Effect of Patient Transfer Training on Low Back Pain in Pre-hospital Emergency Medical Services Personnel

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ABSTRACT

Background and objectives: Pre-hospital emergency medical services (EMS) personnel are responsible for transferring patients. In case of improper patient handling, these individuals become vulnerable to various musculoskeletal problems including back pain. In this study, we aimed to evaluate the impact of an eight-hour training intervention about patient handling and transfer ergonomics on low back pain in pre-hospital EMS personnel working in the Golestan Province, Iran.

Methods: This was a quasi-experimental study with a pre-test/post-test design. The study population consisted of 200 pre-hospital EMS personnel working in the Golestan Province, Iran. Overall, 40 EMS personnel were eligible to participate in the study. Data were collected using a demographic questionnaire, the Oswestry low back pain disability questionnaire and the Quebec back pain disability scale. The eight-hour training session was held by a research nurse, a physiotherapist and a physician. The subjects recompleted the Oswestry low back pain disability questionnaire and the Quebec back pain disability scale at baseline, four weeks and 12 weeks post-intervention. The collected data were analyzed using SPSS 16 and descriptive statistics.

Results: The mean age, body mass index and work experience was 38.6 ± 7.6 years, 25.9 ± 3.5 kg/m^2 and 8.27 ± 5.2 years, respectively. The mean score of functional disability reduced significantly from 35.9 ± 9 at baseline to 27.5 ± 2.5 and 19.6 ± 7 four weeks and 12 weeks after the intervention, respectively (P=0.0001). Furthermore, the mean pain score decreased from 38.7 ± 13.86 to 31.05 ± 10.75 one month post-intervention and to 22.4 ± 9.47 three months post-intervention (P=0.0001).

Conclusion: Our findings suggest that training intervention on ergonomic patient transfer and patient handling can reduce the rate of lower back pain in pre-hospital EMS personnel.

Keywords: Education; Patient transfer; Low Back Pain; Pre-hospital Emergency

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INTRODUCTION

Nurses and paramedical staff, especially pre-hospital emergency medical services (EMS) personnel, are at high risk of low back pain (1-4). According to a systematic review and meta-analysis, the prevalence of low back pain in emergency settings was 4.39% between 2000 and 2016, with the prevalence ranging from 0.9 to 17.1% among different countries (5). In Iran, the prevalence of back pain among nurses was reported between 70 to 78% in different cities, but the overall prevalence of this problem is not clear (4, 6-9).

Back pain is associated with some individual and occupational factors (10) that may be due to the nature of pre-hospital EMS, such as exposure to stressful conditions and work environment, intense physical activity and prolonged standing (1-3). In fact, low back pain is a multidimensional problem that affects the performance and quality of life of pre-hospital EMS personnel (4) and leads to depression, anxiety and decreased job satisfaction (11). This problem is also a common cause of long-term sick leave and early retirement (12). Therefore, ergonomics training along with workplace assessment, rehabilitation and stress management strategies are essential in these personnel (4). Previous studies have also shown the effectiveness of ergonomic interventions such as dynamics-based training programs, training on prevention of work-related musculoskeletal disorders, proper patient transfer techniques and exercises that could prevent low back pain (13-15). According to a systematic review, pre-post studies are the most suitable for assessing the effect of patient transfer interventions (13). Therefore, this study aimed to determine the effect of proper ergonomic patient transfer practice on low back pain in pre-hospital EMS personnel.

MATERIALS AND METHODS

The present study is a quasi-experimental study with a pre-test/post-test design. The study population consisted of 200 pre-hospital EMS personnel working in the Golestan Province, Iran. Inclusion criteria included a score of 25 and above on the Oswestry disability index and the Quebec back pain disability scale, working in the emergency department and being in charge of patient transfers. Those with a second job and history of depression, underlying illness and regular exercise were excluded from the study. Overall, 40 EMS personnel were included in the study.

Data were collected using a demographic questionnaire, the Oswestry Low Back Pain Disability questionnaire and the Quebec back pain disability scale. The Oswestry Low Back Pain Disability questionnaire evaluates the functional ability of an individual with 10 items that are scored zero to five in the areas of pain tolerance, personal care, lifting, walking, sitting, standing, sleeping, social life, travel and pain intensity changes. The score of each section are multiplied by two and an overall score of zero to 100 represents the person's level of disability. Thus, a score of zero indicates good overall health and pain-free performance, 0-25 means mild disability, 25-50 represents moderate disability, 50-75 shows severe disability, and 75-100 indicates complete disability (16).

The Quebec back pain disability scale consists of 25 questions that are scored zero to four and determine pain intensity (zero to 100) in everyday activities. In this questionnaire, score of zero indicates good overall health, a score of 0-25 indicates mild pain, 25-50 represents moderate pain, 50-75 indicates severe pain, and score of 75-100 shows very severe and debilitating pain (17).

