Clinical rheumatology, 1993, **12**, N° 4 515-522

Pain and Fatigue in Patients with Rheumatic Disorders

A.M. MENGSHOEL, Ø. FØRRE

Summary **The purpose of the study was to investigate whether fibromyalgia patients (n = 50) differed from patients with rheumatoid arthritis (n = 22) and ankylosing spondylitis (n = 31) with respect to pain experience, pain coping and fatigue. A high general pain intensity level was recorded by the McGill Pain Questionnaire ($p<0.01$) and the visual analogue scale ($p<0.01$) in the fibromyalgia group compared to the other groups. The pain was of continuous duration in the fibromyalgia patients while the rheumatoid arthritis and ankylosing spondylitis patients experienced intermittent pain. A high correlation between sensory and affective pain rating indexes was determined in all patient groups ($p<0.01$). No statistically significant difference between the groups in pain coping was recorded. A high frequency of reported gastrointestinal problems ($p<0.01$) and high intensity of fatigue ($p<0.01$) were seen in the fibromyalgia group compared to the other groups. In the fibromyalgia group there was no correlation between the sleep problems and fatigue intensity. Thus, the fibromyalgia patients differed from the other groups in reporting frequently shoulder and upper arm pain, continuous pain, higher levels of fatigue and pain intensities as well as high frequency of gastrointestinal problems.**

Key words **Fibromyalgia, Rheumatoid Arthritis, Ankylosing Spondylitis, Pain Assessment, Pain Coping, Fatigue.**

INTRODUCTION

Fibromyalgia is a chronic pain condition characterized by widespread muscle pain and feeling of fatigue (1). It has been suggested that the pain might be a disorder of pain perception (2), of central pain modulation mechanisms (3-5) or a consequence of metabolic changes in the muscles (6-8).

Pain experience is suggested as consisting of a sensory and an affective component (9). The sensory component has much in common with somatic sensations, while the affective component correlates with the reactions of the patients against pain and is highly dependent on psychological variables. In order to increase the understanding of pain experiences in chronic pain patients, "the pain language" was investigated (10-12).

Pain scales utilizing verbal descriptive measures and ratio scaling procedures probably provide the best methods of recording different dimensions of pain experience (13). The methods are suggested to be advantageous when comparing pain levels in groups and to assess both experimental as well as clinical pain (14). The McGill Pain Questionnaire (MPQ) implies such a multidimensional measurement (15-16). It appears to be valid and reliable (17-22).

Fatigue is another important symptom in fibromyalgia (1). The understanding of fatigue might be as complex as that of pain itself. The general feeling of fatigue might be caused by sleep disorders, psychological and physical problems on by the disease itself. Pain, functional disability and fragmented sleep were found to correlate positively with increased levels of fatigue in a group of rheumatoid arthritis patients (23). Sleep disturbances (24) and reduced physical capacity (25) have also been demonstrated in fibromyalgia patients.

Education in pain coping skills has been proposed in the treatment programs of chronic pain patients (9,26, 27). Improved pain coping probably influences pain intensity (28). Cognitive-behavioral approach in the treatment of rheumatoid arthritis (29) and ankylosing spondylitis (30) have shown promising results. Equal approaches might be beneficial in the treatment of fibromyalgia.

The aim of the present study was to investigate whether patients with fibromyalgia differ from patients with rheumatoid arthritis and ankylosing spondylitis with respect to pain experience, pain coping and fatigue.

PATIENTS AND METHODS

Patients

Fibromyalgia (FM) patients

Fifty nonhospitalized female FM patients according to the ACR-criteria 1990 (31) were included in the study. Patients with co-existing diseases were excluded. The mean age of the patients was 34.3 ± 7.7 years (mean ± SD) and the mean duration of symptoms 9.4 ± 6.2 years (Table I).

Rheumatoid arthritis (RA) patients

Twenty-two nonhospitalized RA patients (seventeen females and five males) according to the ARA criteria (32) were included. The patients included belonged to the second functional class according to Steinbrocker's classification (33). They did not have any coexisting disorders. The patients were allowed to be on conventional antirheumatic therapy, but had to be on a stable dose. The mean age was 52.5 ± 12.5 years (mean ± SD), and the mean duration of symptoms was 10 ± 7.6 years (Table I).

