rate of

one-year LBP prevalence among nurses has been from 49.4% to 81%.[4,8]

Understanding of nurses' perceptions about the LBP consequences is important before applying an interventional program to decrease scale of the problem. Theory-based interventions were suggested to be more effective on health-related behaviors compared with non-theoretical approaches.[9] The Protection Motivation Theory (PMT) is one of the widely used theories to explain behavioral patterns and has two constructs that are perceived severity and perceived vulnerability.[10]

Perceived severity includes understanding of both medical consequences (e.g. death, disability, and pain) and possible social consequences (e.g. effects of the medical condition on work, family, life, and social relations), and also the person's estimation of the severity of the disease for himself.[10,11] Perceived vulnerability to health threat refers to one's subjective perception of the risk of contracting a particular disease or medical condition.[10,11] These components could mediate the likelihood of an adaptive response.[12]

Qualitative methods could be used to study behaviors, attitudes, and experiences of people within the context of their lives,[13] where quantitative methods are not applicable. Therefore, qualitative approaches are increasingly used for developing evidence base for public health.[14] Numerous experiences, perceptions and beliefs are not quantifiable and qualitative research methods may provide a deep understanding of individual's experiences.[15] Additionally, the inductive nature of qualitative research allows the theory to emerge from the lived experiences of research participants rather than the pre-determined hypotheses testing of quantitative approaches.[14] Thus, a great opportunity will be created for success when the viewpoints and ways of thinking of the addressed society are taken into consideration before health interventions planning.

Qualitative approaches were shown to be useful, especially in researches about phenomena such as feeling of pain that are considerably different among people due to individualized mental experiences.[16] This qualitative study was conducted to identify and describe the risk perception of nonspecific LBP among nurses in Bandar Abbas, southern Iran.

Materials and Methods

Participants and Procedures

This study utilized a qualitative content analysis design involving semi-structured interviews to explore the risk perception of nonspecific LBP among nurses. Interviews were carried out between September-October 2012 to February-March 2013. Purposeful sampling technique was employed. The sample size was determined when data saturation was confirmed; as a result, thirty nurses were entered through purposive sampling. Including criteria were having at least 1-year work experience in nursing, BS (Bachelor of sciences) or MS (Master of Science) degree, and consent to participate in this research.

Data collection

The development of the interview guide began with reviews of literature on LBP, PMT, and qualitative approaches. The questions were sent for some of the specialists in the field of behavioral and health education. The feedbacks were considered and the questions were reviewed before the interview guide finalized.

Prior to each interview session, the research purposes, reason to record the interview, voluntarily participation and confidentiality of interviewees' identities were explained to all participants. Participants' consent for recording interview was obtained. The interview guide questions were developed based on perceived severity and perceivedvulnerability structures of protection motivation theory for evaluating the risk perception.Guiding questions were used to perform the interviews and these questions (including two questions for determining perceived vulnerability and one question for determining perceived severity) were designed in accordance with the perceived se-

verity and vulnerability of the Protection Motivation Theory (Table 1). Probing questions (such as: please explain more about your feeling, may you explain your feelings more clearly, what do you mean by…….) were also used whenever necessary. In addition, some general questions (the aim of asking these kinds of questions was to get more familiar with the interviewee and create a friendly atmosphere) were asked at the beginning of each interview.

To have an inclusive sample that represent wide range of individual experiences and perceptions the study participants were selected from different ages, genders, positions, wards, work experience backgrounds, marital status and based on different degrees of suffering from low back pain.

Table 1: Samples of guide-questions to perform an interview

PMT Constructs	Sample Questions
Perceived Vulnerability	How much do you think it is probable to get a backache while you are doing your nursing tasks? In what kind of situations may you expect to get a backache in your occupation?
Perceived Severity	What do you think about problems or consequences of backache that might have on your life or future?

Data analysis

All of the interviews were recorded and transcribed right after the record. The transcribed texts were conformed to the recorded interviews in order to verify their validity. Qualitative researches require researcher(s) full engagement in the data processing. Therefore, one of the researchers listened carefully to the recorded interviews and transcribed them. Then the contexts of each hand-written text were reviewed several times. The texts, which were typed in Microsoft Office Word, were transferred into a special qualitative data analyzing software called MAXQDA10 version 10.

Data were processed using deductive content analysis. Recordings of interviews were transcribed and were read and carefully examined to extract key concepts. Primary codes were assigned to each sentence. Primary categories were extracted from the grouping of similar primary codes. Main categories emerged from the assimilation of primary categories. After coding, subcategories were identified based on the subsequent analysis.

