

Frequency of musculoskeletal complaints of the motorboats staff and its relationship with demographic characteristics

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Abstract

Aims: Musculoskeletal disorders are the most common diseases and occupational injuries and the main cause of labors' disability all over the world. Various studies have shown the relationship between whole body vibration and skeletal disorders. The purpose of this study was to investigate musculoskeletal complaints among the motorboat staff.

Methods: This descriptive correlation study was done on 149 of motorboat staff of the Caspian Sea and Persian Gulf in 2010. Sampling was carried out based on purposive and convenience sampling methods. Data were collected using a demographic questionnaire and the NMQ (Nordic Musculoskeletal Questionnaire) and analyzed by SPSS 16 software using Kolmogorov-Smirnov, Chi-square and independent T-test.

Results: The most complaints were lumbar pain (61.1%) and knee pain (60.4%). There was statistically significant relationship between age, height, weight, total work experience and work experience on motorboats and pain in the lumbar region ($p=0.001$). There was statistically significant correlation between knee pain and age, total work experience and work experience on motorboats ($p=0.03$).

Conclusion: The most common musculoskeletal complaint of the motorboats staff is lumbar region and knee pain. Regarding the high prevalence of lumbar and knee pain among motorboats staff that causes decrease in productivity and performance and increase in treatment costs and early disability, the special attention of relevant authorities is required.

Keywords: Musculoskeletal Complaints, Motorboat Staff, Demographic Characteristics

Introduction

According to the International Labor Organization (ILO), the number of occupational accidents and deaths is unimaginably high. Annually, 250 million occupational accidents occur, 1.2 million people die due to these accidents and 160 million workers encounter with occupational diseases. The cost of these incidents is very high for the society and there is no way to express its losses of lives [1]. Based on national studies that was developed by the Health Programs Office of the Health ministry's Network Development Center in 2004, the burden of disease and risk factors in Iran have been on back pain, knee arthritis and other musculoskeletal disorders of working as the major diseases after heart and vessels diseases [2]. Musculoskeletal disorders associated with work usually causes back involvement, neck cervical spine and upper extremities. These disorders are the most common occupational diseases and injuries and they are the major causes of disabilities in the workers [3]. Musculoskeletal problem is one of the main reasons of disability in the United States [4]. Skeletal-muscle disorders due to work impose 20 to 50

billion dollars cost to humans and health-treatment centers each year [2]. In addition, these diseases are responsible for 7% of all illnesses and diseases in the community, 14% of people who refer to doctors and 19% of hospitalized cases in the hospitals. In Iran, musculoskeletal disorders are the most common occupational disorders [3]. According to the World Health Organization, the second leading cause of work absenteeism in the United States is back pain and 20% of absence from work in German is related to disk injuries. Such high figures in the international level, led the World Health Organization to call the first decade of the millennium, as the decade of fighting with the musculoskeletal effects as silent epidemic [2]. Skeletal-muscle disorders refer to a common disorder associated with pain and discomfort in their joints and soft tissues during the movement. These injuries lead to inflammation, pain, movement limitation in the organ or muscles, deformity, erythema, muscle cramps and spasms, etc. Factors such as height, weight, age, gender, job stress, inappropriate methods of performing daily activities, depression, wrong position in the work time, repetitive movements, direct mechanical pressure on body tissues, vibration and

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working with the objects that cause vibration, etc. are among the important factors in the patients with these disorders [5, 6]. Different investigations have shown the relationship between the vibrations of whole body vibration (WBV) with the bone disorders [7]. Many studies have been conducted associated with skeletal-muscle disorders related to the jobs that can be mentioned to the following issues: Hassanzadeh, in his study, examined and identified the risk factors causing musculoskeletal disorders among the motorboats staff in the Ports and Shipping Organization. The results indicated that 28.4% of the employees need to improve in the situation of body for preventing of appearing the musculoskeletal disorders as soon as possible or immediately [8]. Tavakoli, also, conducted a study with the purpose of identification and description of cases of various physical and mental studies with the purpose of identification and description of the cases of different types of physical and psychological and mental diseases between the employed officers and sailors in Islamic Republic of Iran Shipping fleet of commercial ships from 2000 till 2005. In the obtained results, back pain is in the first position with 8% prevalence in the officers and 19% prevalence in the sailors in third position [9]. Another study was conducted by Kngarlu et al. with the purpose of investigating the frequency of musculoskeletal disorders among the disabled people in the air force personnel. In this study, problems and diseases in different parts of the body included the spine 62.2%, lower limb 14.2%, upper extremities 3.5% and general disorder, 15.3%, respectively [10]. through analytic study conducted by Aghili Nezhad et al that was conducted in 2007 with the title “comparison investigation of skeletal-muscle problems between helicopter pilots and airplane pilots”, the amount of back pain after the flight was 42% in the pilots of helicopter and 40% in the pilots of airplanes. The complaints in other musculoskeletal systems in the pilots of helicopter and airplanes were 35% and 37% in the upper section of back, 33% and 30% in the area of neck, 32% and 30% in the area of shoulder and arm, 25.4% and 32.8% in the area of knee and leg, 25% and 23% in the area of legs and pelvis and 18% and 30% in the area of ankle and foot sole [11].