Ankylosing spondylitis (AS) patients

Thirty-one nonhospitalized AS patients (eight females and twenty-three males) according to the diagnostic criteria (34) were included. The patients did not have any coexisting disorders. The patients were allowed to take a stable dose of NSAIDS. The mean age of the patients was 43.8 ± 9.3 years and the duration of symptoms 16.8 ± 9.1 years (Table I).

Table I: *Characteristics of patients with fibromyalgia (FM), rheumatoid arthritis (RA) and ankylosing spondylitis (AS)*

	FM n=50	RA n=22	AS n=31
Age (mean ± SD yrs.)	34.3 ± 7.7	52.5 ± 12.5	43.8 ± 9.3
Duration of symptoms (mean ± SD yrs.)	9.4 ± 6.2	10.0 ± 7.6	16.8 ± 9.1
Sex ratio: females/males	50/0	17/5	8/23
Full or part time employment (%)	48%	33%	74%
Full or partly sick-leave (%)	8%	19%	6%
Receiving disability pension (%)	44%	48%	19%

Methods

Pain assessment

Pain was recorded by the McGill Pain Questionnaire (MPQ). The MPQ (16) has been developed, validated and tested for reliability in a Norwegian version (35). The pain localizations were drawn on a figure. According to the Norwegian version, the characteristics of pain were given by choosing between 106 pain descriptive words assorted in 18 groups. The patients chose the most descriptive word from each group or no word if the words did not match. The pain descriptors were given score values corresponding to their intensities and summarized into a total pain rating index (PRI-T). Furthermore, the 18 groups were clustered and summarized into sensory (PRI-S), affective (PRI-A) and evaluative (PRI-E) pain rating indexes. Pain duration was described as intermittent/periodic or continuous/constant. Pain intensity the last seven days was recorded on a 100 mm visual analogue scale (36). The endpoints of the line were defined as no pain and unbearable pain (37).

Pain coping

Pain coping was monitored by the Vanderbilt Pain Management Inventory (38) that has previously been translated into and used in the Norwegian language. According to this method, the questionnaire was answered by choosing between 5 alternative categories given the score values from 1 to 5. The items were summarized in active and passive pain coping mechanisms. The active mechanisms were suggested to reflect the "healthy" way of coping.

Fatigue

General fatigue during the last seven days was recorded on a 100mm visual analogue scale with the endpoints defined as no fatigue and total exhaustion. The sleep during the last seven days was recorded on a 100mm visual analogue scale with the endpoints defined as good sleeping during the whole night and no sleep at all. The results are presented in millimetres.

General symptoms

The patients were asked if they had experienced symptoms such as gastrointestinal problems, depression, anxiety, swelling, numbness, "weather-sickness", headache, allergy problems or difficulties in concentrating. They

Table II: *Pain localization and other symptoms in fibromyalgia (FM), rheumatoid arthritis (RA) and ankylosing spondylitis (AS) patients*

	FM	RA	AS	Group difference
	n=50	n=22	n=31	significance
	% of n	% of n	% of n	level
Pain localization:				
Head and neck	90	68	77	
Shoulder and upper arm	84	59	45	**
Elbow and hand	86	100	29	**
Thorax	76	23	58	
Lumbar column	76	36	81	
Hip	76	41	42	
Knee	74	82	36	*
Leg and foot	70	91	36	**
Other symptoms reported often/constantly:				
Gastrointestinal problems	48	23	19	*
Depression	21	5	3	
Anxiety	9	9	3	
Swelling	56	55	6	**
Numbness	46	46	9	*
"Weather-sickness"	61	55	36	
Headache	54	14	19	
Concentration problems	35	32	13	
Allergy	38	14	10	

* Group difference at 5% level, ** Group differences at 1% level.

were asked to record whether these symptoms occurred never/seldom or often/constantly.

Study design

Three different groups of chronic pain patients received questionnaires together with written instructions on how to handle the questionnaires. The patients had the possibility of asking for help if needed; they gave informed consent to participate. The study was approved by the Regional Ethical Committee for Medical Research.

