Effect of a Virtual Educational-Training Program on Behavioral Changes Related to Preventing Neck Pain Strategies among Nurses Working in Lorestan Province, Iran

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A B S T R A C T

Aims: The improper posture of nurses' spinal column during work could increase the rate of neck pain among them. Various studies have shown that musculoskeletal disorders, including neck pain, are very common in medical staff, especially among nurses. This study aimed to investigate the effect of an educational-training program on Behavioral Changes Related to Preventing Neck Pain Strategies among Nurses Working in Lorestan Province , Iran

Method and Materials: This study was performed on 90 nurses in two experimental (N=45) and control (N=45) groups. In this study, a researcher-made questionnaire was used to assess the knowledge, attitude, and behaviors of the nurses regarding the neck proper posture. The program was shared through mobile phones and virtual networks, to reduce nurses' misbehaviors by increasing their awareness and changing their attitudes. Data were collected before and three months after the intervention in both groups.

Findings: This study found that nurses obtained low scores in the areas of knowledge, attitude, and behavior before the intervention. There was no significant difference between the experimental and control groups in terms of demographic characteristics and studied variables at initial of the study (p > 0.05); while after the educational-training program, the average scores of nurses in the experimental group increased in all three areas including knowledge, attitudes, and behaviors (p < 0.001).

Conclusion: The present study showed that the ergonomic-based educational-training program can be effective in changing the behavior of nurses in order to prevent their neck pain. Therefore, it is recommended to use virtual educational-training programs in further researches in order to confirm its effectiveness to be able to be applied in health system.

Introduction

Any injury or disorder to a muscle, bone, tendon, ligament, joint, nerve, or blood vessel that is accompanied by sprains, pain, and inflammation is called a musculoskeletal disorder. These disorders can be caused or exacerbated by working conditions [1]. Musculoskeletal disorders are one of the most important occupational health problems in industrialized countries and also one of the main causes of discomfort and disability of working people. Moreover, it is reported that musculoskeletal disorders can increase compensation from work and reduce productivity in developing countries [2]. Neck pain is one of the most common musculoskeletal disorders in today's society; Approximately 67% of people will experience at least one period of neck pain in their lifetime [3]. Neck pain, like back pain, is prone to chronic pain and often leads to long-term disability. In addition, health care costs, combined with this long-term disability, impose a significant economic burden on society and pose a significant challenge to the health care system [4].

The patients with chronic neck pain use twice as much health care services and these costs have a negative impact on the country's economy [5]. Various studies have also shown that neck pain reduces the quality of life and job satisfaction

[6]. Various factors can cause neck pain, including bad habits and poor posture at work [7]. This complication leads to a decrease in normal human movements and reduces the efficiency of the musculoskeletal system performance [6]. A review of previous studies indicates that medical personnel is at risk for musculoskeletal disorders due to repetitive tasks, high workload, poor working conditions, patient ambulation, and psychological factors such as job stress and work shifts [8]. It is estimated that approximately one-third of all cases of sick leave among health care workers are related to musculoskeletal disorders [9]. Given the nature of the job of health care professionals is such that it always exposes them to physical and mental fatigue, research on this issue is important. These job pressures and injuries can negatively affect the services they provide to all members of the community [10]. A study conducted by Fakhreddin Maroufi et al. showed that standardizing the work methods based on ergonomic principles and related exercises reduce neck pain and increase physical strength, which eventually can reduce the number of days off work and increase employee motivation [11].

This study aimed to investigate the effect of an educational-training program on behavioral changes related to preventing neck pain strategies among nurses working in Pole Dokhtar city, Lorestan province.

Method and Materials
This quasi-experimental study was performed among nurses of hospitals in Pol-e Dokhtar city in Lorestan province.
To determine the sample size, by asking the hospital matrons, it was determined that approximately 110 nurses are working in this hospital; Therefore, it was decided that all 110 nurses, if eligible, should be included in the study by census. However, 90 nurses agreed to participate in the study. Using a simple random method, they were divided into two groups of 45 nurses in control and experimental; That is, 45 nurses were selected as the control group and another 45 nurses as the experimental group. Among the second group, three nurses did not satisfy to enter the study.

Before the intervention, after the necessary coordination with the hospital matron, a briefing session was held with all nurses to explain the purpose, implementation method and attract their cooperation to obtain their telephone numbers for virtual training. Then the demographic characteristics and the researcher-made questionnaire were completed by both experimental and control groups.

