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Relationship between construction workers' musculoskeletal disorders and occupational health service activities

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Abstract Construction work consists of numerous factors that influence workers' occupational health and that load the musculoskeletal system in particular. Musculoskeletal disorders are responsible for over a third of all sick leaves lasting over nine days in the construction industry. Occupational health services (OHS) were organized for 85% of the construction workers in our study. The proportion of construction workers who had suffered from chronic or repetitive neck and shoulder, shoulder or arm, or low-back disorders was 55.6%, 44.8% and 42.1%, respectively. Those who felt that they had received enough information, advice or guidance from OHS concerning work posture, work performance or work tools were more often those who had not suffered from shoulder or arm disorders (60.9% vs. 39.1%, p=.024, respectively) or low-back disorders (63.6% vs. 36.4%, p=.034, respectively) during the last month than those who had. Those who had received enough support from OHS concerning maintenance of work ability were more often workers who had not suffered from low-back disorders during the last month than those who had (63.3% vs. 36.7%, p=.004, respectively). OHS should focus more on workers who would really benefit from their activities at a particular time and in a particular situation (primary, secondary or tertiary prevention) and who are themselves devoted to improving their health.

Keywords: construction worker, musculoskeletal disorder, occupational health service

Introduction

Construction workers have more physically demanding jobs than the general population, and are continuously exposed to environmental demands and outdoor climates [8]. Physical load in construction work consists of awkward back and neck postures, twisted and static postures, repetitive movements, whole body and hand-arm vibration, and working with one's hands above shoulder level, which are all harmful to the musculoskeletal system.

Older construction workers are a risk group for musculoskeletal disorders. About a third of the construction workers reported that their health complaints are work-related. Work-related illnesses and diseases may be caused, aggravated, accelerated or exacerbated by workplace exposures, and they may impair working capacity. [8] However, none of the common musculoskeletal disorders are uniquely caused by work exposure.

Musculoskeletal disorders are responsible for over a third of all sick leaves lasting over nine days in the construction industry in Finland. They are one of the main reasons for absenteeism and one of the main causes of work-related disability. [18]

In Finland, employers are obligated by law to organize and pay for OHS for their employees, regardless of the size or industrial sector of the company. In the construction trade, 77% of employers have organized OHS [10], including voluntary health checkups that are offered to all

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construction workers at least every three years. Today's rapidly changing construction sites make conducting effective OHS challenging.

The aim of this study was to determine whether a relationship exists between construction workers' musculoskeletal disorders and OHS activities in the construction industry. To the authors' knowledge there are no earlier studies on this issue.

Methods

A total of 261 construction workers participated in our telephone interview concerning work and health in Finland in 2009 [10]. This figure comprised 255 men and 6 women. The mean age of the respondents was 42.5 (range 21-64 years). The question concerning musculoskeletal disorders was "Have you suffered from chronic or continual neck and shoulder/ shoulder or arm/ low back disorders during the last month?" OHS activities included providing information, advice and guidance on work posture, work performance, and work tools, and providing support for maintaining work ability.

The question concerning providing information, advice and guidance was "Have you received information from OHS professionals concerning work posture, work performance or work tools?" Support for maintaining work ability was examined using the question "Have you received support for maintaining your work ability from OHS?" The response options were "enough", "too little", "not at all", "I have not needed any" or "I cannot say". The answers were divided into two categories: "enough", and a combination of "not at all" and "too little". Other options were excluded. We used the χ^2 test for the differences between categorized variables, and the statistical analyses were performed using the SPSS 18.0 programme. All tests were considered statistically significant if $p < .05$.

Results

OHS was organized for 85% of the construction workers in our study. Of these workers, about 85% were also entitled to curative service conducted by an occupational health physician or nurse. Over a third (35.2%) of the construction workers suffered from some chronic disease or injury and almost 40% of them (37.0%) perceived that their present work was affected by their diseases or injury. The proportion of construction workers who had suffered from chronic or repetitive neck and shoulder, shoulder or arm, or low-back disorders were 55.6%, 44.8% and 42.1%, respectively.

The most common OHS activities among construction workers were health checkups and provision of information concerning life habits. (Table 1)

Table 1 OHS activities among construction workers (n=261)

OHS activity	Conducted (%)
Health checkups during last three years (n=223)	77.1
Sufficient information concerning nutrition, exercise, smoking and alcohol use (n=223)	70.9
Sufficient support for maintaining work ability (n=223)	53.8
Sufficient information concerning work posture, work performance or work tools (n=223)	49.3
Workplace survey during last three years (n=223)	34.5

There were no differences in age, having organized OHS or having OHS including curative services, or between groups who suffer from some musculoskeletal disorder and those who do not. The only differences in OHS activities between groups were found in the information and support provided for maintaining work ability. Those who felt that they had received enough information, advice or guidance from OHS concerning work posture, work performance or work tools were more often those who had not suffered from shoulder or arm disorders (60.9% vs. 39.1%, p=.024, respectively) or low-back disorders (63.6% vs. 36.4%, p=.034, respectively) during the last month than those who had. The results were the same regarding OHS support for maintaining work ability. Those who had received enough support from OHS were more often workers who had not suffered from low-back disorders during the last month than those who had (63.3% vs. 36.7%, p=.004, respectively).

