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The Relationship Between Individual, Occupational Factors and LBP (Low Back Pain) in One of the Auto Parts Manufacturing Workshops of Tehran in 2015

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Abstract: Even though mechanical life is presently the source of valuable services to mankind, it has been faced with many complications including musculoskeletal disorders, different kinds of diseases and Progeria due to unfavorable working conditions. Several factors such as the type of work load, load carrying, physical and psychological factors and duration of work affect occupational low back pain. Repetitive work, load carrying can be found in auto parts manufacturing industries. If indeed occupational and personal factors can make a person susceptible to back pain, it is important to conduct studies in this field. The aim of this analytical-descriptive study was to evaluate the relationship between individuals and occupational factors with low back pain in one of the automobile parts manufacturing workshops in Tehran. For this reason, 160 personnel of different units were randomly sampled. Nordic questionnaire was used to evaluate the prevalence of low back pain. Then, data were analyzed using SPSS Version 16. The results showed that 27.5% of workers studied suffered from back pain. χ^2-test results showed that there was a significant relationship between exercise, experience and the prevalence of back pain. A high percentage of young workers suffered from low back pain, it was expected that increased experience had increased the incidence of back pain.

Key words: Pain, individual and occupational factors, LBP, Nordic questionnaire, increased

INTRODUCTION

Musculoskeletal disorders (especially low back pain) are part of the most common occupational injuries and disabilities in developing countries. In spite of the expansion of mechanized and automated processes, musculoskeletal disorders are the most common reasons for work loss, increased costs and injuries (Da Costa and Vieira, 2010). Research has revealed that more than half of the cases of absenteeism in workplaces are due to musculoskeletal disorders especially back pain (Choobineh, 2001). Several factors which influence the occurrence of low back pains can be categorized into physical and occupational factors like repetitive work, load carrying, working posture, work experience, frequency of load carrying, the height of work surface (Bernard, 1997; Kee and Karwowski, 2001) and risk of mental, individual and organizational factors (Linton and Kamwendo, 1989; Weiser, 1997). Work-related musculoskeletal disorders are often multifactorial and influenced by various factors. Generally, all these factors can be categorized into four: genetic, morphological, psychological and biomechanical factors (Choobineh *et al*., 2005). According to epidemiological studies, environmental factors on LBP do not only capture handling of heavy objects, they also include abnormal situations of the body, sudden and unexpected movements as well as the individual characteristics of workers. Musculoskeletal diseases constitute 7% of all diseases in the community, 19% of hospital admissions and 14% of the cases referred to Physicians. It is note-worthy to say that 62% of patients with

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musculoskeletal diseases are victims of Motion Restrictions (Karwowski and Marras, 1998). A study conducted by Aminian on the back pain and its related factors among male dentists and pharmacists showed that 54.8% of male dentists were victims of back pains in the past 1 year and 36.3% man pharmaceuticals were battling with the disease. There was observed a statistically significant relationship between the variables occupation, age, body mass index, smoking, years of employment and average hours for the week between the dental profession and the risk of back pain (Omid *et al*., 2013). According to the report of the social security organization from the years 1991-1994, 14.4% of breakdowns has been due to musculoskeletal disorders. According to the report of the Social Security Organization in 2000, the highest number of people who referred to the Medical Commission from the years 1991-1994 suffered from breakdowns due to musculoskeletal disorders (Choobineh, 2004). Automobile and motorcycle parts manufacturing workshops are among the industries that these disorders, particularly Low Back Pain (LBP) are common in them, therefore, this study was carried out aimed to determine the relationship between individual, occupational factors and LBP (occupational low back pain) in one of the parts manufacturing workshops.

MATERIALS AND METHDOS

Analysis method: This study was conducted in an auto parts manufacturing workshop in Tehran in order to evaluate the relationship between personal, occupational factors and LBP (occupational low back pain). Out of the total of 200 employees, 160 workers of production line were selected and were guided to fill a demographic form (Poursadeghiyan *et al*., 2016). Nordic questionnaire was used for the determination of musculoskeletal disorders and this was designed by Kuorinka *et al*. (1987) at the Institute of Occupational Health in Scandinavia. Workers were finally interviewed. The questionnaire was applicable to epidemiological studies of musculoskeletal disorders but not for clinical diagnosis. More so, investigations were done about the medical records of workers and it was revealed that 44 patients of the population were having back pains. After transferring data to a PC, SPSS Version 16 Software and ANOVA statistical test, Chi-square and t-test were used in order to examine the relationship between variables.

RESULTS AND DISCUSSION

The average age of workers was 28 years and this suggests workforce in the industry is predominantly young. Those workers who were married were more than 70% and their average work experience was 9 years, <88% of workers had qualifications below diploma (Table 1).