The researcher-made questionnaire [12] were designed in three dimensions (knowledge, attitude and behavior change due to neck pain prevention). After literature review and consideration by specialists in health education, physiotherapy, occupational health and, ergonomics, 28 questions were verified, among which 14 questions were in the field of knowledge, 9 questions were in the field of attitude and 5 questions were related to behavior. In the field of knowledge, the questions were designed in two options, with a maximum score of 28 and a minimum score of 14. This means that any nurse who scores higher has a higher level of knowledge. In the field of attitude, the questions were designed in the form of a five-part Likert scale "strongly agree with score 5", "agree with score 4", "no opinion with score 3", "disagree with score 2" and "strongly disagree with score 1", with a total maximum score of 45 and the total minimum score of 9 points. This means that any nurse who gets a higher grade has a better attitude towards neck pain prevention. In the field of behavior change, the questions were designed in the form of a five-part Likert scale

"always with score of 5", "often with score of 4", "sometimes with score of 3", "rarely with score of 2" and "never with score of 1", for which the maximum score could be obtained in this part was 25 and the minimum score could be 5 points. This means that any nurse who scored higher will do the better behavior in caring to preventing neck pain.

After completing the data collection from both group at initial of the study, the virtual training program were implemented just for experimental group.

In the first stage of virtual educational program, an educational content was provided for the experimental group with the aim of their sensitizing and increasing their awareness. This content includeed information such as statistics of LBP from various sources, information on risk factors for musculoskeletal disorders such as neck pain as well as preventive beaviours to avoid them to be suffered. In the second part, content was presented with the aim of improving the audience's attitude towards the principles of ergonomics behaviours and skills. In this stage the goal was to improve audiences' believe that they can improve their own health with simple methods of selfcare. The participants in experimental group were given the opportunity to discuss with each other and also with the instructor about the material presented inorder to express their views on the topics. In the third part, the principles of ergonomics skills during daily activities were practiced with the participants by using photos, slides and videos in order to create proper performance.

After completing the implementation of the educational program, up to three months later, the presented educational materials were placed in the group as a reminder, and the post-test data collection was performed three months after the intervention of the training program [13] through filling questionnaire in both groups and the data were analyzed using SPSS software version 26.

Findings

Totally 90 nurses with a mean age of 29.94 ± 5.12years were included in the study. Table 1 shows the comparison of both groups in terms of demographic variables. According to the results of Table 1, the mean age of the experimental group was 30.31± 4.8 years. The average work experience of all nurses was calculated as 7.06 ±5.00 which shows that the majority of the study population had good work experience. The nurses participated in the intervention were working in 8 different wards of the hospital, including children ward, emergency ward, CCU, men's ward, women's ward, operating room, maternity ward and, dialysis ward. Emergency with 17 nurses had the highest number of participants among those participated in the study. It should be noted that dialysis nurses with 8 people had the lowest number of participants. The results of Table 1 show that the majority of participants in the study did not work outside of working hours. Table 2. Shows the results due to independent t-test to compare the variables of knowledge, attitude, and behavior of both groups. According to the results of this Table, there was no significant difference in knowledge between the experimental and control groups before the intervention (p = 0.88). This was while that this difference of two groups was significant after the intervention. This indicates an improvement in the knowledge of the experimental group compared to the control group. Moreover, there was no significant difference in attitude between the experimental and control groups before the intervention (p = 0.95). This was while this difference between both experimental

Table 1) Comparison of both groups in terms of demographic variables

Variables	Group		Number	Mean ±SD	N(%)	P-value
Age (years)	Experimental		45		30.314.8±	0.16
	Control		45		29.575.45±	
Work experience (years)	Experimental		45		7.354.82±	0.56
	Control		45		6.775.21±	
Having activities outside of working hours	Experimental	Yes	45		13(28.9)	0.24
		No			32(71.1)	
	Control	Yes	45		11 (24.4)	
		No			34 (75.6)	
Place of service	Experimental		45		–	0.056
	Control		45			

and control groups was significant after the intervention. This indicates that the virtual educational program effect in increasing the attitude of the experimental group. Finally, there was no significant difference in behavior between the two groups before the intervention (p = 0.93). This was while the P-value obtained for both experimental and control groups was significant after the intervention. This indicates the effect of the virtual educational program on improving the neck pain preventive behavior of the experimental group.

