Effectiveness of the back school program on the low back pain and functional disability of Iranian nurse

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Low back pain (LBP) as a recurrent and costly health problem and one of the leading causes of disability, is common in nurses. It can have adverse effects on the quality of life of nurses and quality of care of patients. The aim of the study was to evaluate the effectiveness of Back School program on the LBP and functional disability of Iranian nurses. A quasi-experimental methodological design was utilized for this study. Participants were nurses with back pain who participated in the Back School program workshop and completed a self-report visual analogue scales and Roland–Morris Disability questionnaire that measuring LBP and functional disability. Data were analyzed descriptively and comparisons in LBP and functional disability made between groups with t-test for pre-intervention and analysis of covariance for after intervention.

Sixty-four participants (16 males, 48 females) completed this survey. The study participants' mean age was 38.9 ± 8.1 years in intervention group and 38.1 ± 8.2 in control group. There were no significant differences in terms of pain ($P = 0.575$) and disability scores ($P = 0.844$) before intervention. Although, the intervention led to a decrease in the functional ability and LBP scores of the nurses ($P < 0.001$) in the intervention group compared with that in the control group. Overall, Back School program as an educational strategy can reduce the LBP and functional disability in nurses. This program can be suitable for preventing of pain and functional disability among nurses working in hospital settings.

Keywords: Disability, Education, Iran, Low back pain, Nurses

INTRODUCTION

Low back pain (LBP) as most important musculoskeletal disorders and occupational health problem, has a high prevalence among healthcare workers especially nurses with a lifetime prevalence ranges from 35% to 80% that associated with enormous socio-economic and health costs to society (Azizpour et al., 2017; Járomi et al., 2018; Parreira et al., 2017; Soroush et al., 2018; Van Hoof et al., 2018). This occupational-related chronic nonspecific LBP as a major cause of functional disability lasts for more than 12 weeks and the inappropriate job condition, incorrect body positions, environmental factors, and high patient-care workload causes that millions of nurses around the world suffer from its (Noormohammadpour et al., 2018; Sahin et al., 2011).

Results of a systematic review and meta-analysis carried out by Azizpour et al. (2017) showed that the prevalence of LBP during the working life of Iranian nurses was 63%. Medical and social problems, impairment, chronic pain, activity and efficiency restriction, missed work, loss of optimal performance, diminish the quality of life, burnout, rising medical costs of treatment, care and occupational disability leading to a chronic condition that are some but not all negative impact of occupational LBP. These conditions cause an enormous medical and economic burden on individuals, families, employers, and the healthcare system (Azizpour et al., 2017; Mohseni-Bandpei et al., 2006; Van Hoof et al., 2018).

Nurses due to having a central and important role in providing care for patients, need to have educational interventions and awareness training for help them to prevent, manage and reduce the

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low back injuries and pain that they being able to provide better support for their patients (Ovayolu et al., 2014; Vieira and Brunt, 2016). There are some noninvasive interventions such as physical therapy modalities, exercise, and educational program to prevent and treatment of pain and functional disability of LBP (Sahin et al., 2011).

The comprehensive multidisciplinary programs Swedish Back School was introduced by Zachrisson Forsell in 1969 that aims to reduce the back pain and injury, teach people to care for their own backs and back pain in an active way to improve the functionality and quality of life. This program consisted of information on the structure and function of the spine, biomechanics, optimal posture, ergonomics, and performing special back exercises (Bartz et al., 2016; Forssell, 1981; Straube et al., 2016). It helps nurses on how to protect the spinal structures in daily activities and work (Brox et al., 2008).

The studies were conducted in Hungary showed that applying the Back School program for nurses reduced the chronic nonspecific LBP syndrome (Jaromi et al., 2012; Járomi et al., 2018), help nurses to the execution of proper patient lifting techniques (Járomi et al., 2018) and improve their body posture (Jaromi et al., 2012).

Here, this study provided the Back School workshop to nurses with back pain and examined the effectiveness of lumbar care education based on Back School program to decrease the LBP and functional disability among Iranian nurses.

MATERIALS AND METHODS

A quasi-experimental methodological design was utilized for this study. This study was approved by the Ethics Committee of the University of Social Welfare and Rehabilitation Sciences (register number: IR.USWR.REC.1394.151) and the protocol was registered by the Iranian Registry of Clinical Trials (No. 20150-93024277N1).