Measures for achieving trustworthiness

Researchers need alternative models appropriate to qualitative designs that ensure rigor without sacrificing the relevance of the qualitative research. The criteria in the qualitative research to ensure "trustworthiness" are credibility, transferability, dependability, and conformability ese.[17] These criteria are comparatively well developed conceptually and have been used by qualitative researchers for a number of years.[18]

In this study for enhancing credibility of analysis the data were viewed and coded by the authors and subthemes were discussed. Dependability was enhanced by accurate transcription, and comparison of audio tapes with transcripts for accuracy and verbal cues. Conformability was enhanced through integration of the same subthemes in the transcript data. To enhance transferability, we described the participants' features, methods of data collection and analysis together with some examples from the participants' remarks to pave the way for further research.

Results

The participants were 30 registered nurses (20 females and 10 males). Among them, 24 were married and six were single and also 16 had less than 10 years' experience while, 14 had more working experience. Working shift of the 12 people was fixed at daytime shifts, one person worked fixed at night shift, and 17 people were working in rota-

tion shifts. History of LBP was reported by 19 of the participants. The participants' average age was 34.13 ± 5.5.

Theme 1: Perceived Severity had the following sub-themes

Confronting with difficulties in one's own life and profession, psychical and mental consequences, conflicts and problem in married life, and financial problems.

Confronting with difficulties in one's own life and profession

LBP may have significant effects on individuals' living conditions and may cause interruptions in performing daily life activities. This consideration has been well expressed by one of the nurses who have experienced frequent periods of LBP:

"When I have a low back pain, I can no longer do my tasks at home; take care of my children and do lots of other activities. I cannot really handle my whole responsibilities. They will become so difficult tasks and I cannot cope with these problems." (P25).

Most of the female participants said that the LBP could affect the activities related to their home and children:

"When I get a low back pain, it makes me unable to do my housework. I cannot take care of my child. When my child talks to me, I'm not in mood. I would tell him/her to leave me alone, I want to rest. I have pain!" (P1).

Developing disorders in profession

Imperfect curing of the non-specific LBP and its related pain, which may occur periodically, may lead to people's inability in performing their professional duties sufficiently. Therefore, LBP may affect nurses' work performance. For example, one of the participants said:

"LBP affects my abilities to have efficiency in my job performance" (P6).

Moreover, almost all participants had said that the LBP could reduce their motivation to continue their work and therefore nurses may request for an untimely retirement. For instance, one of the participants commented on the fact as follows:

"…well, one may not be able to continue his/her occupation and so apply for early retirement or he/she might even be forced to leave his/her job anyway" (P2).

Various reasons can cause distraction of concentration on professional duties. One of these reasons is sickness and having pain. Lack of required level of concentration can inevitably lead to errors in nursing performances. One of the participants told:

"LBP leads to a range of errors when we're doing our job. When we have backache, we concentrate on the pain and this may lead us to give unintentionally wrong medicines to a patient" (P23).

Psychical and mental consequences

This item plays an important role in one's successful function in real life social relationships. Success in fulfillment of one's own emotional needs requires suitable public and social relationships. People with better public and social relationships will have more satisfaction in their lives. Some participants believed that getting a backache affected their public and social relationships. One of the participants reflected this concern as follows:

"LBP might prevent a sufferer to have a suitable relationship with the people around him/her" (P23).

The main and most important objective of a nurse is to provide a sound and effective care for hospitalized patients. Achieving this goal require not only good quality specialized cares, but also quality care provision for instance through a good and respectful relationship with the care receiver. Addressing such a fact, some participants said that have a backache could pervert their relationships with the patients. For example, one of the participants said: "….. It prevents me to make a good relationship with my patients. I'm getting bored" (P23).

Some of the participants told that getting a LBP cause them to feel that they are nervous and depressed:

"One might be an active person before getting a backache but LBP could limit his/her capabilities. It could also limit daily life activities, relationships, friendships etc. All of these limitations could potentially lead a person to depression" (P18).

"LBP makes me nervous, because when you feel such a pain in your body, it doesn't let you do your job properly at that moment. Therefore, you'll get nervous. You may even become aggressive!" (P19).

Conflicts and problems in married life

There are different issues, which may cause disputes and /or arguments between the couples. In the current study, the participants believed that the backache could create or worsen disputes and problems in their family life. For example, some of them said:

"Family life is an interactive environment; an environment in which the couples must cooperate to fulfill the family normal functions. But if men for example, get backache, they may be no longer capable of doing their routine responsibilities at home and this may cause problem in their home life and lead to disappointment and sadness" (P14).

