

SHORT COMMUNICATION

RHEUMATIC COMPLAINTS AND MUSCULOSKELETAL DISORDERS IN WORKERS OF A MEAT PROCESSING INDUSTRY

LADISLAV KRAPAC¹, MATILDA SLADOLJEV²,
DRAŽEN SAČER³ AND DAVORIN ŠAKIĆ¹

Department of Physical Medicine and Rehabilitation, Clinical Hospital "Dubrava", Zagreb¹, Department of Occupational Health "Podravka", Koprivnica², Private Department of Physical Therapy, Koprivnica³, Croatia

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The effects of unsatisfactory microclimatic conditions and forced body position on the occurrence of fatigue and pain at work and disorders of the musculoskeletal system were evaluated in 90 female workers employed in the meat processing industry. The control group consisted of 95 workers whose work did not involve repetitive operation patterns and took place in a satisfactory microclimate. The mean age of both groups was 35 years. The data on symptoms were collected through a questionnaire. Further medical and functional examination of the locomotor system was carried out in both groups. Compared to the control, a significantly higher percentage of the exposed workers complained of fatigue and pain during work and manifested marked disorders. Most of degenerative rheumatic diseases of the spine were diagnosed in both groups. Other disorders found in the exposed workers in higher prevalence than in the control were: extraarticular rheumatic diseases as fibromyalgia, humeroscapular peri-arthritis, and epicondylitis. This paper proposes primary and secondary prevention of rheumatic diseases for workers in the meat processing industry.

Key terms:
extraarticular rheumatic diseases, microclimate, prevention, questionnaire, women

The unsuitable microclimatic and ergonomic conditions in the meat and fish processing industry are well known (1-7). Rheumatic disorders and diseases thereof prevail in women (8-12). Many years of follow-up in occupational health indicate that women employed in the meat processing industry suffer from rheumatic disorders more frequently than other professions, and that the rheumatic diseases are serious (3-7, 13, 14). The aim of this work was to verify this assumption.

SUBJECTS AND METHODS

We studied a group of 90 female workers employed in the meat processing industry, aged 33.9 ± 5.3 years. The task of separating meat from the bone involves repetitive arm movement and is performed in the standing position. The technological procedure requires relative humidity of over 70%. The temperatures in the working environment are higher than 28°C . Occasionally, the workers handle frozen meat at temperatures lower than 10°C . The work in shift may also require operation in a refrigerator, where microclimatic conditions are extremely unfavorable with the air temperature ranging between -20 and -10°C . The control group comprised 95 women matching the exposed group in age (36.3 ± 7.8 years), years of service (15.1 ± 6.2 years), and social status. Their work involved satisfactory microclimatic and ergonomic conditions.

In 1995 we completed a questionnaire given to the workers during shift. The questionnaire contained 37 questions with the aim to determine the effect of unsatisfactory working conditions on the occurrence of fatigue and pain of the musculoskeletal system. Additional medical examinations and functional testing of the locomotor system were carried out for each of the three shifts. The movements of the spine and arm joints, paravertebral muscle tension, pain at palpation, and axial pressure were also examined. Data from earlier medical records, particularly X-ray and laboratory data, were used to differentiate inflammatory and degenerative or even extraarticular rheumatic diseases. The statistical analysis of the results used the chi-square test to determine the differences between the exposed and the control group.

RESULTS

The occurrence of fatigue was similar for both groups; the exposed group displayed it after 27.5 ± 4.6 years of service, and the control group after 27.8 ± 7.0 years of service. Workers in the control group noticed pain after 25.9 ± 7.7 years of service, while the exposed workers noticed it after 27.8 ± 7.0 years of service, which renders the difference statistically insignificant.

The data from the questionnaire on the intensity of the locomotor system disorders shows that the majority of the exposed workers reported marked (51%) and mild (25%) disorders at work. In the control group, marked disorders were reported by 5% of the subjects only and mild disorders by 23%. According to the questionnaire, nearly all the workers (97%) in the meat processing industry complained of fatigue and pain, which significantly differed ($P < 0.05$) from the control (67%). However, at examination, only 71% of the exposed workers and 48% of controls ($P < 0.01$) reported an increased pain in the musculo-skeletal system at work.

Both groups of women reported a mild pain (9% of the exposed and 11% of controls) at the start, reaching its peak during the shift and decreasing towards its end (16% and 20%, respectively).

Table 1 presents the factors which the examinees considered relevant for the increased fatigue or pain. In the opinion of 42% of the exposed workers and 35% of the controls, movement or exercise would help decrease the pain, while a similar percentage (21% and 16%, respectively) considered that more frequent breaks would help

the most. Significantly more exposed workers than controls (16% and 8% respectively; $P < 0.05$) claimed that better working conditions would help reduce the pain.