Participants and recruitment

The inclusion criteria for this study was nurses who to be bachelor's degree in nursing (BSN), employment in one of the medical departments, having back pain and an interest for participating in the Back School workshop in Shohada Tajrish Hospital affiliated to the Shahid Beheshti University of Medical Sciences, Tehran-Iran from May to August 2015. Participants were recruited across purposeful sampling and then randomly assigned to the intervention and control group equally (32 nurses in each group). Nurses were not eligible for inclusion in the study if they have a history of back surgery in the past 2 years, congenital anomaly and inflammatory diseases of the spine, pregnancy, severe osteoporosis. The research objectives and process were explained to all the nurses and written informed consent was obtained. All the nurses were informed that participation was voluntary and they had the right to withdraw at any time.

Instruments

The LBP of nurses evaluated by the visual analogue scales (VAS) as a popular and self-reported tool for the measurement of pain. This scale consists of a straight line that ranging from "no pain" on the left end (0 cm) of the scale and the "worst pain" on the right end of the scale (10 cm) (Delgado et al., 2018). The nurses select the point on the line that best represents his/her perception of LBP level. A higher score indicates greater pain intensity.

The Roland–Morris Disability Questionnaire (RMDQ) (Roland and Morris, 1983) as one of the most recommended back-pain specific questionnaires to assess disability was utilized for measures of disability in nurses. This self-completed questionnaire was designed in 1983 for use in research, clinical practice and different settings to assess physical disability due to LBP and consist of 24 items (yes/no) that assess the execution of daily physical activities and life functions that may be affected by LBP, such as housework, sleeping, mobility, dressing, getting help, appetite, irritability, and pain severity. The scores range from 0 (no disabili-

Table 1. Content of educational intervention

Part	Content
First part	Epidemiology of skeletal and muscular disorders, costs of these disorders, individual factors associated with skeletal and muscular disorders, the relationship between job with skeletal and muscular disorders and high-risk occupations in this regard, the impact of lifestyle in musculoskeletal disorders, the importance and necessity of self-care in preventing and reducing these disorders
Second part	Physiology and anatomy of the spine, types and common causes of low back pain and symptoms of its, factors causing of low back pain, the results of inaccurate anatomical status
Third part	Lumbar protection techniques and how to prevent back pain, proper body conditions in some cases as sleeping, sitting, driving, standing and walking, proper techniques for picking up objects and patients, relocation, transporting
Forth part	Sports exercises and related and useful therapeutic movements for back pain

ty) to 24 (maximum disability). This instrument is short, simple to complete and readily understood and as a standardized measure widely used by back pain researchers (Roland and Fairbank, 2000; Smeets et al., 2011; Yamato et al., 2017). The questionnaire has undergone validity and reliability testing in several studies (Asghari, 2011; Mousavi et al., 2006). The correlation coefficient was 0.80 in the present study.

Procedures

After sampling, nurses in the intervention group were included in the Back School workshop to prevent the LBP. The program was administered by a physiotherapist and the duration of the workshop was 3 hr. This workshop consisted of information on the structure and function of the spine, biomechanics, optimal posture, ergonomics, and performing special back exercises in accordance with Back School program (Table 1). The 15 min of the workshop's end was dedicated to questions and answers and at the end, a LBP booklet that included a summary of workshop discussions was given to the participating nurses. Participants in both groups completed the VAS and RMDQ questionnaire before and two months after the workshop. Although the workshop was not held for the control group, after the end of the study in order to observe ethical issues, a LBP booklet was given to these nurses.

Statistical analysis

The sample size was estimated based on a similar study conducted by Sahin et al. (2011) who investigated the effectiveness of Back School for treatment of pain and functional disability in patients with chronic LBP (Sahin et al., 2011) and considering $\beta = 0.20$, $\alpha = 0.05$, estimate of variance $= 1.643$ and $d = 0.9$, a total of 32 study participants were estimated to be required in each group.

$$ n = \frac{2 \left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2 \sigma^2}{d^2} $$

Descriptive statistics were used to report nurses' demographic and clinical characteristics. Statistical analyses were performed at a confidence level of 0.05 using IBM SPSS Statistics ver. 21.0 (IBM Co., Armonk, NY, USA). The mean and standard deviation were used to describe the quantitative variables, whereas the frequency and percentages were used to describe the qualitative variables. The normality of the data distribution was examined using the Kolmogorov–Smirnov test. We used the nonparametric tests for the data, which were not normally distributed. To compare the mean difference in functional disability and LBP, the independent t-test was used in pre-intervention and analysis of covariance was used among the two groups after intervention.