After signing a consent form and completing the questionnaires, all EMS personnel with a pain and disability score of 25 or above were enrolled in the study. Due to the intensive 24-hour shifts, the subjects were divided into two groups. For both groups, an 8-hour training session was held by a research nurse, a physiotherapist and a physician in charge of the emergency training center in Gorgan, Golestan Province. This training session included theoretical and practical training on the correct ergonomics and movement in patient transfer and the dynamics of back pain

prevention. Four and 12 weeks after the training sessions, the participants recompleted the Oswestry low back pain disability questionnaire and the Quebec back pain disability scale and the obtained data were compared to baseline data.

In this study, all ethical considerations were taken into account and the participants were ensured about the confidentiality of their information. In addition, the study protocol received approval from the Ethics Committee of the Golestan University of Medical Sciences (approval code: 94185).

All data were analyzed in SPSS 16 using descriptive statistics, the Kolmogorov–Smirnov test, repeated measures ANOVA and Bonferroni test. All statistical analyses were performed at significance level of 0.05.

RESULTS

The mean age, body mass index and work experience was 38.6 ± 7.6 years, 25.9 ± 3.5 kg/m2 and 8.27 ± 5.2 years, respectively. The frequency distribution of socioeconomic variables in the subjects is shown in table 1.

Table 1. Frequency distribution of demographic variables in the subjects

Variables		Frequency	Percent
Marital status	Single	5	10.4
	Married	43	89.6
Education level	Diploma and Associate Degree	32	66.7
	Undergraduate and graduate	16	33.3
Economic status	Poor and moderate	41	85.4
	Well and great	7	14.6
Total		48	100

Based on the results from the Quebec back pain disability scale, 70% of the subjects had moderate low back pain before the intervention, which was reduced to 62.5% one month and to 30% three months after the intervention. Moreover, 20% of the subjects had severe pain before the intervention, which decreased to 5% in the following month and to 2.5% three months after the intervention (Table 2). Furthermore, the mean pain score decreased from 38.7 ± 13.86 to 31.05 ± 10.75 one month after the intervention and to 22.4 ± 9.47 three months after the intervention (P=0.0001).

Table 2. Frequency of low back pain in the participants before and after the intervention

Pain intensity score	0-25 (mild)		25-50 (moderate)		50-75 (severe)	
Before the intervention	4	10	28	70	8	20
One month after the intervention	13	32.5	25	62.5	2	5
Three months after the intervention	27	67.5	12	30	1	2.5

Based on the results obtained from the Oswestry low back pain disability questionnaire, 87.5% of the subjects had moderate functional disability and the rest had severe functional disability. However, one month after the intervention, none of the participants had severe functional disability, 70% had moderate functional disability and 30% had mild functional disability. Three months after the intervention, the frequency of moderate and mild functional disability was 20% and 80%, respectively (Table 3).

Table 3. Frequency of Oswestry functional disability in subjects with low back pain

Functional disability	0-25 (mild)		25-50 (moderate)		50-75 (severe)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Before the intervention	0	0	35	87.5	5	12.5
One month after the intervention	12	30	28	70	0	0
Three months after the intervention	32	80	8	20	0	0

According to the Oswestry Low Back Pain Disability questionnaire, the mean score of functional disability reduced significantly after the intervention (Table 4).

Table 4. Mean score of Oswestry functional disability in subjects with low back pain

	Before the intervention		One month after the intervention		Three months after the intervention		P-value
Oswestry functional disability	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	0.0001
	34.07	8.09	27.47	5.18	19.67	6.05	

DISUCSSION

The purpose of this study was to determine the effect of ergonomic patient transfer training on intensity of low back pain in pre-hospital EMS personnel in the Golestan Province, Iran. The findings showed that the training intervention effectively reduced the level of low back pain and its associated functional disability. Similar to our findings, in a study by Fongsri et al., a four-week, once-weekly training intervention for 80 minutes significantly reduced the mean score of low back pain, which could be due to improved patient transfer skills and improved muscle strength (19).

There is also a relationship between low back pain and poor body mechanics. In a quasi-experimental study, Owen et al. demonstrated that the rate of pain complaints and absenteeism among nurses was reduced over five years following ergonomic interventions (20). Thus, proper patient transfer techniques should be considered as a strategy to reduce back pain (21). In line with our findings, Nelson et al. reported that training on ergonomic and proper patient transfer techniques can reduce the rate of musculoskeletal disorders in nurses (22). However, Arabs et al. found no significant association between ergonomic intervention and low back pain among hospital staff (14).

This inconsistency of results could be related to differences in the tools used for assessing pain intensity in the subjects (the Nordic musculoskeletal questionnaire vs. the Quebec back pain disability scale). According to Jouybari et al., training nurses on ergonomics and utilization of appropriate facilities can effectively improve the work environment of health care personnel (23).

CONCLUSION

Our findings suggest that training intervention on ergonomic patient transfer and patient handling can reduce the rate of low back pain in pre-hospital EMS personnel.

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DECLARATIONS

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Ethics approvals and consent to participate

Written consent was obtained from all participants. The study protocol received approval from the Ethics Committee of the Golestan University of Medical Sciences (approval code: 94185).

Conflict of interest

The authors declare that there is no conflict of interest.

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