Table 1. Most frequent reasons for increased fatigue and pain in the exposed female workers of a meat processing industry and in the control workers (expressed through percentage).

	Exposed workers (n=90)		Control workers (n=95)	
	Fatigue ^a	Pain ^b	Fatigue	Pain
Unphysiologic position of the body	81	74	44	46
Unsatisfactory microclimate	10	7	0	1
Hard work	7	3	14	12
No reason given	2	16	42	41

The difference between the exposed and the control group: $P < 0.01$ (^a $\chi^2=55.5$; ^b $\chi^2=24.6$).

Table 2 shows the distribution of fatigue and pain in the body with respect to its reported frequency. Significantly greater frequency of fatigue and pain in the shoulder of the dominant arm was reported by the exposed workers than by controls.

Table 2. Distribution of fatigue and pain in the body as reported by the exposed and the control workers (expressed through percentage).

Part of the body ^a	Exposed workers (n=90)		Control workers (n=95)	
	Fatigue	Pain	Fatigue	Pain
Low back	49	46	40	39
Back	44	40	36	37
Neck	41	44	43	36
Right shoulder	26	26	12	10
Without symptoms	22	23	26	20

^aExaminees were allowed to state two body parts.
 There were no differences between the exposed and the control group.

Table 3 shows the most frequent clinical diagnoses of the locomotor system diseases. Moderate and/or more severe degrees of disease were twice as frequent in the exposed group as in the control group (74% and 36%; $P < 0.01$).

Table 3. Most frequent clinical diagnoses in the musculo-skeletal system in the exposed and control workers (expressed through percentage)

	Exposed workers (n=87)	Exposed workers (n=80)
Cervical and cervicobrachial syndrome	31	39
Thoracic and lumbosacral syndrome	13	20
PHSC of the dominant hand	14	11
Fibromyalgia	18	2
Epicondylitis	12	6
Other rheumatic diseases	1	10
Static syndrome	10	2
Without disease	42	42

The difference between the exposed and the control group: $P < 0.05$ ($\chi^2 = 14.9$).

The study was concluded with an analysis of correlation between the data on fatigue/pain obtained from the questionnaire and the data obtained from the standard, rheumatologic examination (Table 4). Consequently, some differences were noted for each of the two groups.

Table 4. Correlation between the results of medical examination and information given by the exposed and control workers in the questionnaire (expressed through percentage).

	Exposed workers (n=87)	Control workers (n=80)
Complete agreement	69	80
Partial agreement	10	11
Disagreement	21	9

The difference between examined and control group: $P < 0.05$ ($\chi^2 = 5.46$).

DISCUSSION

Although statistical indicators of morbidity and absenteeism clearly point that rheumatic disorders represent the most frequent complaints, the overall proportion of severe disorders in the locomotor system of the exposed workers (51%) is disturbing. Surprisingly, almost all exposed women and 88% of controls reported rheumatic disorders at work, even the younger workers. A large proportion of those questioned reported fatigue and pain (97% of the exposed and 67% of controls; $P < 0.01$) at work.

Viikari-Juntura (8) found a similarly high proportion of rheumatic disorders in Finnish slaughter-house workers, while other authors report lower proportions (1-5, 9-12). In this study, the majority of the exposed workers connected disorders with an inappropriate position during work. The same caused increased fatigue and/or pain reported by 46% of women in the control group, which can partly be explained by work at home or agricultural/gardening activity. Only 10% of the exposed workers believed that unfavorable microclimate contributed to the increased rheumatic disorders. To our knowledge, the workers in the meat processing industry underestimate the microclimatic risk factor. The incorrect use of protective clothing and footwear may also increase the occurrence of extraarticular rheumatic diseases. The frequently reported disorders of the spine and shoulder of the dominant arm are clearly the result of a non-ergonomic strain during work, particularly when a standing position with bent spine and raised arms performing repetitive motion is assumed for some time. This fact was demonstrated in our earlier studies (6, 7, 13-15), and in similar investigations of overuse syndromes by other authors (16-19).

Medical examination confirmed a high proportion of diseases of the musculo-skeletal system in both groups (58%). However, the meat industry workers were more seriously affected. Milder forms of extraarticular rheumatic diseases were particularly frequent in the exposed group (44%) as opposed to the control group (20%). Proportions so different have rarely been reported in other industries (5, 19). The proportion of epicondylitis (12%) reported for the meat processing industry corroborates the results of our study (8, 10). In Finland, the annual incidence of epicondylitis in workers employed in sausage production was as high as 11% (8). Most frequently it involved radial epicondylitis of the dominant arm. Another investigation did not find such a high proportion of epicondylitis in similar occupations, and neither did the disease lead to a higher rate of sickness or incapacitation (1). However, these results are hardly comparable with the results of this study due to different methodological approach.

