THE SWEDISH BACK SCHOOL IN CHRONIC LOW BACK PAIN II

Part II. Factors Predicting the Outcome

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ABSTRACT. The aim of the study was to analyse the factors predicting the outcome of the Swedish back school and spontaneous recovery in chronic low back pain. The predicting variables describing the treatment group ($n=95$) and the control group ($n=93$) at the initiation of study included sociodemographic factors, variables related to work, severity of low back pain, and a number of clinical measurements and evaluations. The Oswestry Low Back Pain Disability Questionnaire was used for judging recovery factors. It was found that the best predictor for the outcome of the treatment and for spontaneous recovery was work satisfaction.

Key words: low back pain, back school, outcome study.

Factors affecting the outcome of the back school have been little researched. Still, it is important to characterise these factors because the back school regimen (like any therapy) has prerequisites of its own regarding patients and other variables if the optimum outcome is pursued.

An important dimension to be considered in the context of the back school is the acuteness and chronicity of the patient's condition. Bergquist-Ullmann & Larsson (2) reported a favourable outcome of the back school in the treatment of (sub) acute stages of low back pain (LBP). The patients of the study were selected among the employees of Volvo. On the other hand, Lindequist et al. (8) did not obtain similar results with the Swedish type of back school among acute low back pain patients. The authors considered the lack of expected positive outcome of the treatment to have been due to heterogeneity of the patient series of the study. Lankhorst et al. (7) studied the benefits of the Swedish type back school in chronic LBP. They concluded that the back school should be administered at early stages of the disease, in chronic LBP the back school no longer helps. In the first part of the present study (5) it was shown that the back school was successful in reducing subjective scores of pain and disability in mild or moderately severe chronic or recurrent low back pain female subjects.

The purpose of this part of the study was to analyse which factors predicted the outcome of treatment once the back school regimen was instituted. Interest was focused on predictors which are easily available at the initiation of treatment.

PATIENTS AND METHODS

Patients. The number of subjects included in the study was initially 204 of which 188 completed the study (95 in the treatment group and 93 in the control group). This part of the study concerns 177 subjects out of 188 (11 subjects had incomplete data in the criterion index, i.e. the Oswestry Low Back Pain Questionnaire). The main criterion for the subjects was the presence of a low back pain syndrome which had lasted for at least one year and which had given symptoms during the month preceding the initial examination. All the subjects were female. The patient series is described in detail in the first part of the study (5).

The patients in the treatment group attended a 60-min education and exercise session six times in the course of three weeks. A review class of 2×60 min took place six months after the back school proper. The patients in the control group were given the instruction material of the back school (a 15-page hand-out), but no actual treatment was administered to the control group. These subjects were, nevertheless, free to use the health care services they were accustomed to.

For the analysis the subjects were divided into four groups: "good responders" in the treatment group (T+) and in the control group (C+), and "poor responders" (T− and C−, respectively) according to the change in the results of the Oswestry Low Back Pain Questionnaire (4) during the 12-month follow-up. "Good responders" showed improvement according to this index whereas "poor responders" showed deterioration or no change during the follow-up.

The predictors of the outcome in this analysis were:

1) sociodemographic factors: age; level of professional education (1 = no training, ..., 4 = technical institute or respective),

2) variables related to work: physical strenuousness of work (a subjective score, 1 = light work, ..., 6 = very strenuous work); work satisfaction (a sum index of 10 items) (Table III),

Table I. *Means and standard deviations of the discrimination function among good responders and poor responders in the treatment group (T+ and T−) and the control group (C+ and C−), and number of subjects*

	Mean and SD
Treatment group	
T+ ($n=44$)	0.428±1.086
T− ($n=43$)	−0.372±1.080
Control group	
C+ ($n=37$)	0.463±0.901
C− ($n=53$)	−0.376±0.921

3) severity of low back pain: use of analgesic drugs during the month preceding the intervention; total duration of sick leaves due to low back pain during the preceding year,

