

FREQUENT MUSCULOSKELETAL DISORDERS AND HEALTH RELATED QUALITY OF LIFE AMONG INDUSTRIAL WORKERS – A PROSPECTIVE STUDY

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ABSTRACT

The high percentage of musculoskeletal disorders (MSD) in various populations underlines the need for distinguishing between severely and mildly affected individuals. To investigate MSD from various body parts reported in 1998 as predictors of health related quality of life reported in 2002, we examined the frequency of MSD on a five-point scale, health related quality of life (SF-36) and sickness absence among 3087 workers in the aluminium industry in Norway. High frequencies of MSD from all body parts were related to lower scores on the SF-36 and increased sickness absence. This relationship was strongest for low back pain. Workers who reported low back pain “very often” had a mean role-physical score equivalent to that of the 18th percentile of the general population. The results show that workers who reported MSD often or very often were severely affected. The five-point scale of the frequency of MSD can be used to distinguish individuals at high risk for reduced health related quality of life and sickness absence.

BACKGROUND

The high percentage of musculoskeletal disorders (MSD) found in studies of general populations and various occupational groups underlines the need for distinguishing between severely and mildly affected individuals. As episodes of MSD may be a normal part of life and ageing, the challenge is to identify and prevent the serious and chronic MSD that result in disability. A description of the impact of different levels of MSD on outcomes like health related quality of life and sickness absence is of importance to occupational health services, workers, employers and society in the choice between alternative preventive strategies (Pransky, 1996). In addition, studies have found that measuring severity of discomfort is useful in evaluating the efficacy of interventions (Baron, 1996).

The aim of this prospective study was 1) to estimate the impact of MSD on health related quality of life and sickness absence four years among industrial workers, and 2) to find a cut off point on the employed scale of MSD that discriminates between severely and mildly affected individuals.

A previous cross-sectional study on these aims has been performed in the aluminium industry (Morken, 2002). A prospective study provides a better design about the causation of disease or the consequences of disease.

METHODS

A prospective study was performed to investigate MSD from various body parts reported in 1998 as predictors of health related quality of life reported in 2002. All employees at the eight aluminium smelting plants in Norway were invited to answer a self-administered questionnaire, and 3087 workers answered both in 1998 and in 2002. The occurrence of MSD was recorded

according to a modification of the Standardised Nordic Questionnaire (SNQ) for the analysis of MSD (Kuorinka, 1987). The question about MSD was phrased as follows: Have you had complaints (pain, discomfort or reduced mobility) during the past 12 months in ___? The list included the neck, shoulders, elbows, hands, upper back, lower back, hips, knees and feet. A five-point scale ranging from “never” to “very often” was used instead of the dichotomised alternatives yes-no used in the original version.

The workers assessed their health-related quality of life (HRQOL) using the SF-36 Health Survey (Ware 1993). The items in the SF-36 Health Survey are grouped into eight multi-item scales. These include physical functioning, role limitations due to physical problems, role limitations due to emotional problems, bodily pain, social functioning, mental health, vitality and general health perceptions. Sickness absence due to MSD was measured by days during the past 12 months.

Statistics

Pearson’s correlation coefficient (r) was used to estimate the bivariate correlation between MSD from the nine body parts in 1998 and the eight scales of SF-36 in 2002, and between MSD in 1998 and days of sickness absence in 2002. Multivariate regression analyses were carried out for MSD from each of the nine body parts in 1998 as the independent variables and each of the eight SF-36 scales in 2002 as a dependent variable.

RESULTS

The response rate was 92% in 1998 and 95% in 2002. Using bivariate correlation analysis, we found significant correlation between higher frequency of MSD from each of the nine body parts and decreased scores of all the eight SF-36 scales. To estimate the relative importance

of MSD for the various body parts we performed multivariate regression analyses with MSD from each body part as independent variables and each of the SF-36 scales as dependent variables (table 1). High frequencies of MSD from all body parts were related to lower scores on the SF-36. This relationship was strongest for MSD from the lower back and the neck. Low back pain showed the strongest correlation with the scales for physical function, bodily pain and general health. Workers who reported low back MSD "very often" had a mean role-physical score equivalent to that of the 18th percentile of the general population. Neck pain showed the strongest correlation with role limitations due to physical problems, bodily pain, general health and vitality. The highest adjusted R² were found for the scales of bodily pain (R²=0.22), general health (R²=0.16) and physical function (R²=0.12).

In bivariate correlation analysis, MSD from all body parts except the feet were correlated with days of sickness absence due to MSD. The correlation ranged from $r=0.050$ for MSD from the knees to $r=0.112$ for low back pain.