Table 1: Demographic information for population (N = 160)

Variables	Quantity
Average age (years)	28±7
Weight (kg)	72.5±14
Average Height (cm)	171.06±11
Marital status (married)	75%
Average work experience (years)	5±3
Daily working time (h)	10±2

Table 2: Frequency distribution of back pain prevalence in terms of work experience

Work experience	Patients with low back pain (%)	Healthy workers	p-value
1-3	7.6%	0.61%	0.031
4-7	19.90	11.50	

Table 3: Frequency distribution of back pain prevalence in terms of various business units

Unit name	Patients with low back pain (%)	Healthy workers (%)
Welding	6.0	20.0
Pressing	6.5	5.0
Assembly	7.5	17.5
Machining and turning	4.0	22.5
Injection and packaging	3.5	7.5

Table 4: Frequency distribution of back pain prevalence in terms of education

Level of education	Patients with low back pain (%)	Healthy workers (%)
Primary school	7.50	37.5
Middle school	12.50	20.0
High school	7.50	15.0

Table 5: Frequency distribution of back pain prevalence in sporting activities

Sport activities	Patients with low back pain (%)	Healthy workers	p-value
Never	7.5	30.0	0.035
Sometimes	7.5	27.5	
Always regularly	12.5	15.0	

Table 6: Frequency distribution of back pain prevalence in working posture

Level of education	Patients with low back pain (%)	Healthy workers (%)
Standing	5.0	25.0
Sitting	7.5	30.0
Standing-sitting	15.0	17.5

Table 2 shows a significant relationship between prevalence of LBP and work experience (p_{value} = 0.031). So, with increased work experience, the percentage of patients with Low Back Pain (LBP) had increased. Table 3 shows no significant relationship between the prevalence of low back pain and various business units. However, workers in welding, pressing and assembly units suffered low back pains more than others and the highest rates of low back pains was recorded by the assembly unit. Also, Table 4 shows no significant relationship between the prevalence of low back pain and level of education. A significant relationship was found between the incidence of back pain and sports activities (p-value = 0.035) in that people who had regular exercise had higher prevalence of low back pains as shown in Table 5. Table 6 shows no significant difference between the various work postures

Table 7: Frequency distribution of back pain prevalence in terms of working height

Height of work surface	Patients with low back pain (%)	Healthy workers (%)
Appropriate	5.0	20.0
Inappropriate	22.5	52.5

and prevalence of LBP. Also, Table 7 shows no significant difference between the prevalence of LBP and the height of work surface meanwhile, people who had inappropriate height of work surface were more likely to suffer from back pain.

Active investigations are being conducted for years regarding the causes of low back pain and evidence from those investigations have shown no simple mechanism behind this disease. However, there are a number of personal and environmental factors associated with work and this makes each of them very important for discussion and study. According to the results of this study, there was a high prevalence of low back pain among the study population (27.5%). Having compared the results of this study with a research carried out by Asghari in a food industry, it was clear that the highest prevalence of low back pain was related to musculoskeletal disorders (Asghari *et al*., 2011). Also, the results of a study conducted by Chubineh on 88 workers of a sugar factory in Shiraz showed that the workers had high prevalence of low back pain (54.3%) (Choobineh *et al*., 2009a, b). Judging from the results of this study, physical activity and the prevalence of low back pain had a significant relationship between them. Therefore, those who had more physical activities were more likely to have experienced back pain. Previous researches conducted in other countries have shown how controversial the effects of exercise on low back pain were. Most studies have indicated that exercise has no effect on back problems. In a study conducted by Ahmadi *et al*. (2014) on 400 industry workers, the prevalence of low back pain was 57.1%, there was a significant relationship between back pain among workers with work experience ($p = 0.000$), h per week ($p = 0.007$) and level of physical activity ($p = 0.000$). A significant relationship was observed between incidence of low back pain and work experience and those who had more working experience had low back pains. This result is consistent with the results of similar studies conducted in this field and it shows that without favorable conditions, personal and professional factors with less years of exposure increases the risk of the incidence of low back pain. No significant relationship was observed between incidence of low back pain and level of education, working height, type of job and different working postures but prevalence of back pain was higher in people with inappropriate work surface. According to the results, correcting working height, proper training of workers on how to implement sports activities, learning how to do the job correctly and correcting work stations to close off working posture to its standard rate and paying more attention to some risky activities such as assembly and spin-off activities are effective to reduce the incidence of low back pain. In view of that, it is important to implement quick corrective actions that correspond to high risks of $WRMSD_s$. Ergonomics risk assessment methods for posture analysis (Kohammadi *et al*., 2016) and relationship between $WRMSD_s$ and job content and performance are recommended. This information is useful because its data can be used to reduce the risk of low back pains.

CONCLUSION

Having determined the high incidence of low back pain (27.5%) in the population under study, it is necessary to implement intervention programs.

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