Discuss

The aim of this study was to investigate the effect of a virtual educational-training program based on ergonomic principles on the prevention of neck pain among nurses. Since not all ergonomic principles can be followed in the workplace, which can lead to incorrect positioning at work, specific neck exercise can be a substitute for preventing neck pain . This means that by doing related exercises, nurses can compensate for their wrong behaviors. It should be noted that the interval of 3 months was very suitable for

Table 2) Comparition the studied variables of both experimental and control groups

Variable	Time	Group	Df	t	*P-value
Knowledge	Before intervention	Experimental Control	88	0.11	0.88
	After intervention	Experimental Control	85	5.49	< 0.001
Attitude	Before intervention	Experimental Control	88	0.05	0.95
	After intervention	Experimental Control	85	4.20	< 0.001
Behavior	Before intervention	Experimental Control	88	0.08	0.93
	After intervention	Experimental Control	85	6.40	< 0.001

*Significance level less than 0.05 is considered.

training and teaching exercises. During this 12-week period, the researchers were able to correct a large part of the nurses' misbehavior by using videos, educational photos, and short messages. During this period, the researchers of this study recalled the material that had been taught in the first two weeks of education. This method was more useful for the authors than methods such as face-to-face or multimedia training. Because in this method, it was possible to remind that the content would be observed again in the workplace in case of forgetting the materials. The effect of the intervention on the nurses' knowledge was considered as optimal. It was concluded that there was a significant difference between the experimental and control groups after the intervention. This means that the intervention had a positive effect on increasing the knowledge of nurses in the experimental group. This result is consistent with the results of the study of Baghban Karimi [14] which showed that teaching ergonomics principles increased the score of knowledge and performance in the intervention group. In the present study, the mean knowledge scores of the experimental and control groups were reported to be 20.95 and 20.86, respectively, before the intervention. The same values were reported in Karimi Baghban's study as 24.29 and 22.12 and in Peymani's [15] study as 29 and 29.83. This difference in the mean scores can be due to reasons such as higher nurses' degrees or more questions in the mentioned studies [14, 15]. The intervention had an effect on improving the attitude of nurses in the experimental group. According to the results, it has been shown that the attitude of the experimental group, before and after the intervention, were significantly different from each other. These findings are in the line of previous study[15]. After the intervention, the mean attitude score of the experimental group increased significantly,

while the control group did not change significantly. The results of the intervention had an effect on changing the behavior of nurses to perform neck pain prevention behaviors. The present study showed that the nurses of the experimental group obtained a better score than the control group, which shows the importance and significant impact of the virtual training program. These findings are in the line of previous study [14] and [16]. The present study clearly showed the effect of ergonomic interventions in three areas of know;edge, attitude and, behavior. This has been very effective in preventing musculoskeletal disorders, such as neck pain. Our results were in line with Farahabadi et al [17] who showed that the prevalence of musculoskeletal disorders in nurses is high and also recommended ergonomics workshops and preventive tasks.

Ergonomic interventions were also recommended in other studies by Shokati et al. [18], Maroufi et al. [11], Rokni et al. [19], Miri et al. [20], and Dehdashti et al. [21] . In these studies, as in the present study, it was confirmed that due to the high prevalence of musculoskeletal disorders, inappropriate posture at work and harmful work environments, ergonomic interventions can be a good solution to reduce pressure on the neck and trunk during work. Based on the results of this study and also the similar results of the mentioned studies, it is better for nurses to be adequately educated about the patient transfer and proper physical condition at work. Moreover, the present study showed that exercise therapy combined with ergonomic interventions which were useful for preventing neck pain. This study had its own strength points as following: 1- In most of the mentioned studies, there is a positive attitude and high satisfaction among students and faculty members regarding the use of virtual

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education, but considering that the effect of virtual education on learning and learners' satisfaction can be different depending on the method used. in our country there is emergency needs to conduct more extensive studies in this field to assess the effect of virtual education.In this study this aim was addressed. 2- Due to the pervasiveness of musculoskeletal disorders such as neck pain, attention to the results of such research is more and more visible and it is suggested that in teaching and applying the principles of ergonomics and exercise to be more payed attention that was addressed here. However there was some limitations for this study.

Lack of cooperation of some nurses due to personal problems during the intervention was one of the main limitations of this study. In future studies, it is better to provide the ground for creating a reliable environment for people participating in the intervention and also to justify them for being satisfied to take part in all stages of the intervention. Being self-reporting

Conclusion
The present study showed through a correct and coherent educational program, knowledge. attitude and behaviors due to neck pain prevention can be well strengthened, which will ultimately lead to the prevention of neck pain. This educational-training program was based on ergonomic principles and at-work exercises which were done in cyberspace and was useful to prevent neck pain in nurses.

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