Statistics

The distributions of the continuous variables are given in mean and 95% confidential interval of the mean (C.I.M.). With regard to the results of the continuous variables the differences between the groups were tested by means of the ANOVA and Duncan's multiple range test; the correlation coefficients were calculated by the Pearson Correlation Test (39). The categorical variables were analyzed by the Cochran-Mantel-Haenszel test (40). Corrections for the group differences in age and duration of symptoms were made in the analysis of variance (ANOVA) and in the Cochran-Mantel-Haenszel test. Two-tailed tests were applied. Values equal to or less than 0.05 were considered as statistically significant.

RESULTS

The patient groups

None of the RA and AS-patients fulfilled the criteria of fibromyalgia. The groups differed in age ($p<0.05$), and the FM and the AS groups differed in duration of symptoms ($p<0.05$). Consequently, in the further statistical analysis it was corrected for the group differences with respect to age and duration of symptoms in the Cochran-Mantel-Haenszel test and the ANOVA test.

Pain assessment

Pain was measured by means of the McGill Pain Questionnaire (MPQ). The patient groups differed in pain localizations to the hand/elbow ($p<0.01$), knee

Table III: *Pain scores in fibromyalgia (FM), rheumatoid arthritis (RA) and ankylosing spondylitis (AS) patients*

	FM group n=50	RA group n=22	AS group n=31
Variables	Mean 95% C.I.M.	Mean 95% C.I.M.	Mean 95% C.I.M.
McGill Pain Questionnaire			
Total Pain Rating Index	57 **	42	32
(PRI-T)	50 – 63	29 – 56	22 – 42
Sensory Pain Rating Index	36 ##	28	20
(PRI-S)	32 – 40	19 – 37	14 – 26
Affective Pain Rating Index	16 ##	11	9
(PRI-A)	14 – 19	6 – 16	5 – 13
Evaluative Pain Rating Index	5 #	4	3
(PRI-E)	4 – 5	2 – 5	2 – 4
Number of Words Chosen	11 ##	8	6
(NWCH)	9 – 12	6 – 11	5 – 8

** 1% level, statistically the FM group differed significantly from the other groups; # 5% level; ## 1% level, statistically the FM group differed significantly from the AS group.

Table IV: *The intensity of symptoms measured by 100mm visual analogue scales in patient groups with fibromyalgia (FM), rheumatoid arthritis (RA) and ankylosing spondylitis (AS)*

Symptoms	FM-group n=50	RA-group n=22	AS-group n=31
	Mean 95% C.I.M.	Mean 95% C.I.M.	Mean 95% C.I.M.
Pain intensity during	58 **	39	43
seven days (mm VAS)	53 – 63	29 – 48	34 – 52
Sleep problems last	49 #	34	39
seven days (mm VAS)	42 – 57	23 – 46	30 – 49
Fatigue during seven	66 **	44	49
days (mm VAS)	61 – 71	32 – 57	41 – 57

** FM group statistically different from the other groups at 1% level; # FM group statistically different from the RA group at the 5% level.

($p<0.01$) and leg/foot ($p<0.01$) with the highest occurrence observed in the RA group. Group differences were also observed with respect to the shoulder and upper arm pain ($p<0.01$) with the highest frequency reported in the FM group (Table II). The FM group had a high total pain rating index ($p<0.01$) compared to the other groups (Table III), as well as a high pain intensity during the last seven days ($p<0.01$) measured on a visual analogue scale (Table IV). Furthermore, the FM group had high sensory ($p<0.01$), affective ($p<0.01$), evaluative ($p<0.05$) pain rating indexes and used more pain descriptors ($p<0.01$) as compared with the AS group (Table III). A positive correlation between PRI-S and PRI-A was seen both in the FM ($r=0.6$, $p<0.01$), as well as in the RA ($r=0.8$, $p<0.01$) and the AS group ($r=0.8$, $p<0.01$). The pain was reported as constant or continuous ($p<0.01$) in the FM-group while the RA and the AS group reported intermittent or periodic pain.