In addition, Ensign et al. in their study in the Naval Health Center in the state of Santiago, the prevalence of damages reported by the crew of special motorboats was investigated. The results showed that the maximum prevalence of damages had been muscular spasm and vertebral problems and trauma and were mostly related to the waist, knee and shoulder [12].

Morken et al. in a cross sectional study investigated the prevalence of musculoskeletal disorders and its relationship with the physical activities in the work time and break in the staff of the Royal Navy in Norway. Based on the obtained results, the most prevalent muscular disorder is back pain with the prevalence of 15%, shoulder with the prevalence of more than 12% and the neck with the prevalence of more than 11% [13].

The purpose of this study was to investigate the musculoskeletal complaints in the motorboats staff.

Methods

This research is a cross-sectional correlation study. Correlation studies investigate the way that the amount of change in an attribute or variable is related to the changes of other variable or variables. When with the increase of a variable, another variable also increases or when its decrease is to some extent predictable, a correlation exists [14]. The number of samples in the research was calculated 160 people based on previous studies [12, 13] and considering 10% loss. The study was conducted with the cooperation and collaboration of 149 motorboat staff in Caspian and South Seas in 2010 based on objective and easy sampling.

The data collection tools included a demographic questionnaire and the NMQ questionnaire (Nordic Musculoskeletal Questionnaire). The demographic questionnaire included information about the personal specifications of the motorboat staff and the standard Nordic questionnaire was used for investigating the musculoskeletal complaints. This questionnaire was designed by Kornica et al. in 1987 in the Institute of Occupational Health in the Nordic countries (Scandinavia) that is an appropriate standard questionnaire for collecting the information related to musculoskeletal problems and epidemiological investigation of musculoskeletal diseases [15, 3]. This questionnaire divides the musculoskeletal system of body into 9 areas of neck, shoulder, elbow, arms and wrists, upper back, lower back (back), leg and hip, knees and ankles and investigates the above areas by questions about the records of pain in these areas. The validity of this questionnaire has been confirmed in several domestic and foreign studies. Face validity of this questionnaire has been confirmed by the professors and faculty members of nursing and health. This questionnaire can be used in epidemiological investigations of musculoskeletal disorders, but it cannot be used as a device for patient screening.

Having at least one year of experience on motorboats was considered as the inclusion criterion. After passing the official stages and observing the moral issues of research, the questionnaires were completed and gathered with explaining the method of work and assuring that the information remains confidential and obtaining the consent of the motorboats staff.

The obtained data was analyzed by SPSS 16 software. For describing the quantitative data the central index and dispersion indexes such as average and standard deviation were used. For comparing the quantitative data, the normality was investigated by one sample Kolmogorov-Smirnov test that had normal distribution and then the T-test was used. In addition, for qualitative variables relative and absolute frequency and for musculoskeletal complaints' comparison based on the area of pain, Chi-square test was used.

Table 1- Frequency of musculoskeletal complains during past 12 months among the motorboats staff

Frequency of complaints→ Location of pain↓	Number	Percent	
Neck	60	40.3	
Back	71	47.7	
Waist	91	61.1	
Leg & Hip	91	61.1	
Knee	90	60.4	
Shoulder	Right	15	10.1
	Left	15	10.1
	Both	26	17.4
Hand	Right	13	8.7
	Left	10	6.7
	Both	9	6
Elbow	Right	6	4
	Left	7	4.7
	Both	6	4.0
Ankle	34	22.8	

Results

The average of samples' age was 28 years old, the maximum age was 45 and the minimum age was 19 years old. 103 individuals were married (69.1%) and 46 (30.9%) were single. The average of height in the samples was 174cm and the average of weight was 72kg. The average of BMI was 23.7kg/m² with the maximum of 33kg/m² and the minimum of 17.3kg/m². The average of work experience on motorboats was 5.6 years with the maximum of 20 and minimum of one year. The average of working hours on motorboat was 42 hours per week. 48 people (32.2%) of the samples worked in official time and 101 individuals (67.8%) worked in rotating shifts.