Financial problems

Most of the male nurses who participated in the research believed that the financial problem might be one of the important consequences of backache for them, since it could cause job leaves in working days and hours and/or increase their absence at work with financial consequences. For example, some of the participants told: "Since we are men and, therefore, the supporters of the family, if we get a low back pain, we cannot do our best at work. This may force us to request early retirement or even permanently leave our job. So, considering the high costs of life, men are expected to meet the families' financial needs" (Page 8).

"In our society, we -men- must financially support the family. When I have a LBP, I cannot continue my work. Therefore, I can't earn money" (P16).

Theme 2: Perceived vulnerability had the following sub-themes

Problems and limitations related to hospitals' working conditions and the nature of nursing profession.

Problems and limitations in a hospitals' working system

Working hard and continuously will be very harmful when the spinal cord is in a fixed position. It is better to set even a short rest time aside to reduce pressure, which might be resulted from the postures nurses should practice on a regular basis. Unfortunately, there is no time to relax and restore the energy in nursing job due to the high demands, sensitivity of the job, wide range of the tasks and duties and lack of sufficient personnel. This deficiency expressed several times by the respondents. For example, one of them said:

"It's very likely among the nurses to get a low back pain, because the pressure is too much, while workforce is limited. Thus, we can rarely sit for a few moments to give rest to our back. That's why I believe that nursing job can have a 100% influence on the increment of the low back pain" (P3).

Unsuitable method of lifting heavy things can also increase the probability of getting backache among the nurses; however, due to the lack of facilities and proper equipment, nurses often have to lift heavy things by putting a lot of pressure on their body. One of the participants told: "…to change the position of the patients or moving some of very heavy trolleys from one end of the section to the other end we must often have a direct role. So, this will put pressure on our back" (P3).

As a comfortable mattress provides a suitable bed for a calm sleep and it may keep the spinal cord in relax position, some nurses emphasized that without a suitable place to rest, especially during the nightshifts, they may predispose to get a backache. One of the nurses said:

"We have no suitable place to rest. During the nightshift, nurses can only rest on the stretchers or coaches. This could gradu-

ally cause LBP due to uncomfortable positions" (P9).

Some nurses complained about unsuitability or nonexistence of some facilities such as proper ergonomic chairs, convenient tools to help movement of the patients, and easily portable equipment etc. that may endanger nurses' health and their spinal cord tissues:

"…the chairs we use in our ward are not standard; we should bend our backs slightly. This can be harmful for our back itself" (P7).

"Most of the time, lack of suitable facilities in a ward results in low back pain. For example, we have nothing suitable to move heavy objects in our ward. We should move heavy oxygen cylinders, DC shocking devices, or a trolley with damaged wheels" (P5).

The nature of the nursing profession

Nurses who work in different wards of a hospital usually encounter unscheduled and undefined tasks, as every individual patient might require different cares, and with shortage of nursing workforce control of a nurses' workload will be a hard job. Therefore, LBP may occur due to the work pressure resulted by lack of required number of nurses in work shifts. A participant explained this matter as follow: "with this working condition, I certainly believe that I will get a backache, because the workload is too high. Emergency ward is an especial place. A place with a high admission rate and the patients who refer to this ward are thoroughly different from those who go to a clinic for a visit. The patients who come here are particularly in a very bad condition and you might check them more than 10 or 15 times in a working shift until their conditions become stable" (P16).

Another nurse said: "sometimes a patient in emergency conditions is brought to the ward with severe bleeding, acute dehydration, large cuts, etc. In these circumstances, you should always work very fast and hard. You have to do nursing practices as fast as possible and only think about the patient at that moment. This, itself, might cause a low back pain" (P10).

Some of the nurses stated that the existing stress in their workplace might be a trigger to increase the possibility of getting a backache. One of the participants explained:

"With such a severe work stress in the ward, it is very likely for me to get a low back pain. In wards like emergency and medical wards, there's too much stress on nurses, e.g. thinking that you are in charge of a patient with unstable conditions who may arrest at any moment, or a patient who suddenly goes into shock and even into coma; these are all stressful" (P 25).

Many of nurses get backache due to the unsuitable physical position and improper habits. Unsuitable physical positions cause unusual pressure on the spinal cord. Some tissues are too stretched, the muscles get tired and the joints and nerves will be under the pressure. One of the participants explained that: "…we should give medicines and take care of the patients. We should check their body positions and all of these put pressures on our back and therefore it is more likely to get a LBP in our profession."(P4).