Fatigue

General fatigue and amount of sleep problems were recorded by visual analogue scales. The FM group reported a high degree of fatigue compared with the other groups ($p<0.01$), and a high amount of sleep problems ($p<0.05$) compared with the RA group (Table IV). There were positive correlations between fatigue and pain intensity, as well as pain intensity and sleep problems in all patient groups. Positive correlations between fatigue intensity and sleep problems were deter-

Table V: *The relationships between pain, fatigue and sleep problems measured on visual analogue scales in fibromyalgia (FM), rheumatoid arthritis (RA) and ankylosing spondylitis (AS) patients*

	FM	RA	AS
Relationship between:	Correlation coefficient	Correlation coefficient	Correlation coefficient
Pain and fatigue intensities	0.6 ***	0.8 ***	0.4 *
Pain intensity and amount of sleep	0.5 ***	0.6 **	0.5 *
Fatigue intensity and amount of sleep	0.3 n.s.	0.6 **	0.5 **

* statistically significant at 5% level; ** statistically significant at 1% level; *** statistically significant at 0.1% level.

mined in the RA and the AS group, but not in the FM group (Table V).

Pain coping

Pain coping was measured by the Vanderbilt Pain Management Inventory. The mean (C.I.M.) score numbers of active versus passive coping mechanisms were in the FM group 21 (20-22) versus 27 (26-29), in the RA group 22 (20-25) versus 28 (25-31) and in the AS group 21 (19-22) versus 26 (24-28). No statistically significant differences between the groups were found. The FM group, however, differed significantly from the RA and AS groups in choosing more frequently the items "reading" ($p<0.05$) as an active coping strategy and "seeking health professionals" ($p<0.05$) among passive coping mechanisms.

General symptoms

The groups differed in reporting gastro-intestinal problems ($p<0.05$) with the highest prevalence among the FM patients. Group differences were noticed in reporting a feeling of swelling ($p<0.01$) and numbness ($p<0.01$) with the highest occurrence in the FM group and the RA group. "Weather-sickness" were frequently reported in all groups (Table II).

DISCUSSION

The present study shows that the FM patients differed from the other groups in reporting shoulder and upper arm pain, pain of continuous duration, higher degree of fatigue and pain intensities, as well as a higher prevalence of gastrointestinal problems. The patient groups did not differ with respect to pain coping.

The McGill Pain Questionnaire has previously been used to record pain in many studies and in different patient populations (17-19, 41). As the Norwegian version of the MPQ does not directly correspond to the version in other languages, it is impossible to compare the levels of pain rating indexes with the studies from other countries. Comparing the differences in pain rating indexes between disease categories, however, has been suggested to be of value (42).

The present study shows a significantly higher general pain intensity level measured with the MPQ and the visual analogue scale in a FM group than in a RA and AS group. These findings are in correspondence with previous studies comparing FM and RA patients (43-44). By comparing seven rheumatic disorders the highest pain intensity levels were found in low-back pain, neck pain and in FM patients. The lowest pain intensity was observed in the RA patients (45). These studies did not include AS patients.

The methods of scaling different dimensions of pain experience presuppose that there are separable sensory and affective components of pain, and secondly that the scales do in fact measure these components (14,46). The intensity by which a stimulus is subjectively judged as painful accounts for the sensory aspect (pain threshold). The affective aspect of pain (pain tolerance) reflects the unpleasantness and desire to escape (9) and might be produced by psychological rather than somatic factors (47).

The present study revealed significantly higher sensory and affective pain ratings in the FM group in comparison with the AS group, but not in comparison with the RA group. These findings are in agreement with the results from previous studies using the MPQ in order to record pain in FM and RA patients (10,11,44), but in conflict with Gaston-Johansson et al. (43) who found a significantly higher affective pain score in the FM group than in the RA group. To our knowledge, equivalent studies have not been performed in order to evaluate pain among AS patients. In the present study there was a positive correlation between the sensory and the affective ratings in all patient groups. This indicates that the sensory and affective components of pain influence each other (9).

In the present study the patient groups did not differ in pain coping. This accords well with the findings by

Uveges et al. (44) that also reported higher pain intensity and no differences in pain coping in the FM group compared with a RA group. A negative correlation between "healthy" pain coping and general pain intensity level (48) and the affective pain level has been observed (49). In the present study the FM patients differed from the other patient groups in choosing more frequently the item "seeking health professionals" as a coping strategy. This might reflect that the FM patients feel more helpless than the other groups in coping with their situation. In spite of a higher pain intensily in the FM group compared with the other groups, put no difference in pain coping, our observations, however, do not exclude the possibility that improved pain coping might reduce the pain intensity within groups. In a previous study we demonstrated that physical fitness training neither improved the general pain intensity level nor the ability to control pain in FM patients (50). The efficacy of treatment programs including pain coping skills might thus be of great interest.

