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RISK OF LONG-TERM DISABILITY AMONG PATIENTS WITH BACK PAIN

Annika Hellzén Ingemarsson,[1] Lena Nordholm,[2] and Tatjana Sivik[1]

From the [1] Department of Primary Health Care, University of Göteborg, and [2] Göteborg College of Health Sciences, Department of Rehabilitation, Göteborg, Sweden

ABSTRACT. The aim of this study was to find predictors of length of time on sick-leave and the change in sick-leave as a result of intervention. Many studies of back pain show that medical and psychosocial factors covary with length of sick-leave. The results are based on the questionnaire responses of 240 patients. A stepwise multiple regression showed that the significant predictors of number of sick-days the year after intervention were the number of sick-days before the intervention and also hypochondria. Significant predictors of sick-leave change were sleep disturbance and number of sick-days before intervention. A discriminant function analysis comparing a group that had decreased its sick-leave with one that had increased its sick-leave showed 7 predictors of increased sick-leave: high risk of somatisation; many children and family members living at home; a change in tasks at work owing to pain; brothers and sisters with longstanding pain problems; frequent pain, and sleep disturbance. It is important for physiotherapists to enquire about patients' earlier sick-leave patterns in order to identify risk factors for long-term disability among patients with back pain. Some of these factors have been identified in this study.

Key words: sick-leave, back pain, physiotherapy.

INTRODUCTION

Long-term disability can be very costly for both the individual and society at large. By increasing the knowledge and understanding of the background factors of disability and the ensuing sick-leave, rehabilitational institutions may be able to recognise those patients that are at high risk of developing long-term disabilities.

A low correlation between diagnosed illness and days of sick-leave for patients with back pain has been reported in the literature (1–3, 34, 38). However, sick-leave is the primary criterion used by both insurance companies and medical institutions to evaluate intervention. Days of sick-leave is a complex measurement, since it may reflect not only illness/disorder but also the social insurance system, attitudes and values in a society (7). Earlier studies have shown that there are other factors in addition to medical factors involved in the length of sick-leave among patients with back problems. Satisfaction with one's work situation, the ability to affect decision-making in the workplace, attitudes towards oneself and one's own health, previous sick-leave, the personnel policies of the workplace, personality, and psychosocial circumstances are among those factors (5, 7, 14, 16, 35, 36).

A study by Sandström (27) described factors such as social circumstances, illness history and physical symptoms, which predicted the patient's return to work after rehabilitation. It was shown that short previous sick-leave (among older patients), gender (only men returned to full-time employment), limited dependency on analgesics, less frequent pain in the back and neck, a positive attitude by the patient towards his/her own ability to function on a daily basis and lack of fatigue after work were all good predictors of return to work.

In an epidemiological study of sick-leave, 230,000 immigrants in Malmö, Sweden, were investigated. The study showed that women, individuals with low incomes, single people and some immigrant groups had a high frequency of absenteeism. This frequency also increased with age (16).

A study from Göteborg, Sweden (37) reported very strong correlations between working conditions and sick-leave. The study included a group of patients on sick-leave for back pain at the time of the study, and a control group comprising individuals who had not been on sick-leave during the preceding year. The individuals on sick-leave as a result of back pain showed a higher frequency of absence compared with the control group,

and had a lower degree of autonomy in the workplace, an inferior position at work, a lower level of education and a wish to change employment. Furthermore, social factors unrelated to work seemed to play an equally important role. Psychosocial problems were more prevalent as the length of sick-leave increased. Among a group of patients *without* any apparent musculo-skeletal symptoms, the patients were more fatigued towards the end of the day and experienced psychosomatic problems more frequently, and the frequency of absenteeism was higher than among the group *with* clinically evident symptoms.

Bonsall et al. (3) reported that short-term sick-leave is affected by the attitude of management toward employees. A positive attitude by management towards employees returning to work also influenced the long-term effects of rehabilitation according to Ekberg & Linton (6).

A study in Belgium reported a strong correlation between sociocultural and work-related factors and the perception of back pain. The results based on 4,000 individuals showed that demographic and sociocultural factors are most significant when the patient experiences back pain for the first time. Dissatisfaction with work conditions was reported in connection with previously reported back problems and daily back pain, but not in connection with the first occurrence of back pain. Furthermore, it was shown that employed individuals had a lesser degree of health problems than those who did not work (31). Back problems among machine operators have been found to be related to both physical and psychosocial stress factors, whereas neck pain was associated only with physical stress factors in the working environment (17).