The comparison of the questionnaire medical examination data shows that the exposed workers tended to overemphasize the symptoms of strain during the shift. Authors in other countries came to a similar conclusion after comparing answers from a questionnaire and data from medical examination of the locomotor system (1, 12, 19). Anamnestic reports of pain and medical examination data matched for only 69% of the exposed and for 80% of the control workers. In general, the reliability of data for evaluation of the musculoskeletal system disorders based on a questionnaire is usually doubtful, particularly with respect to workers with lower education.

CONCLUSIONS AND RECOMMENDATIONS

The study has shown a high proportion (51%) of marked rheumatic disorders reported by workers in the meat processing industry confirming data published previously;

The frequency of extraarticular rheumatic diseases was confirmed by a medical examination in 44% of the examined workers;

Working in a strained position, unfavorable microclimatic conditions (hot/cold, and damp) and frequent repetitive arm movements are the factors that contribute

to rheumatic disorders, particularly to the occurrence of extraarticular rheumatic diseases;

The obligatory use of protective clothing and footwear, improved microclimatic conditions and automatization of production, ergonomic adjustment of workplaces to anthropometric requirements of the worker should significantly contribute to primary and secondary prevention of rheumatic disorders and prevent the progression of such disorders into diseases;

Special programs for recreation and rest for exposed workers, as well as medical examinations should be carried out on a regular basis and their efficiency should be scientifically evaluated.

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Sažetak

REUMATSKE TEGOBE U RADNICA MESNE INDUSTRIJE

Mikroklimatski uvjeti i položaj tijela pri radu bitno utječu na pojavu reumatskih, posebice izvanzglobnih tegoba. U namjeri da ispituju utjecaje nepovoljnih mikroklimatskih uvjeta i prisilnih položaja tijela pri radu na pojavu zamora, boli i bolesti u koštano-mišićnom sustavu u djelatnica zaposlenih u mesnoj industriji, autori su proveli anketna ispitivanja, kliničke preglede i funkcionalna testiranja lokomotornog sustava. Koristili su se i podacima iz prijašnje medicinske dokumentacije, posebice radiografskim snimkama kostiju i zglobova. Anketu s 37 pitanja o zamoru i boli sustava organa za kretanje samostalno je ispunilo 90 radnica mesne industrije, prosječne životne dobi 34 godine i s prosječno 14 godina radnog staža te 95 radnica iz kontrolne skupine s prosječnom životnom dobi 36 godina i radnim stažom 15 godina. Ispitivane radnice obavljaju posao stojeći, pognute glave i uz ponavljanje istovrsnih pokreta rukama. U radnim prostorijama vlažnost zraka je iznad 70%, a temperature su iznad 28 °C. Pri radu sa zamrznutim mesom temperature zraka iznose od -10 do -20 °C. Ispitanice u kontrolnoj skupini imale su povoljne mikroklimatske uvjete i slobodan ritam rada. Rezultati su pokazali da je na radu zamor i bol osjećalo značajno više ispitivanih (96%) negoli kontrolnih radnica (66%). Dob u kojoj su se ove smetnje pojavljivale bila je podjednaka; 24. godina u ispitivanih i 30. godina života u kontrolnih radnica. Tegobe su bile izrazite u 50% radnica mesne industrije i u svega 5% kontrolnih radnica. Kliničkim pregledom u obje skupine zabilježeni su podjednaki simptomi degenerativnih reumatskih bolesti (cervikobrahijalni sindrom u više od 30% i lumbosakralni sindrom u 14%, odnosno 19% radnica). Značajna razlika među skupinama nađena je u izvanzglobnim reumatskim bolestima (44% prema 19%). Fibromialgije i epikondilitisi bili su izraženiji u ispitivanoj skupini (u 30% prema 8%), a nije bilo razlika u humeroskapularnom periartritisu (14% i 11%). Predložene su mjere primarne i sekundarne prevencije reumatskih bolesti u zaposlenica u mesnoj industriji.

Ključne riječi:

anketni upitnik, izvanzglobne reumatske bolesti, mikroklimatski uvjeti, prevencija, žene

Requests for reprints:

Ladislav Krapac, M.D., Ph.D.
Department of Physical Medicine and
Rehabilitation
Clinical Hospital "Dubrava"
Avenija izviđača 6
10000 Zagreb, Croatia