Previously, sleep disturbances have been demonstrated in FM (24,44), RA (51,52) and in AS patients (53). Sleep problems have been shown to exacerbate pain in RA patients (54). Positive relationships between fatigue intensity and sleep problems versus pain intensity were observed in all patient groups in the present study. This indicates that treatments towards reduction of fatigue intensily and sleep problems might also serve as pain reduction therapy in rheumatic disorders. Furthermore, there were positive correlations between fatigue and sleep in the RA and the AS groups. It is interesting that such a correlation was not determined in the FM group. This might reflect that fatigue and sleep disorders are more separate phenomena in FM than in RA and AS groups.

All patients were outpatients. In the FM and RA group there were mostly women, while the AS group consisted mostly of men. The group differences might then have been caused by the difference between sexes rather than the disorders themselves. Therefore, each diagnostic group was divided into subgroups of males and females and the results were compared for differences within the groups. In general, women had some higher pain complaint scores than men, but they did not reach significant levels for any results (data are not shown). As the groups did show difference in age and duration of symptoms, we chose to correct for the patients' age and the duration of symptoms in all the statistical analyses.

CONCLUSION

The fibromyalgia patients differed from the rheumatoid arthritis and ankylosing spondylitis group in reporting pain localization in the region of the shoulder and upper arm, higher intensities of pain and fatigue and more frequent report of gastrointestinal problems. Sleep problems and fatigue intensity did not correlate in the fibromyalgia patients.

Acknowledgements: Thanks are due especially to Ragnhild Walle-Hansen and Fridtjof Bjerkhoel in finding participants for the study and to Hans Fagerthun for his assistance with the statistical analysis. Financial support was given by the Norwegian Fund for Postgraduate Training in Physiotherapy, the Olga Immerslund Legacy for Rheumatological Research and Hafslund-Nycomed.

REFERENCES

1. Yunus, M., Masi, A.T., Calabro, J.J., Miller, K.A., Feigenbaum, S.L. Primary fibromyalgia (fibrositis): Clinical study of 50 patients with matched normal controls. Semin Arthr Rheum 1981, 11, 1, 151-171.
2. Smuckler, N.M. Pain perception. Bull Rheum Dis 1985, 35, 1, 85-91.
3. Smythe, H.A. "Fibrositis" as a disorder of pain modulation. Clin Rheum Dis 1979, 53, 823-832.
4. Vaerøy, H., Helle, R., Førre, Ø., Kåss, E., Terenius, L. Elevated CFS levels of substance P and high incidence of Raynaud phenomenon in patients with fibromyalgia: new features for diagnosis. Pain 1988, 32, 21-26.
5. Yunus, M.B. Towards a model of pathophysiology of fibromyalgia: Aberrant central pain mechanisms with peripheral modulation (editorial). J Rheumatol 1992, 19, 6, 846-850.
6. Bennett, R.M. Physical fitness and muscle metabolism in the fibromyalgia syndrome. An overview. J Rheumatol 1989, (19) 16, 28-29.
7. Bengtsson, A., Henriksson, K.G. The muscle in fibromyalgia - a review of Swedish studies. J Rheumatol 1989, (19) 16, 144-149.
8. Vaerøy, H., Quiao, Z.G., Mørkrid, L., Førre, Ø. Altered sympathetic nervous system response in patients with fibromyalgia (fibrosistis syndrome). J Rheumatol 1989, 16, 11, 1460-1465.
9. Fields, H. Pain. McGraw-Hill, NY 1987.
10. Leawitt, F., Katz, R.S., Golden, H.E., Glickman, P.B., Layfer, L.F. Comparison of pain properties in fibromyalgia patients and rheumatoid arthritis patients. Arthr Rheum 1986, 29, 6, 775-781.
11. Nolli, M., Ghirelli, L., Ferraccioli, G.F. Pain language in fibromyalgia, rheumatoid arthritis and osteoarthritis. Clin Exp Rheumatol 1988, 6, 27-33.
12. Wagstaff, S., Smith, O.V., Wood, P.H.N. Verbal pain descriptors used by patients with arthritis. Ann Rheum Dis 1985, 44, 262-265.
13. Hall, W. On ratio scales of sensory and affective verbal pain descriptors. Pain 1981, 11, 101-107.