The importance of the working environment has also been emphasized in a recently published study by Ekberg & Wildhagen (7), where 93 patients with disorders of the neck and shoulders were assessed on health status before rehabilitation and 12 months after. It was found that patients with long-term sick-leave (>101 days) perceived their work as more demanding both physically and mentally compared with those with shorter sick-leave. Furthermore, the number of days of sick-leave after rehabilitation was positively associated with days of sick-leave during the preceding year. These authors concluded that long-term sick-leave was largely associated with work conditions rather than with individual conditions, and emphasized the importance of improving working conditions as well as treating the individual with musculo-skeletal disorders.

Earlier research on the prognostic value of psychological factors shows that whether or not patients with chronic back pain return to work is dependent upon their personality structure (9). Through a stepwise analysis the author was able to show that the highest predictive power, 87%, was achieved in four factors: optimistic/pessimistic view of life, task rigidity, sociability, self-image. Those who returned to work had a more positive and hopeful attitude towards life in general, experienced feelings of insufficiency to a lesser degree, did not need care taking and social support much, were less introverted and more flexible, and had a more positive self-image than did those who remained on disability. The working group also had a stronger motivation to work, judged their ability to return to work as good, described their families as supportive and positive towards their ability to return to work, were less accustomed to their role as patients, and perceived their back pain as less disabling. However, there was no apparent difference between the two groups regarding satisfaction with work, level of activity during leisure time, neuroticism and psychosomatic symptoms.

Many studies also show a strong connection between chronic low back pain and the emotional state of the patient. Gentry et al. (10) found that 23% of chronic low back pain patients had a history of psychiatric or emotional disturbance. Sivik et al. (29) have shown that personality is of significance in cases of subacute lower back pain. The results from that study showed that the patient group differed significantly from the control group regarding hypochondria, depression, hysteria and tendency to somatisation of social and psychosocial problems as concluded from PPD—Patient Pain Drawing (28). In a study of patients with subacute back and neck problems, Klingberg-Olsson et al. (19) found that psychologically vulnerable patients had a higher number of sick-listing days during the year before intervention and, more importantly, significantly longer periods of sick-leave the year after intervention as compared with patients with an organic origin to their problems. In conclusion, confirmation of the illness and somatic intervention therein actually seemed to reinforce illness behaviour.

Inversely one can ask what characterises an individual who works despite illness. An analysis of what is typical of construction workers who had never had any back problems was undertaken in Lund, Sweden (15). It appeared that low age, a healthy lifestyle, a low tendency to stress, a positive psychosocial environment and moderate psychological and physical demands were all important factors in characterising a person without a back problem.

Purpose of the study

To ascertain predictor variables for length of sick-leave among individuals with back pain.

Research questions

What variables predict length of sick-leave the year after intervention? What variables characterise individuals with, respectively, increased and decreased sick-leave after intervention?

METHOD

Design

The study was carried out at the Outpatients Physiotherapeutic Rehabilitation Clinic, Olskroken, Göteborg, Sweden. It was undertaken within the context of a larger prospective study concerned with the effects of physiotherapeutic treatment for patients with neck and back pain. All 240 patients participating in this project were on sick-leave from regular jobs, to which they would return when they were free from symptoms. They were randomly divided into four intervention groups. Before and after intervention, all patients were given a thorough physiotherapeutic functional evaluation, a psychological personality test and a questionnaire. The results of this project have been reported in earlier studies (11, 14, 20).

Subjects

Two hundred and forty patients (136 women, 104 men) of working age with subacute pain in the neck and back participated in the study. The average age for women was 33.03 (SD = 7.8), and for men 33.5 (SD = 7.8). The average age for all patients was 33.2 (SD = 8.2). Consecutive patients who fulfilled the inclusion criteria below were referred to physiotherapeutic intervention by general practitioners in Göteborg, Sweden, between 1988 and 1990. All 240 patients who were referred participated in the study: 75% had back pain, 15% had neck pain, and 10% had pain in both back and neck. The criteria for inclusion in the study were the following: age 20–50 and on sick-leave at the time of the referral but not for longer than 8 weeks for the current episode of sick-leave. The extensive questionnaires required a good command of the Swedish language.