Another nurse said: "We may stand up for long time in our work, e.g. sometimes we have to stand up at a patient's bed side for more than 45 minutes and do CPR (Cardio Pulmonary Resuscitation) on the patient. The CPR causes LBP itself if you need to bend forward for doing your job properly. These long term standing ups in this position could cause backache." (P1)

Discussion

Although LBP is not a life threatening condition compared with, diseases like cancer, but it can cause major problems and significantly affect one's quality of life. Qualitative approach was used in this study to understand the risk perception of non-specific LBP among nurses.

The study participants believed that LBP had a negative influence on their lives. This finding is supported by the research of

Smith et al.[19] LBP has a negative effect on the nurses' daily activities and may restrict their movements in some cases.[20]

Our study findings showed that LBP might cause interruptions in nursing profession in different ways. Reduction of the efficiency of the nursing personnel who have LBP is one of the most common problems for the hospital managers.[21] More than 3.5% of nurses leave their jobs because of the LBP.[22] In 53.6% of nurses working behavior was affected by LBP, 48.1% of the nurses stated that their ability to perform their duties was decreased and 5.7% of them addressed that with LBP they hardly could manage to accomplish their nursing tasks properly.[20]

This study results also suggested that LBP could cause significant undesirable psychical and mental consequences, which is similar to the findings of other studies.[23,24]

One of the sub-themes of the perceived severity in this study was the conflicts and problem in married life because of getting a LBP. Such a sub theme was not mentioned in other studies possibly due to divergent contextual factors including differences in cultures and social support mechanisms of the countries in the world.

Having a peaceful family life is essential to have a good work performance. Thus, each individual factor that could cause tension in family life will indirectly affect work performance as well. In this study, the participants (men and women, in general), claimed that getting LBP can disturb their peaceful family life and consequently their job performance will further be affected.

Based on our study findings, LBP can cause financial problems for nurses. This sub theme was not reported in the previous studies. This might be due to the insufficiencies of the country's insurances mechanisms to cover temporary or permanent job leaves relating to work environment accidents, illnesses, or job insecurity for nurses who have health problems. Financial problems for a nurse with LBP could worse his/her health condition or adds to the current burdens of daily life pressures.

One of the sub-themes of the perceived vulnerability was the existing problems and limitations in a hospital's working system including shortage of workforce and lack of suitable equipment etc. which is concurrent with the findings of previous studies.[1,20] Insufficiency of nursing workforce, lack of suitable equipment to move or transfer patients, having relatively long working shifts (more than 12 hours) are the main risk factors for LBP.[25] High workload and nurses' various duties are the important risk factors to get backache.[1]

Participants of this study explained that the nature of the nursing profession itself is a reason for LBP. Such a conclusion was similarly reported in other studies. Improper postures for long times at work is a serious risk factor to get LBP.[26] Taking care of patients in different but required positions may cause musculoskeletal disorders among nurses (the chance will increase 7.2 times).[19] Other factors like frequent bending forward, working in semi-sitting position, standing up for long time, moving and checking too many patients with serious disabilities, unpredictable patients' conditions and receiving too many patients in emergency conditions were reported as main reasons to have LBP among the nurses.[1]

Conclusion

Reflected perceived factors by the study participants that may facilitate LBP and the reported consequences following work related LBP in nurses require further investigation to effectively intervene on work environments, rules and regulations related to nursing profession and on nurses as well. Nurses concerns and their work conditions must be carefully considered for the sake of quality nursing care in our hospitals.

Acknowledgments

We would like to thank our volunteer study participants for their help. This article was drafted based on the findings of the research project, which was done as a Ph.D.

dissertation in health education and promotion. The study was supported by the Shahid Sadoughi University of Medical Sciences, Yazd, Iran. The authors declare that there is no conflict of interests.