Table 2. Demographic characteristics of nurses

Characteristic	Intervention group (n = 32)	Control group (n = 32)	P-value
Gender			0.586[a]
Male	7 (21.9)	9 (28.1)	
Female	25 (78.1)	23 (71.9)	
Age range (yr)			0.737[b]
<30	8 (25)	10 (31.25)	
31–44	12 (37.5)	12 (37.5)	
>45	12 (37.5)	10 (31.25)	
Relationship status			0.055[a]
Married	21 (65.5)	13 (40.6)	
Single	11 (34.5)	19 (59.4)	
Second job			1.000[a]
Yes	8 (25)	8 (25)	
No	24 (75)	24 (75)	
Employment background (yr)			0.312[b]
<10	12 (37.5)	12 (37.5)	
11–20	10 (32.25)	11 (34.4)	
>21	10 (32.25)	9 (28.1)	
Body mass index (kg/m²)			0.148[b]
Underweight (16–18.5)	0 (0)	1 (3.1)	
Healthy weight (18.5–25)	12 (37.5)	13 (40.6)	
Overweight (25–30)	16 (50)	18 (56.3)	
Obese (>30)	4 (12.5)	0 (0)	

Values are presented as number (%).
[a]Chi-square. [b]t-test.

Table 3. Comparison of the mean and standard deviation of nurses' low back pain and functional disability scores in the intervention and control groups

Variable	Group		Type and test results
	Intervention	Control	
Functional disability			
Before	11.06 ± 5.105	10.81 ± 35.65	$P = 0.844$ $t = 0.198$ (t-test)
After	9.66 ± 6.553	11.09 ± 5.195	$P < 0.001$ $F = 30.001$ (ANCOVA)
Low back pain			
Before	5.44 ± 2.552	5.09 ± 2.319	$P = 0.575$ $t = 0.564$ (t-test)
After	4.03 ± 1.975	5.22 ± 2.310	$P < 0.001$ $F = 196.875$ (ANCOVA)

ANCOVA, analysis of covariance.

RESULTS

A total of 64 nurses provided informed consent and 100% completed the survey (n = 64). The study participants' mean age was 38.9 ± 8.1 years in intervention group and 38.1 ± 8.2 in control group—75% of them were female (n = 48). Almost more than half (n = 34, 53.1%) had an overweight status in body mass index. No significant differences were observed between the two groups in terms of the demographic data (Table 2). The results showed that the two groups were not significantly different in terms of LBP ($P = 0.575$) and functional disability scores ($P = 0.844$) before intervention. Table 3 indicating that the intervention led to a decrease in the functional ability and LBP scores of the nurses ($P < 0.001$).

DISCUSSION

The findings of this study revealed that the LBP and functional disability significantly reduced in the nurses participated in the Back School program. The results of systematic review indicated that due to the low- to very low quality of the evidence for all treatment comparisons, outcomes, and follow-up periods of Back School program for chronic nonspecific LBP, it is recommended that additional and future research be done to determine the different effects of this program (Parreira et al., 2017). According to other studies report, the educational intervention and preventive program such as Back School program can be significantly effective in pain relief (Glomsrød et al., 2001; Járomi et al., 2018; Van Hoof et al., 2018), increased the number of properly techniques in patient lifting (Járomi et al., 2018) in nurses and decreased pain intensity (Bartz et al., 2016) and disability (Sahin et al., 2011), improved functionality, and the recovery of activities of daily living in people with chronic musculoskeletal pain (Bartz et al., 2016).

The work condition such as high patient-care workload, longer work hours, and long-standing and walking per day are as risk factors for LBP in hospital nurses that occupational safety and regular education programs such as Back School program should be initiated to control these risk factors (Ovayolu et al., 2014; Shieh et al., 2016). Nurses due to the nature of work, need to protect and improve their health in order to be able to provide effective care and be more beneficial for the patients. The LBP and functional disability caused by it, is a challenge to provide the best care and it can have adverse effects on quality of life for nurses and the quality of care of patients; although it can be completely pre-

ventable if the necessary precautions and educations are taken (Shieh et al., 2016; Patil et al., 2018).

Our study has some limitations. In this study, we assessed the pain and disability using the self-administered questionnaires that there is potential for the severity of LBP and disability conditions to be overestimated. Thus, the use of objective measurements is recommended in future studies. Also, the work condition such as standards of nurse-to-patient ratios is accordance with Iran condition that it be considered in the generalization of the results. It is recommended to conduct further studies with a larger group of nurses including staff of hospitals of different regions and sizes, which would be useful for confirming the results of this study.

This study provided evidence that the Back School program can reduce the LBP and functional disability among nurse. Thus, our data indicate that this program can be suitable for preventing and improving pain and functional disability among nurses working in hospital settings.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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