Dependent variables

The variable *length of sick-leave* was defined as the total number of days on sick-leave (irrespective of cause) during one year. Data were compiled by the National Social Insurance Office (NSIO) both for the year prior to intervention and for the year after intervention (*sick-leave after*). *Sick-leave difference* was defined as the difference between the number of days on sick-leave before and after intervention. Registration of sick-leave at the NSIO was compulsory at this time in Sweden from the first day of illness in order to obtain reimbursement. A doctor's certficate was required for illness that lasted longer than one week.

Predictor variables

During the patient's first visit to the physiotherapist a questionnaire was completed. Variables included in this questionnaire were used as predictor variables. The questionnaire was based upon Swedish and American scales (23, 24, 26, 28, 33). The predictor variables were arranged as follows: background (gender, age, marital status, children, children at home, family members at home, education, nationality, employment), sick-leave before, pain variables (onset, medication, frequency, diurnal rhythm, sensitivity, variation, location, intensity in general—VAS 1, peak intensity—VAS 2, sleep disturbance, parents' pain, siblings' pain, children's pain, family problems), psychological variables (hypochondria, depression, hysteria), physical activity (exercise, rest, relaxation, discontinuation of physical activity), work-related variables (wish to return to work, change of work, job stress) and medical consultations, alternative consultations, visits to physician.

Statistical analysis

Multiple regression

The analysis was done with the Statistical Analysis System (SAS) statistical program for calculating descriptive statistics, correlations and stepwise multiple regression. The significance level was set at $p < 0.05$.

The statistical analysis was performed as follows:

Phase 1: The correlation between each predictor variable and the dependent variable was calculated using Spearman's correlation coefficient (more than two organisational levels of variables). In cases where the variable had only two levels, Wilcoxon's test was used.

Phase 2: Multivariate analysis. All significant predictor variables were included in a model according to stepwise regression analysis. Ten significant variables for *sick-leave after* and 5 significant variables for *sick-leave difference* were included in the model.

Phase 3: Verification of the stepwise regression analysis through non-parametric partial correlation analysis. The statistical technique of multiple regression was used when the variables were continuous.

Discriminant function analysis

A two-group discriminant functional analysis is used when the dependent variable no longer forms a continuous variable but is a nominal variable. The dependent variable *sick-leave difference* was dichotomised by dividing it into two groups: those constituting an *increase* (group 1) and those constituting a *decrease* (group 2). This variable was the criterion variable in the discriminant function analysis which attempted to differentiate the two groups using the same predictors as in the multiple regression. The calculations were performed with Statistica software. The significance level was set at $p < 0.05$.

RESULTS

The mean number of sick-days the year after intervention for all 240 patients was 86.5 days (SD = 93.9), and the median was 46 days (range: 0 to 361) (Table II). The large difference between the mean and median values illustrates the skewness of the distribution. The mean difference between the number of sick-days before and after intervention was 25.5 days (SD = 88.0), and the median was 5.5 days (range: −172 to 333). The groups were unevenly distributed, which is reflected in the

Table I. *Comparisons between dichotomous independent variables for the sick-leave variables resulting in significant differences (Wilcoxon test)*

		Sick-leave after			Sick-leave difference		
Independent variables	*n*	Mean (SE)	Median	*p*-value[1]	Mean (SE)	Median	*p*-value[1]
Nationality				*			n.s.
Swedish	197	79.8 (6.18)	45.0		22.4 (6.36)	5	
Non Swedish	36	123.0 (16.09)	85.8		45.8 (18.85)	16.3	
Siblings' pain				n.s.			*
No	193	83.9 (6.8)	45.0		22.8 (6.52)	–0.5	
Yes	20	86.7 (18.0)	47.5		36.7 (14.0)	20.0	
Family problem				n.s. ($p = 0.08$)			*
No	145	94.8 (7.75)	41.0		17.6 (7.49)	–6.5	
Yes	68	78.9 (11.47)	71.0		35.8 (10.25)	14.0	
Sleep disturbance				***			***
No	49	43.3 (7.25)	20.0		–9.9 (7.26)	–13.0	
Yes	178	98.9 (7.53)	64.5		36.1 (7.02)	11.0	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
[1] Wilcoxon test.

difference between the mean and median values for *sick-leave after* and *sick-leave before* intervention. In Tables I and II, 15 significant predictor variables and associated descriptive statistics are reported. The remaining 24 predictor variables were not significant.