4) eight clinical measurements and evaluations: mobility of the spine forward in which the mobility of the lumbar section of the spine (forward flexion 1) and flexion of the whole spine (forward flexion 2) were summed; lateral flexion of the spine (flexion to the right and left were summed); ability to do squats (max 10 times); dynamic trunk muscle strength (the results of back muscle and stomach muscle exercises were summed, max 20 times); static trunk muscle strength (dynamometrically measured trunk extension and flexion strength summed); number of painful standard spots on palpation of the shoulder-neck area (max 8); the number of painful standard spots on palpation of the lumbar area; body-mass index (weight/height^2).

Statistical methods. The predictors of outcome of treatment and the predictors of spontaneous recovery were studied by means of discrimination analysis. The *t*-test for comparison of means of independent samples was also used.

RESULTS

There were three functions in the discrimination analysis, and one of them was statistically significant $\chi^2_{(16)}=26.40$, $p<0.05$. The means and standard deviations of this function among "good responders" and "poor responders" are presented in Table I. From the mean values one can see that this function, i.e. these predictors, differentiate the "good responders" and "poor responders" both in the treatment group and in the control group.

The correlation of each predictor with the discrimination function is presented in Table II. The highest correlation is shown by "work satisfaction" (0.760). This correlation is far above the others, which means that the alleviation of low back pain is primarily dependent on the patient's attitude towards her work. The more content the subject was with her work, the better the chance of her recovery. Some correlation

with the discrimination function was also shown by the duration of sick leaves due to low back pain (0.322) and dynamic trunk muscle strength (−0.249).

Once work satisfaction proved to be the best predictor the index of work satisfaction was studied further. In the treatment group, the means and standard deviations of the index for "good responders" and "poor responders" were 17.8±7.7 and 13.4±7.5, respectively ($p<0.01$). In the control group, the corresponding figures were 18.4±6.6 and 14.0±7.0 ($p<0.01$).

The means and standard deviations of each item of this index for "good responders" and "poor responders" are presented in Table III. The trend observed in the sum index was repeated in every single item in the treatment group, and even in the control group, except for the item "I can ascend in my career". Statistically the most significant differences between "good" and "poor responders" were observed in the treatment group for the items "I can get training ($p<0.01$) and "I can communicate with other employees" ($p<0.01$).

The correlation between Oswestry's index at the beginning of the follow-up and the work satisfaction index was low in both the treatment group (0.015) and the control group (0.009).

DISCUSSION

The most important predictor of the outcome of the treatment as well as of spontaneous recovery was the work satisfaction index. The results suggest that work satisfaction is strongly associated with the

Table II. *Correlations between the discrimination function and the variables predicting the outcome*

	Correlation
Age	−0.149
Level of professional education	0.185
Physical strenuousness of work	−0.226
Work satisfaction	0.760
Use of analgesics	−0.165
Duration of sick leaves	0.322
Forward flexion of the spine	0.032
Lateral flexion of the spine	0.087
Ability to do squats	−0.128
Dynamic trunk muscle strength	−0.249
Static trunk muscle strength	0.069
Painful spots in the shoulder-neck area	−0.185
Painful spots in the lumbar area	0.077
Body-mass index	0.129

Table III. *The items of work satisfaction index (Tuomi et al. 1985), and the means ($\bar{x}$) and standard deviations (SD) of each item in good responders and poor responders in the treatment group (T+ and T−) and the control group (C+ and C−). Significance between good and poor responders*