14. Gracely, R.H., Dubner, R. Pain assessment in humans - a reply to Hall. Pain 1981, 11, 109-120.
15. Melzack, R., Torgersson, W.S. On the language of pain. Anesthesiology 1971, 34, 50-59.
16. Melzack, R. The McGill Pain Questionnaire: Major properties and scoring methods. Pain 1975, 1, 277-299.
17. Prieto, E.J., Hopson, L., Bradley, L.A., Byrne, M., Geisinger, K.F., Midax, D., Marchisello, P.J. The language of low back pain: factor structure of McGill Pain Questionnaire. Pain 1980, 8, 11-19.
18. Reading, A.E. The internal structure of the McGill Pain Questionnaire in dysmennorhoea patients. Pain 1979, 7, 353-358.
19. Graham, C., Bond, S.S., Gerkovich, M.M., Cook, M.R. Use of the McGill Pain Questionnaire in the assessment of cancer pain: repliciability and consistency. Pain 1980, 8, 377-387.
20. Dubuisson, D., Melzack, R. Classification of clinical pain descripions by multiple group discriminant analysis. Exp Neurol 1976, 51, 480-487.
21. Reading, A.E. A comparison of the McGill Pain Questionnaire in chronic and acute pain. Pain 1982, 13, 185-192.
22. Huskisson, E.C. Measurement of pain. J Rheum 1982, 9, 5, 768-769.
23. Crosby, L.J. Factors which contribute to fatigue associated with rheumatoid arthritis. J Adv Nurs 1991, 16, 974-981.
24. Moldofski, H., Scarisbrick, P., England, R., Smythe, H. Musculoskeletal symptoms and non-REM sleep disturbance in patients with "fibrositis syndrome" and healthy subjects. Psychosom Med 1975, 37, 341-351.
25. Mengshoel, A.M., Komnæs, H.B., Førre, Ø. Muscle strength and aerobic capacity in primary fibromyalgia. Clin Exp Rheumatol 1990, 8, 475-479.
26. Keefe, F.J. Behavioral assessment and treatment of chronic pain: current status and future directions. J Consult Clin Psychol 1982, 50, 6, 896-911.
27. Goldenberg, D.L. Management of fibromyalgia syndrome. Rheum Dis Clin North Am 1989, 15, 3, 499-512.
28. Keefe, F.J., Dolan, E. Pain behavior and pain coping strategies in low back pain and myofascial pain dysfunction syndrome patients. Pain 1986, 24, 49-56.
29. Parker, J.C., Frank, R.G., Beck, N.C., Smarr, K.L., Buescher, K.L., Phillips, L.R., Smith, E.I., Anderson, S.K., Walker, S.E. Pain management in rheumatoid arthritis patients. A cognitive-behavioral approach. Arthr Rheum 1988, 31, 5, 593-601.
30. Basler, H.D., Rehfisch, H.P. Cognitive-behavioral therapy in patients with ankylosing spondylitis in a German self-help organization. J Psychosom Res 1991, 35, 2/3, 345-354.
31. The American College of Rheumatology. Criteria for the classification of fibromyalgia. Report of the multicenter Criteria Committee. Arthr Rheum 1990, 33, 2, 160-172.
32. Arnett, F.C., Edworthy, S.M., Bloch, D.A., McShane, D.J., Fries, J.F., Cooper, N.S., Healey, L.A., Kaplan, S.R., Liang, M.H., Luthra, H.S., Medseger, T.A.Jr., Mitchell, D.M., Neustadt, D.H., Pinals, R.S., Schaller, J.G., Sharp, J.T., Wilder, R.L., Hunder, G.G. The American Rheumatism Association 1987 revised criteria for the classification of rheumatoid arthritis. Arthr Rheum 1988, 31, 315-324.
33. Steinbrocker, O., Traeger, C.H., Batterman, R.C. Therapeutical criteria in rheumatoid arthritis. JAMA 1949, 140, 659-662.
34. Moll, J.M.H., Wright, V. New York clinical criteria for ankylosing spondylitis. Ann Rheum Dis 1973, 32, 354-363.
35. Strand, L.I., Wisnes, A.R. The development of a Norwegian pain questionnaire. Pain 1991, 46, 61-66.
36. Price, D.D., McGrath, P.A., Rafii, A., Bucklingham, B. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. Pain 1983, 17, 45-56.