Discussion

Earlier studies concerning the relationship between OHS and musculoskeletal disorders have basically focused on the effectiveness of different kinds of intervention. As our study was a questionnaire-based cross sectional study, we could not determine the effectiveness or content of OHS activities. We found a minor relationship between some musculoskeletal disorders and OHS activities. Construction workers with shoulder or low-back disorders need a great deal of guidance and concrete advice on how to manage with these disorders at work. One reason why we could not find a greater association between OHS activities and different musculoskeletal disorders could be that the physical aspects of work and the workplace are not the only factors which influence musculoskeletal health. Both individual factors (age, personal habits, heredity) and social, economic and cultural context also influence musculoskeletal health [13]; factors which cannot be influenced by OHS activities. Activities to reduce musculoskeletal disorders should be versatile.

Individual counselling and training programmes should start before workers have to take sickness absences, and should be aimed at employees with mild complaints or disorders. Multidisciplinary interventions [3, 9,], early workplace interventions [2] and organisational interventions [7] are the most effective in reducing disability pensions and sickness absence days. According to de Boer et al.'s [4] prospective controlled trials study, counselling and training intervention programmes for construction workers at a high risk of disability pension slightly improved the work ability of the employees in the intervention group while the work ability of the employees in the control group remained the same. In addition, intervention programmes resulted in a better fit of the workers' capacities with their jobs and in improved mental resources, which included optimism, enjoyment and being active. [4]

Moreover, systematic reviews (RCTs) of the effectiveness of physical and organisational ergonomic interventions on low back pain and neck pain [6], concluded that ergonomic interventions are usually not effective in preventing or reducing low back pain and neck pain among non-sick listed workers. However, the reviewed studies consisted of office, garment and kitchen workers, so the generalisability of the results to the entire working population is low. [6]

Indeed, according to a review on the prevention and management of neck/upper extremity musculoskeletal conditions, no single strategy for intervention was identified that was considered effective for all types of industrial settings. [5]

Physical work demands and musculoskeletal symptoms decreased significantly when changes in workers' behaviour and lifting devices were part of the intervention [15]. This result is in disagreement with the results of Martimo et al. [12] on training and lifting equipment for preventing back pain. They concluded that there is no evidence to support the use of advice or training in working techniques with or without lifting equipment for preventing back pain or consequent disability. [12]

The early ergonomic interventions conducted by OHS reduced sickness absence due to upper-extremity or other musculoskeletal disorders. Ergonomic improvements in the workplace reduced the occurrence of sickness absence, but not the symptoms due to musculoskeletal disorders. The total number of sickness absence days in the intervention group was about half of that of the control group. The subjects who benefitted most from the intervention were those who were exposed to work-related physical load factors, were older, and had high pain intensity and a higher level of physical activity. [14] In addition to early ergonomic intervention, adequate medical care is effective in preventing and restoring the self-reported productivity loss associated with upper-extremity disorders [11].

Interventions aimed at preventing construction workers from dropping out of the workforce should primarily focus on reducing physical and psychosocial load at work. [1]

In a study by Welch et al. [17] on 40-59 year-old roofers, job accommodation appeared to be provided for 31% of the roofers with a musculoskeletal disorder, and it was associated with a reduced likelihood of subsequently leaving roofing for health-related reasons. Each year the increase in age was associated with a 15% increase in the likelihood of leaving work, and each point of improvement in physical functioning was associated with a 7% decrease in the likelihood of leaving. [17]

Successful implementation of rehabilitation programmes, ergonomics and health promotion require work with and within the community of construction [16]. It is recommend that occupational

health personnel interact sufficiently early with supervisors and make worksite visits when musculoskeletal disorders appear and employees complain of them. [11] In practice, an occupational health professional, preferably an occupational physiotherapist, visits the construction site, assesses work performance, and tries to find different ways in which to work together with the construction worker. It should be remembered that the aetiology of musculoskeletal disorders is multifactorial. Therefore, multifactorial intervention including modification of behavioural and lifestyle factors, in addition to ergonomic modification, may be more effective than mere ergonomic intervention. [14]

In order to improve the effectiveness of occupational health activities, the workers involved in these actions should be chosen well. The questionnaire is a good method for selecting the right people, i.e. workers who would really benefit from the activities at a particular time and in a particular situation (primary, secondary or tertiary prevention), and are themselves devoted to improving their health. The selection criteria must be based on study results.