The stepwise regression analysis showed two significant predictors of *the number of sick-days after intervention*: *sick-days before intervention* and *hypochondria* (Table III and Fig. 1). In step 3, the variable *insomnia* was also included, however with non-significant *p*-value (0.075). Significant predictors of the *difference in number of sick-days* during the year before and the year after intervention were *insomnia* and *number of sick-days before* (Table IV). In step 3 the variable PPD was also included with non-significant *p*-value (0.10).

Each of the 15 variables had a significant correlation (Tables I and II), but when the entire system was used in the stepwise regression analysis only two significant variables remained for each dependent variable. The multiple regression analysis showed that 17% of the variance of the dependent variable *sick-leave after intervention* was explained by the two variables *hypochondria* and *sick-leave before* intervention ($F = 16.56$, $p < 0.0001$) (Table III). Similarly, 10% of the variance ($F = 9.75$, $p < 0.0001$) in the second dependent

Table II. *Descriptive statistics on significant predictor variables and Spearman correlations (r_s) between predictor variables and each of the two dependent variables ("sick-leave after", "sick-leave difference")*

				Sick-leave after		Sick-leave difference	
Variable	*n*	Mean ± SD	Median	r_s	*p*-value	r_s	*p*-value
Education	238	1.3 ± 0.6	1.0	–0.181	**	–0.104	n.s.
Sick-leave before	240	61.0 ± 52.6	48.0	0.410	***	–0.267	***
Hypochondria	200	60.4 ± 18.2	58.5	0.275	***	0.069	n.s.
Hysteria	200	64.7 ± 10.4	64.0	0.160	*	0.095	n.s.
Pain drawing	212	7.3 ± 3.1	8.0	0.118	n.s. ($p = 0.08$)	0.170	*
Pain medication	222	0.9 ± 0.9	1.0	0.200	**	0.049	n.s.
Pain frequency	221	2.9 ± 0.5	3.0	0.223	***	0.113	n.s. ($p = 0.09$)
VAS 1[1]	203	1.7 ± 0.9	2.0	0.239	***	0.119	n.s. ($p = 0.09$)
Medical consultations	212	1.0 ± 0.4	1.0	0.161	*	0.028	n.s.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
[1] Visual Analogue Scale for pain as generally experienced.

Table III. *Results of stepwise regression analysis for the dependent variable "Sick-leave after" (n = 240)*

Variable	Parameter estimate	Standard error	*F*	*p*-value
Intercept	–23.27	20.72	1.26	0.2632
Sick-leave before	0.53	0.13	16.08	0.0001
Hypochondria	1.12	0.34	11.02	0.0011

variable—*the difference in number of sick-days* before and after intervention—was explained by *insomnia* and *number of sick-days before* intervention (Table IV).

In the univariate analysis of 78 tests which resulted in 15 significances, we found that the upper limit for the number of altered false significances was 3.3 (8). The results of the stepwise regression analysis were verified by a non-parametric partial correlation analysis. In order to eliminate the influence of a variable when another is being tested against the dependent variable, Mantel's technique of pooling (22) applied to Pitman's non-parametric permutation test was used (4). The results of the verification tests showed that all significances remained.

The results of the discriminant function analysis between two groups, one of which consisted of patients whose number of sick-days decreased after intervention, and the other of patients whose number of sick-days increased after intervention, showed statistical significance (p = 0.0001). The variables included in the prediction model were the following: PPD, number of children living at home, number of family members at home, change of employment as a result of problems, siblings with extended periods of pain, pain frequency, insomnia (Table V). Compared with the group with a decreased number of sick-days, the group with an *increased number of sick-days* had a *high PPD* value (i.e. were at risk of somatisation of pain), had *many children and other family members at home*, had *changed employment as a result of problems*, had *siblings with extended periods of pain*, had *frequently recurring pain*, and *woke up often at night owing to pain.*

DISCUSSION

The purpose of this study was to find variables which could be used in predicting the extent of sick-leave among patients with back and neck problems. The strongest risk factor was, as was foreseeable, lengthy sick-leave before intervention. This result confirms previous findings. For example, Ekberg & Wildhagen (7) found that days of sick-leave during the preceding year was positively associated with days of sick-leave after rehabilitation among patients with neck and shoulder disorders. Similarly, the results of the present study also support the findings by Svensson (32) and Sandström (27). The fact that the measure of sick-days included all sick-leave, not just specific sick-leave owing