37. Seymour, R.A., Simpson, J.M., Charlton, J.E., Phillips, M.E. An evaluation of length and end-phrase of visual analogue scales in dental pain. Pain 1985, 21, 177-185.
38. Brown, G.K., Nicassio, P.M. Development of a questionnaire for the assessment of active and passive coping strategies in chronic pain patients. Pain 1987, 31, 53-64.
39. Kendell, M., Stuart, A. The advanced theory of statetics. Vol I, Griffin et co. Ltd. London 1979.
40. Grefti, A. Categorical data analysis. John Wiley & Sons, NY 1990.
41. Burckhardt, C.S. The use of the McGill Pain Questionnaire in assessing arthritis pain. Pain 1984, 19, 305-314.
42. Rollman, G.B. Measurement of pain in fibromyalgia in the clinic and laboratory. J Rheumatol 1989, (19 suppl.) 16, 113-119.
43. Gaston-Johansson, F., Johansson, G., Felldin, R., Sanne, H. A comparative study of pain description, emotional discomfort and health perception in patients with chronic pain syndrome and rheumatoid arthritis. Scand J Rehabil Med 1985, 17, 109-119.
44. Uveges, J.M., Parker, J.C., Smarr, K.L., McGowan, J.F., Lyon, M.G., Irvin, W.S., Meyer, A.A., Buckelew, S.P., Morgan, R.K., Delmonico, R.L., Hewett, J.E., Kay, D.R. Psychological symptoms in primary fibromyalgia syndrome: Relationship to pain, life stress, and sleep disturbance. Arthr Rheum 1990, 33, 8, 1279-1283.
45. Hawley, D.J., Wolfe, F. Pain, disability, and pain/disability relationships in seven rheumatic disorders: A study of 1,522 patients. J Rheumatol 1991, 18, 10, 1552-1557.
46. Price, D.D., Harkins, S.W., Baker, C. Sensory-affective relationships among different types of clinical and experimental pain. Pain 1987, 28, 297-307.
47. Veilleux, S., Melzack, R. Pain in psychotic patients. Exp Rheumatol 1976, 52, 535-543.
48. Keefe, F.J., Caldwell, D.S., Martinez, S., Nunley, J., Beckham, J., Williams, D.A. Analyzing pain in rheumatoid arthritis patients. Pain coping strategies in patients who have had knee replacement surgery. Pain 1991, 46, 153-160.
49. Anderson, L.P., Rehm, L.P. The relationship between strategies of coping and perception of pain in three chronic pain groups. J Clin Psychol 1984, 40, 1170-1177.
50. Mengshoel, A.M., Komnæs, H.B., Førre, Ø. The effects of 20 weeks of physical fitness training in female fibromyalgia patients. Clin Exp Rheumatol 1992, 10, 345-349.
51. Mahowald, M.W., Mahowald, M.L., Bundlie, S.R., Ytterberg, S.R. Sleep fragmentation in rheumatoid arthritis. Arthr Rheum 1989, 32, 8, 974-983.
52. Lavie, P., Epstein, R., Tzischinski, O., Gilad, D., Nahir, M., Lorber, M., Scharf, Y. Actigraphic measurements of sleep in rheumatoid arthritis: comparison of patients with low back pain and healthy controls. J Rheumatol 1992, 19, 362-365.
53. Taylor, H.G., Wardle, T., Beswich, E.J., Dawes, P.T. The relationship of clinical and laboratory measurements to radiological change in ankylosing spondylitis. Br J Rheumatol 1991, 30, 330-335.
54. Nicassio, P.M., Wallston, K.A. Longitudinal relationships among pain, sleep problems, and depression in rheumatoid arthritis. J Abnorm Psychol 1992, 101, 3, 514-520.
55. Serbo, B., Jajic, I. Relationship of the functional status, duration of the disease and pain intensity and some psychological variables in patients with rheumatoid arthritis. Clin Rheumatol 1991, 10, 4, 419-422.[1]

Received: 18 March 1993.
Accepted: 28 May 1993.
Correspondence to: A.M. MENGSHOEL,
Oslo Sanitetsforening Rheumatism Hospital, Akersbakken 27,
N-0172 Oslo, Norway.