References

[1] S.M Alavinia., C. van Duivenbooden and A. Burdof, Influence of work-related factors and individual characteristics on work ability among Dutch construction workers. Scand J Work Environ Health 33 (2007), 351-357.

[2] B.B.Arnetz, B.Sjögren, B Rydehn and M. Roland 2003. Early workplace intervention for employees with musculoskeletal-related absenteeism: a prospective controlled intervention study. J Occup Environ Med 45 (2003), 499-506.

[3] A.G. de Boer, J.C. van Beek, J. Durinck, J.H.Verbeek and F.J. van Dijkl, An occupational health intervention programme for workers at risk for early retirement: a randomised controlled trial. Occup Environ Med 61 (2004), 924-929.

[4] A.G. de Boer, A. Burdof, C. van Duivenbooden and M.H. Frings-Dresen, The effect of individual counselling and education on work ability and disability pension: a prospective intervention study in the construction industry. Occup Environ Med 64 (2007), 792-797.

[5] M G Boocock, P J McNair, P J Larmer, B Armstrong, J Collier, M Simmonds and N Garrett. Interventions for the prevention and management of neck/ upper extremity musculoskeletal conditions: a systematic review. Occup Environ Med 64 (2007), 291–303.

[6] M.T. Driessen, K.I. Proper, M.W. van Tulder, J.R. Anema, P.M. Bongers and A. van der Beek, The effectiveness of physical and organisational ergonomic interventions on low back pain and neck pain: a systematic review. Occup Environ Med 67 (2010), 277-285.

[7] H. Goine, A. Knutsson, S. Marklund and B. Karlsson, 2004. Sickness absence and early retirement at two workplaces - effects of organisational intervention in Sweden. Soc Sci Med 58 (2004), 99-108

[8] P. Hoonakker P and C. van Duivenbooden, Monitoring working conditions and health of older workers in Dutch construction industry. American Journal of Industrial Medicine 53 (2010), 641-653.

[9] I.B.Jensen, G. Bergström, T. Ljungquist and L. Bodin, A 3-year follow-up of a multidisciplinary rehabilitation programme for back and neck pain. Pain 115 (2005), 273-283.

[10] T. Kauppinen, R. Hanhela., I Kandolin, A. Karjalainen, A. Kasvio, M. Perkiö-Mäkelä, E. Priha, J. Toikkanen and M. Viluksela, Työ ja terveys Suomessa 2009. [In English: Work and Health in Finland 2009] Finnish Institute of Occupational Health, Helsinki. Sastamala: Vammalan Kirjapaino Oy, 2010.

[11] K-P. Martimo, R. Shiri, H. Miranda, R. Ketola, H. Varonen and E. Viikari-Juntura, Effectiveness of an ergonomic intervention on the productivity of workers with upper-extremity disorders - a randomized controlled trial. Scand J Work, Environ health 36 (2010): 25-33.

[12] K-P. Martimo, J. Verbeek, J. Karppinen, A.D. Furlan, E-P. Takala, P.P. Kuijer, M. Jauhiainen and E. Viikari-Juntura, Effect of training and lifting equipment for preventing back pain in lifting and handling: systematic review. BMJ 336 (2008), 429.

[13]National Research Council and the Institute of medicine Musculoskeletal disorders and the workplace: Low back and upper extremities. Washington DC: the National Academy Press, 2001.

[14] R. Shiri, K-P. Martimo, H. Miranda, R. Ketola, L. Kaila-Kangas, H. Liira, J. Karppinen and E. Viikari-Juntura, The effect of workplace intervention on pain and sickness absence caused by upper-extremity musculoskeletal disorders. Scan J Work Environ Health 37 (2011), 120-128.

[15] H.F. van der Molen, J.K. Sluiter, C.T.J. Hulshof, P. Vink and M.H.W. Frings-Dresen, Effectiveness of measures and implementation strategies in reducing physical work demands due to manual handling at work. Scand J Work Environ health 31 (Suppl 2, 2005), 75-87.

[16] L. Welch. Improving work ability in construction workers - let's get to work. Editorial. Scand J Work Environ health 35 (2009), 321-324.

[17] L.Welch, E. Haile, L.I. Boden and K.L. Hunting, Musculoskeletal disorders among construction roofers - physical function and disability. Scan J Work Environ Health 35 (2009), 56-63.

[18] Working conditions in Finland, data system, 2009. [In Finnish Työolot Suomessa tietojärjestelmä]