	T+ $\bar{x}$ SD	T− $\bar{x}$ SD	C+ $\bar{x}$ SD	C− $\bar{x}$ SD
Scoring: 0 = not at all true, ..., 3 = very true				
I can get guidance at work	1.9 1.0	1.7 0.9	1.8 1.0	1.5 1.0
I can influence my working environment and working plan	1.4* 1.0	0.9 0.9	1.4 1.0	1.1 1.0
I can learn new things and develop myself	1.8* 1.1	1.2 1.1	1.7* 0.8	1.2 1.0
I can use my capabilities and talents	1.7 1.1	1.3 1.0	1.6 0.9	1.3 1.1
I can get positive feed-back and respect in my work	1.4 0.9	1.2 0.9	1.5 0.9	1.2 1.0
I can freely communicate with other employees	2.6** 0.5	2.2 0.7	2.5 0.6	2.3 0.8
I can see the meaning of the results of my work	2.0 0.9	1.6 0.8	1.9 0.8	1.8 1.1
I can ascend in my career	1.3* 1.2	0.7 0.9	0.8 0.9	0.9 1.1
I can get training to enhance or to preserve my working skills	1.8** 1.1	1.2 1.1	1.4 1.0	1.3 1.1
I enjoy my work	2.1 0.8	1.9 0.9	2.4* 0.6	2.1 0.8

* = p<0.05 and ** = p<0.01.

changes in subjective functional capacity of chronic low back pain patients.

Looking at the individual items, one finds that the observed difference between "good" and "poor responders" is rather consistent throughout, pointing to good internal reliability of the index. Statistically the most significant differences were observed in the treatment group for the items "I can get training" and "I can communicate with other employees". In a broader context, the latter stresses the importance of social support gained through other workers. "I can get further training" is logically connected with the items "I can influence my working environment" and "I can ascend in my career". They all indicate positive occupational development and convey positive prospects (promises of a better future).

The association between work satisfaction and low back pain has also been recognized in the earlier studies. Alaranta (1) found that work satisfaction was associated with the degree of disability caused by low back pain (all the patients had undergone back surgery). According to Vällfors (10), work satisfaction was associated with the duration of sick leave for low back pain. Bergquist-Ullman & Larsson (2) found that LBP patients reporting dissatisfaction with their jobs had had a longer initial episode and

longer absence from work than satisfied patients. Dissatisfaction with the working environment was also associated with a longer absence from work both during the initial episode and during recurrences. Järvikoski & Puumalainen (6) found that the relationship between work satisfaction and LBP was more pronounced with men than women. In the present study, the correlation between work satisfaction and the disability caused by low back pain was low at the beginning of the study, whereas the correlation between work satisfaction and the change in the disability caused by low back pain was significant.

Esbjörnsson (3) studied psychological factors of prognostic value as to the return to work among low back pain patients. She compared those patients who after rehabilitation return to work (working group) with those still on sick leave (sick-listed group). In that study, work satisfaction did not differ between the groups. The author emphasized, instead, differences of the personality structure between the groups. The less self-confident, more rigid, intraceptive, succorant patients with a more negative self-image in the sick-listed group were interpreted as more vulnerable than the patients in the working group. This may refer to the fact that the role of work satisfaction may vary according to the severity of low

back pain and status of employment. If the condition is very difficult and the ability to work is under threat, work satisfaction is no more relevant.

From a treatment point of view, work satisfaction is a complicated issue; one can hardly direct therapy on such a basis. On the other hand, if indeed the back school gains therapeutic value through factors such as social support, this knowledge might be utilised in developing the back school. The requirement of homogeneity, as suggested by Lindequist et al. (8), and the role of social support are quite obviously linked. Assumably it is easier to get social support from people with a similar social background.

As for the other results of this study, it was found that the total duration of sick leaves due to low back pain was associated with a positive outcome of treatment or of spontaneous recovery. The more sick leaves, the better the outcome. This result may have been mainly caused by spontaneous recovery, as the patients with the most sick leaves during the year preceding the initial examination, who were still working one year later, were likely to show a great deal of recovery.

In conclusion, the work satisfaction index was a better predictor of the outcome of treatment and of spontaneous recovery than any clinical evaluation or objective measurement. The result suggests that a variety of psychosocial factors may have to do with the outcome of the treatment or of spontaneous recovery of low back pain patients. This calls for particular attention to the social network of the occupational environment.

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