DISCUSSION

We have found an association between increasing frequency of MSD and HRQOL, measured by SF-36 Health Survey among worker in the aluminium industry. We also found a higher prevalence of sickness absence in the groups that reported a higher frequency of MSD.

Most of the associations analysed in the prospective study were weaker than in the cross-sectional study in the same population (Morken 2002). Possible explanations of the weaker associations are the multifactorial nature and the variations in frequency and intensity of MSD.

Measuring the frequency of MSD on a five-point scale makes it possible to discriminate between severely and mildly affected individuals. This is important in the discussion of which workers have to be prioritised to improve their musculoskeletal health or prevent sickness absence.

Low back pain and neck pain had the strongest relationship with HRQOL. Low back pain had the strongest relationship with sickness absence. In a previous publication (Morken, 2000), the lower back was shown to be the body part that has the highest prevalence of MSD in the aluminium industry. A total of 23% of the workers reported low back pain "often" or "very often". The workers who reported MSD from the lower back "very often" reported marked difficulties in physical functioning like lifting, climbing, bending and walking. Musculoskeletal symptoms from the lower back were most strongly correlated with the three scales that primarily reflect physical health problems. These findings support previous studies that show a relationship between physical risk factors and low back pain (Burdorf 1997, Garg 1992). Neck pain was associated with generally low HRQOL, both physical and mental.

The relatively poor level of functioning among persons with musculoskeletal conditions has also been found in a study that compared the HRQOL of a wide range of chronic disease patients (Sprangers 2000).

CONCLUSION

The results show that workers who reported MSD "often" or "very often", especially low back pain and neck pain, were severely affected four years later. We suggest that preference should be given to risk factors related to low back pain and neck pain in order to increase HRQOL and reduce sickness absence in the aluminium industry.

On a five-point scale ranging from "never" to "very often" we suggest that workers who report MSD "often" or "very often" from one or more body parts should be classified as having significantly impaired health. By discriminating between severely and mildly affected individuals, the five-point scale for MSD may increase the sensitivity of identifying workers at risk for serious dysfunction.

ACKNOWLEDGEMENT

The project was initiated by the Aluminium Industry in Norway and is a co-operation project between Elkem Aluminium Lista, Elkem Aluminium Mosjøen, Hydro Aluminium Karmøy, Hydro Aluminium Sunndal, Hydro Aluminium Holmestrand, Hydro Aluminium Høyanger, Hydro Aluminium Årdal, Årdal Carbon, Sør-Norge Aluminium Husnes AS, Aluminiumindustriens Miljøsekretariat and the University of Bergen.

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Table 1. Association between the frequency of musculoskeletal disorders from nine different parts of the body in 1998 and the SF-36 Survey in 2002 ($n= 3087$) in multiple regression analysis with each of the eight scales of SF-36 as the dependent variable. * $p<0.05$ ** $p<0.01$ *** $p<0.001$

| | Standardised Beta Coefficient | | | | | | | | | Adj R ² |
|-----------------------------|-------------------------------|-----------|--------|----------|------------|-----------------|----------|----------|----------|--------------------|
| | Neck | Shoulders | Elbows | Hands | Upper back | Lower back | Hips | Knees | Feet | |
| Physical functioning | -0.08** | -0.03 | -0.05* | -0.04 | -0.01 | -0.13*** | -0.09*** | -0.08*** | -0.07*** | 0.12 |
| Role limitations, physical | -0.14*** | -0.04 | -0.02 | -0.05* | -0.03 | -0.10*** | -0.03 | -0.05** | -0.03 | 0.10 |
| Bodily pain | -0.14*** | -0.13*** | -0.02 | -0.06** | -0.02 | -0.19*** | -0.02 | -0.09*** | -0.03 | 0.22 |
| General Health | -0.14*** | -0.04 | -0.03 | -0.08*** | -0.05* | -0.13*** | -0.05* | -0.05** | -0.06** | 0.16 |
| Vitality | -0.15*** | -0.04 | 0.01 | -0.08*** | -0.01 | -0.08*** | 0.00 | -0.04* | -0.06** | 0.10 |
| Social functioning | -0.09*** | -0.05* | 0.04 | -0.08*** | 0.02 | -0.04* | -0.06** | -0.03 | -0.04* | 0.06 |
| Role limitations, emotional | -0.05 | -0.05 | 0.03 | -0.06* | -0.04 | -0.01 | -0.01 | -0.04* | -0.03 | 0.03 |
| Mental Health | -0.10*** | 0.00 | 0.03 | -0.06** | -0.05* | -0.03 | -0.02 | -0.04 | -0.04* | 0.04 |