References

1. Smith DR, Mihashi M, Adachi Y, Koga H, Ishitake T. A detailed analysis of musculoskeletal disorder risk factors among Japanese nurses. *J Safety Res* 2006; 37:195-200.
2. Burton AK, Balagué F, Cardon G, Eriksen HR, Henrotin Y, Lahad A, et al. Chapter 2. European guidelines for prevention in low back pain. *Eur Spine J* 2006;15:S136-168.
3. Kool J, de Bie R, Oesch P, Knusel O, van den Brandt P, Bachmann S. Exercise reduced sick level in patients with non-acute, nonspecefic low back pain: A meta analysis. *J Rehabil Med* 2004;36: 49–62.
4. Sadeghian F, Kalalian Moghaddam H, Javanmard M, Khosravi A, Adelnia S. An epidemiological survey of Low back pain and its relationship with occupational and personal factors among nursing personnel at hospitals of Shahrood Faculty of Medical Sciences. *Iranian South Medical Journal* 2005;8:75-82.[In Persian]
5. Mitchell T, O'Sullivan PB, Burnett AF, Straker L, Rudd C. Low back pain characteristics from undergraduate student to working nurse in Australia: a cross-sectional survey. *Int J Nurs Stud* 2008;45:1636-1644.
6. Ghaffari M, Alipour A, Jensen I, Farshad AA, Vingard E. Low back pain among iranian industrial workers. *Occup Med*(Lond) 2006;56:455-460.
7. Kohestani HR, Baghcheghi N, Abedsaiidi J, Ghezelbash A, Alavimajd H. Determining the association between low back pain and occupational stress in nurses. *Arak Medical University Journal* 2006;9:73-81.[In Persian]
8. Sharifnia H, Haghdoost AA, Beheshti Z, Soleymani MA, Bahrami N, Hojjati H, et al. Relationship between backache and psychological and psychosocial job factors among the nurses. *International Journal of Nursing and Midwifery* 2011;3:86-91.
9. Coole C, Drummond A, Watson PJ, Radford K. What concerns workers with low back pain? Findings of a qualitative study of patients referred for rehabilitation. *J Occup Rehabil* 2010;20:472-480.
10. Cismaru M, Lavack AM. Interaction effects and combinatorial rules governing protection motivation theory variables: a new model. *Marketing Theory* 2007;7:249-270.
11. Kim S, Jeong S-H, Hwang Y. Predictors of pro-environmental behaviors of American and Korean students: the application of the theory of reasoned action and protection motivation theory. *Sci Commun* 2013;35:168-188.
12. Plotnikoff RC, Rhodes RE, Trinh L. Protection Motivation Theory and Physical Activity A Longitudinal Test among a Representative Population Sample of Canadian Adults. *J Health Psychol* 2009; 14:1119-1134.
13. Green J, Thorogood N. Qualitative methods for health research.3rd ed. London: Sage; 2013.
14. Allender S, Cowburn G, Foster C. Understanding participation in sport and physical activity among children and adults: a review of qualitative studies. *Health Educ Res* 2006;21:826-835.
15. Keshavarz Z, Simbar M, Ramezankhani A, Alavi Majd H. Factors influencing the behavior of female-workers in the reproductive age regarding breast and cervical cancer screening based on the Integrated Model of Planned Behavior and Self-Efficacy: A qualitative approach. *Journal of School of Public Health and Institute of Public Health Research*2012;9:23-36.[In Persian]
16. Mitchell LA, MacDonald RA. Qualitative research on pain. *Curr Opin Support Palliat Care* 2009;3:131-135.
17. Shenton AK. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information* 2004;22:63-75.
18. Morse JM , Barrett M, Mayan M , Olson K, Spiers J. Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods*2002;1:13-22.
19. Smith DR, Choe MA, Jeon MY, Chae YR, An GJ, Jeong JS. Epidemiology of musculoskeletal symptoms among Korean hospital nurses. *Int J Occup Saf Ergon*2005;11:431-440.
20. Karahan A, Kav S, Abbasoglu A, Dogan N. Low back pain: prevalence and associated risk factors among hospital staff. *J Adv Nurs* 2009;65:516-524.
21. Cunningham C, Doody C, Blake C. Managing low back pain: knowledge and attitudes of hospital managers. *Occup Med*(Lond) 2008;58:282-288.

22. Branney J, Newell D. Back pain and associated healthcare seeking behaviour in nurses: A survey. *Clinical Chiropractic*2009;12:130-143.
23. Hurwitz EL, Morgenstern H, Chiao C. Effects of recreational physical activity and back exercises on low back pain and psychological distress: findings from the UCLA Low Back Pain Study. *Am J Public Health* 2005;95:1817-1824.
24. Mehrdad R, Dennerlein JT, Haghighat M, Aminian O. Association between psychosocial factors and musculoskeletal symptoms among Iranian nurses. *Am J Ind Med* 2010;53:1032-1039.
25. Vieira ER, Kumar S, Coury HJ, Narayan Y. Low back problems and possible improvements in nursing jobs. *J Adv Nurs* 2006;55:79-89.
26. Janwantanakul P, Pensri P, Jiamjarasrangsi W, Sinsongsook T. Associations between prevalence of self-reported musculoskeletal symptoms of the spine and biopsychosocial factors among office workers. *J Occup Health* 2009;51:114-122.