The maximum amount of pain and discomfort in the motorboat staff was reported in back region, leg and

hip was 91 individuals (61.1%) and knee pain was placed in the second position with the number of 90 individuals (60.4; Table 1). Based on the findings, during the last 12 months, 36 people (24.2%) had used therapeutic leave due to their back pain and 33 people (22.1%) had used therapeutic leave due to knee pain.

There was a significant relationship between the demographic characteristics of age ($p=0.003$), height ($p=0.02$), weight ($p=0.02$), work experience on motorboats ($p=0.006$) and the total work experience ($p=0.001$) with appearing the pain in back area during the past 12 months. However, there was no significant relationship between BMI ($p=0.42$) and the duration of work on motorboats per week ($p=0.19$) with appearance of pain in the back area.

In addition, there was significant relationship between knee pain and the demographic characteristics of age ($p=0.03$), total work experience ($p=0.04$) and the duration of working on motorboats per week ($p=0.03$) during the past 12 months. This is while no significant relation was observed between knee pain and the characteristics of height ($p=0.11$), weight ($p=0.09$), BMI ($p=0.3$) and the experience of working on motorboats ($p=0.08$).

Discussion

Based on the current research, most of the musculoskeletal complains in this study refer to the back region (61.1%) that is in accordance with other studies in this domain including the study conducted by Hassanzadeh [8], Tavakoli [9], Ensign et al [12] and Morken et al. [13]. In addition, Lipscomb et al. in a study in the North Carolina investigated the musculoskeletal signs in 215 fishermen. The signs that had caused the disorder in performing the tasks during past 12 months were reported by 38.5% of studied samples and the most common signs were related to back pain (17.7%) [17].

Significant statistical relation was observed between back pain and the demographic characteristics of age, height, weight, work experience on motor boats and total work experience that this study is in accordance with the study of Morken [13] and Lipscomb [16]. Based on the study of Seraji et al. [18] the most common reported complaint of building labors was back pain (50.6%). In addition, in the study of Choobineh et al. on rubber factory labors the rate of back pain complaints was equal to 50.2% [19]. In the study of KamaliNia et al. evaluating the positional pressure on upper organs among the assembly line labors of telecommunication factories in Shiraz, the most prevalent source of discomfort and pressure was

determined in back region with the prevalence of 67.9% [20]. In addition, Choobineh et al. investigated the musculoskeletal disorders in nurses and its relationship with occupational, psychological and physical pressure and reported the pains of back region as the most prevalent complaint with the rate of 59.9% [21].

In the study of Mirmohammadi et al. musculoskeletal disorders were investigated in the employees of a producing industry that in this study back pain was the most prevalent disorder 50% [22].

The second area of pain in the motorboat staff was the knee that the amount of pain in this area was reported 60.4%. This finding is in accordance with the findings of Hassanzadeh et al., Ensign et al. and AghiliNezhad et al. [8, 11, 12]. Significant relationship was observed between knee pain and the characteristics of age, total work experience and the duration of work on motorboats per week based on statistical tests.

Neck pain had affected 40.3% of the studied samples in the present study. This result has been confirmed in the studies of Hassanzadeh et al. Ensign et al. and Aghili et al. [8, 11, 12]. In the study of Nasl-Seraji with the subject of ergonomic evaluation of working position among the dentistry staff, the problems of neck region was reported equal to 65%, back pain equal to 60%, shoulder problems equal to 38% and the wrist equal to 31%, that the observed difference can be explained with regard to the involved organs in dentistry related occupations [23].

Considering the prevalence of pain in the back and knee and the occupation of samples in the present study and regarding the similar conducted studies and their results, one can say that the complains about the pain of these areas is related to the type of occupation. Therefore, considering the average of age (28 years) and that the motorboat staff are young, the results of this study are notable for the navy healthcare authorities. Based on the conducted studies that show the effects of regular sport on decreasing back pain [24, 25] and considering the relationship between pain in the studied body areas and weight and height, regular exercises should be considered in the working program of this group based on the supervision of occupational medicine specialists. In addition, the essential trainings for keeping and caring of musculoskeletal system must be presented to this group of workers during their presence in motorboats. The engineering of motorboats and reducing physical and vibrating pressure on the staffs is an essential task that needs the review of engineering and designing by specialists.

Conclusion

The most common musculoskeletal complaints among the motorboat staff are related to the pains in the back region (61.1%) and then knee (60.4%). Considering the high prevalence of back and knee pains in the motorboat staff that cause the reduction of productivity and function along with imposing treatment costs and early disability, related authorities should pay special attention to this domain.

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