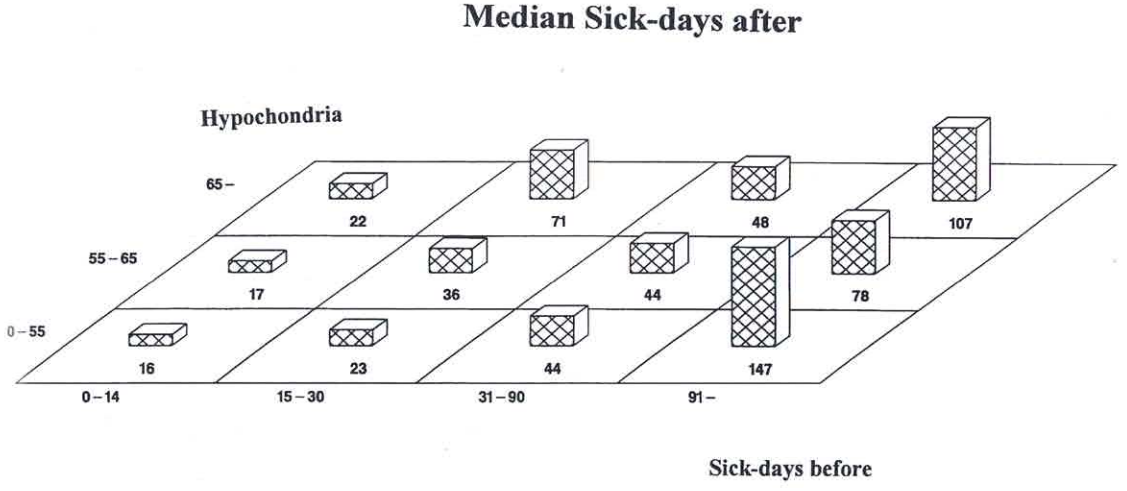

Fig. 1. Median "Sick-days after" in relation to "Sick-days before" and "hypochondria".

Table IV. *Results of stepwise regression analysis for the dependent variable "Sick-leave difference" (n=240)*

Variable	Parameter estimate	Standard error	*F*	*p*-value
Intercept	8.00	13.61	0.35	0.5571
Sick-leave before	–0.36	0.11	10.44	0.0014
Sleep disturbance	47.78	14.25	11.24	0.0010

to back and neck problems, is of no importance in this context, as shown by Westrin (38).

The results indicated that insomnia had a strong predictive value of risk of sick-leave, a fact that has been shown by Esbjörnsson (9) and Rubenowitz & Norrgren (25). The latter found that, in a group of back patients, 55% reported always or frequently experiencing sleeping disturbance, whereas only 13% in the control group reported the same. The average values for all MMPI variables are higher for the back patients compared with the reference values. Our results, which showed increased values in the so-called neurotic triad, confirm earlier findings among pain patients (13, 24, 29).

However, the connection between pain and personality is not linear but rather multifactored and multifaceted. Psychological and psychosocial vulnerability increases the risk of developing chronification of pain, and chronic pain, in turn, reinforces certain personality traits. It is thus important to be able to identify vulnerable individuals at an early stage. It is essential that the physiotherapist is able to examine patients at risk of long-term disability as early as possible in the intervention process. Results from a study of early intervention in cases of patients with acute musculo-skeletal problems show that the effects of intervention reduced the length of sick-leave among first-time patients, whereas relapse patients showed no difference (21). This confirms both earlier results (11, 14) as well as the results from this study, stating that length of sick-leave during the year before intervention is a strong predictor of future sick-leaves. The results of the discriminant function analysis showed that psychological and psychosocial factors at work and at home have strong predictive value. Patients with an increase in sick-leave the year after intervention were those with difficulties at home and work. They had more children and larger families, and had siblings suffering from pain. The latter fact shows that some psychosocial factors have an effect on individuals, and that "the language of pain" may reflect family relations during childhood (30).

Table V. *Summary of discriminant function analysis*

Variable	Wilks' lambda	*F*-remove	*p*-value
Pain drawing	0.8754	12.5055	0.0005
Children at home	0.8500	6.8356	0.0097
Family members	0.8510	7.0544	0.0086
Change of work	0.8430	5.2715	0.0228
Siblings' pain	0.8482	6.4220	0.0121
Pain frequency	0.8503	6.8946	0.0094
Sleep disturbance	0.8480	6.3896	0.0123

$n = 191$
Wilks' lambda: 0.81941.
approx. F (7.183) = 5.7615.
$p < 0.0001$

It seems clear that health professionals need to be aware of the influence of psychosocial factors in understanding patients with musculo-skeletal disorders. Klaber Mofett & Richardson (18) also suggested that greater awareness of the role of psychological influences in pain could help maximise treatment effects. We would suggest that a high degree of cooperation between physiotherapists and psychologists could be recommended at an early stage. By investigating both somatic and psychosocial factors in order to ensure adequate intervention from the very beginning, the individual and society could probably be saved a great deal of monetary and emotional cost.

CONCLUSIONS AND IMPLICATIONS

This study has identified some of the factors which may be of importance to the early detection of risk patients. The implication of this study is that physiotherapists, along with other health professionals, have an important function in identifying risk factors in long-term disability among patients with back pain. The physiotherapist should intervene at an early stage in order to ensure proper intervention and a successful outcome thereof.

Note: Interested readers may obtain a full list of variables and complete tables upon request from AHI, at the address below.

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REFERENCES

1. Aronoff, G., McAlary, P. W., Witkower, A. & Berdell, M.: Pain intervention programs: Do they return workers to the workplace? Occup Med *3*: 123–136, 1988.
2. Bigos, S. J., Battié, M. C., Spengler, D. M., Fisher, L. D., Fordyce,W. E., Hansson, T. H., Nachemsson, A. L. & Wortley, M. D.: A prospective study of work perceptions and psychosocial factors affecting the report of back injury. Spine *16*: 1–6, 1990.
3. Bonsall, J. L., Squier, J. E. O., Baron, C. A. & Parker, G.: Effect of physiotherapy on sickness absence in industry: A comparative study. Soc Occup Med J *41*: 176–180, 1991.
4. Bradley, J. V.: Distribution-Free Statistical Tests, pp. 68–76, Prentice-Hall, London, 1968.
5. Deyo, R. A. & Tsui-Wu ,Y. J.: Functional disability due to back pain. Arthritis Rheum *30*: 1247–1253, 1987.
6. Ekberg, K. & Linton, S. J.: Tidig rehabilitering inte entydigt positivt [Early rehabilitation not always positive]. Läkartidningen *91*: 969–972, 1994 (in Swedish).
7. Ekberg, K. & Wildhagen, I.: Long-term sickness absence due to musculoskeletal disorders: The necessary intervention of work conditions. Scand J Rehab Med *28*: 39–47, 1996.
8. Eklund, G. & Seeger, P.: Massignifikansanalys [Analysis of mass significance]. Statistisk tidskrift *3*: 355–365, 1965 (in Swedish).
9. Esbjörnsson, E.: Personlighet och smärta. Psykologiska faktorers betydelse för arbetsåtergång hos patienter med kroniska ländryggsbesvär [Personality and pain: Psychological factors of prognostic value for return to work among low back pain patients]. Dissertation, University of Göteborg, 1984 (in Swedish).
10. Gentry, W. D., Shows, W. D. & Thomas, M.: Chronic low back pain: A psychological profile. Psychosomatics *15*: 174–177, 1974.
11. Gustavsson, E., Klingberg-Olsson, K. & Hellzén Ingemarssson, A.: En jämförande studie av sjukgymnastiska gruppbehandlingsmodeller för patienter med akuta och subakuta rygg- och nackbesvär [A comparative study of physiotherapeutic treatments in groups for patients with back pain]. Rapport till Arbetsmarknadsförsäkringar, Stockholm, 1994 (in Swedish).
12. Hanvik, L. J.: MMPI profiles in patients with low-back pain. J Consult Psychol *15*: 350–353, 1951.
13. Hathaway, S. R. & McKinley, J. C.: Minnesota Multiphasic Personality Inventory. University of Minnesota. The Psychological Coorporation, New York, 1967.
14. Hellzén Ingemarsson, A., Sivik, T. & Nordholm, L.: Sick-leave among patients with lumbar and cervical pain: relationship to previous sick-leave, education, nationality, sleep disturbances and pain experience. Physiother Theory Practice *12*: 143–149, 1996.
15. Holmström, E.: Musculo-skeletal disorders in construction workers related to physical, psychological and individual factors. Dissertation, University of Lund, 1992.
16. Isacsson, A., Hansson, B. S., Janzon, L. & Kugelberg, G.: The epidemiology of sick leave in an urban population in Malmö, Sweden. Scand J Soc Med *20*: 234–239, 1992.
17. Johansson, J. Å.: Psychosocial factors at work and their relation to musculosceletal symptoms. Dissertation, University of Göteborg, 1994.
18. Klaber Mofett, J. A. & Richardson, P. H.: The influence of psychological variables on the development and perception of musculoskeletal pain. Physiother Theory Practice *2*: 3–11, 1995.
19. Klingberg-Olsson, K., Hellzén Ingemarsson, A. & Sivik, T. M.: Psykologisk sårbarhet och kronifiering av rygg- och nackbesvär [Psychological vulnerability and development of chronic back pain]. Sjukgymnasten. Vetenskapligt Suppl *1*: 1994 (in Swedish).
20. Lansinger, B., Nordholm, L. & Sivik, T.: Characteristics of low back pain patients who do not complete physiotherapeutic intervention. Scand J Caring Sci *8*: 163–167, 1994.
21. Linton, S. J., Hellsing, A. L. & Andersson, D. A.: A controlled study of the effects of an early intervention on acute musculo-skeletal pain problems. Pain *54*: 353–359, 1993.
22. Mantel, N.: Chi-square test with one degree of freedom. Extension of the Mantel-Haenszel procedure. J Am Stat Ass *59*: 690–700, 1963.
23. Melzack, R.: The McGill Pain Questionnaire: Major properties and scoring methods. Pain *1*: 277–299, 1975.
24. Ransford, A. O., Cairns, D. & Mooney, V.: The Pain drawing as an aid to the psychologic evaluation of patients with low-back pain. Spine *1*: 127–134, 1976.
25. Rubenowitz, S. & Norrgren, F.: Olika medinflytandeformers effekter. En studie vid 10 tillverkningsföretag [The effects of different forms of participation in decision-making. A study of 10 manufacturing businesses]. Dept. of Psychology, University of Göteborg, 1980 (in Swedish).
26. Rydén, O., Lindal, E., Udén, A. & Hansson, B.: Differentiation of back pain patients using a pain questionnaire. Scand J Rehab Med *17*: 155–161, 1985.
27. Sandström, J.: Clinical and social factors in rehabilitation of patients with chronic low back pain. Scand J Rehab Med *18*: 35–43, 1986.
28. Sivik, T. M., Gustafsson, E. & Klingberg-Olsson, K.: Differential diagnosis of low-back pain patient. A simple quantification of the pain drawing. Nord J Psychiatry *46*: 55–62, 1992.
29. Sivik, T. M., Röjwall, S., Gustafsson, E., Klingberg-Olsson, K., Wagner, A. & Delimar, N.: Relationship between back pain and personality. Nord J Psychiatry *46*: 189–193, 1992.
30. Sivik, T. M. & Teorell, T. (eds.): Psychosomatic medicine. Studentlitteratur, Lund, 1995 (in Swedish).
31. Skovron, M. L., Szpalski, M., Nordin, M., Melot, C. & Cukier, D.: Sociocultural factors and back pain. A population-based study in Belgian adults. Spine *19*: 129–137, 1994.
32. Svensson, H. O.: Low back pain in forty-seven year old men. II. Socio-economic factors and previous sickness absence. Scand J Rehab Med *14*: 55–60, 1982.
33. Svensson, H. O.& Andersson, G. B. J.: Low back pain in forty to forty-seven year old men. I. Frequency of occurrence and impact on medical services. Scand J Rehab Med *14*: 37–53, 1982.
34. Taylor, P. J.: Personal factors associated with sickness absence. Br J Ind Med *25*: 106–118, 1968.
35. Tellnes, G., Bruusgaard, D. & Sandvik, L.: Occupational factors in sickness certification. Scand J Prim Health Care *8*: 37–44, 1990.

36. Theorell, T., Harms-Ringdahl, K., Ahlberg-Hultén, G. & Westin, B.: Psychosocial job factors and symptoms from the locomotor system—A multicausal analysis. Scand J Rehab Med *23*: 165–173, 1991.
37. Vällfors, B.: Acute, subacute and chronic low back pain. Dissertation, University of Göteborg, 1985.
38. Westrin, C.-G.: Low back sick-listing. A nosological and medical insurance investigation. Acta Socio-Medica Scandinavica *2-3*: 127–134, 1970.

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Address for offprints:

Annika Hellzén Ingemarsson
Banaliden 10
SE-436 45 Askim
Sweden