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Nonorganic pain drawings are associated with low psychological scores on the preoperative SF-36 questionnaire in patients with chronic low back pain

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Abstract The Short Form 36 questionnaire (SF-36) measures general health and well-being. Within the last 5 years it has been used increasingly to characterise patients in the medical literature. Relatively few studies have used the SF-36 on patients with chronic low back pain undergoing preoperative evaluation, but results suggest that it may be predictive of surgical outcome. Pain drawings are a routine part of evaluation prior to spinal surgery in several centres, since their classification of organic or nonorganic has been shown in some studies to correlate well with psychological characteristics predicting poor outcome. The purpose of the present study was to assess possible correlations between nonorganic pain drawings and the psychological scales in the SF-36. We included 128 patients in the study, all of them referred from other hospitals. Previous spinal surgery had been undergone by 25%, and 59% required daily medication because of low back pain. All patients completed pain drawings using predefined symbols. These pain drawings were scored dichotomously as organic or nonorganic based on a brief description of a typical nonorganic characteristics.

Patients also completed the Danish version of the SF-36 questionnaire. Statistical analysis was performed using logistic regression analysis. The pain drawing classification was used as the dependent variable and scores on the eight scales of the SF-36 as independent variables. *P* values of <0.05 were considered significant. The mean scores of the patient population on all eight scales were significantly lower than Danish norms. The only scales that correlated with the presence of nonorganic pain drawings were emotional role (RE) and mental health (MH), both measuring psychological health. The odds ratio (OR) of receiving a nonorganic pain drawing was 22 (95% confidence interval, or CI, 7–65) if the scores on RE and MH were more than 2 standard deviations (SD) below the Danish norm. This is the first study providing evidence that pain drawing ratings are influenced by the psychological scales of the SF-36. The clinical relevance of this observation regarding prediction of outcome after spinal surgery should be assessed in future studies.

Keywords SF-36 · Pain drawing · Nonorganic

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Introduction

There are several indications that abnormal pain behaviour leads to discouraging outcome after spinal surgery. There-

fore, tools for such assessment are greatly needed. The Short Form 36 questionnaire (SF-36) is a self-administered instrument for measuring general health and well-being. It has gained popularity during the last 5 years in epidemiological, medical, and surgical contexts [13, 14, 19].

The SF-36 consists of eight scales, four each measuring physical health and psychological health [27]: physical function (PF), physical role (PR), bodily pain (BP), and general health (GH) and vitality (VT), social function (SF), emotional role (RE), and mental health (MH). Most people over 16 can complete the questionnaire in 5 to 10 min. The result is presented as a profile of the eight scales with scores from 0 to 100, with a higher score representing better health. Some advantages of this instrument are its extensive validation and the existence of age-matched normative data from large populations. Comparative data for various specific diseases are also underway. Furthermore, the International Quality of Life Assessment (IQOLA) Project [1] ensures that translations of the questionnaire are performed according to standardised principles, making international comparisons possible.

Within the last few years, an increasing number of studies in orthopaedic surgery have used SF-36 for outcome measurement [3, 4, 12, 17,23], often in combination with disease-specific questionnaires. Grevitt et al. [11] introduced the SF-36 in spinal surgery in 1997. Since then a limited number of studies have used it in outcome studies after spinal surgical procedures. Albert et al. [2] demonstrated improvements on four of the eight scales after fusion for scoliosis, and Glassman et al. [8] reported that results from the preoperative SF-36 can predict the risk of reoperation after lumbar spine fusion.

One factor that may carry predictive value of success after spinal surgery is the preoperative psychological characteristics of the patient. Wiltse et al. [28] demonstrated that high scores measuring "hypochondriasis" and "hysteria" of the Minnesota Multiphasic Personal Inventory (MMPI), among several indicators, were predictive of poor outcome after chemonucleolysis. Ransford et al. [22] demonstrated that for patients with low back pain, an abnormal way of depicting their symptoms on a silhouette of the human body is associated with elevated scores on the same two scales of the MMPI. Based on a detailed scoring system assigning penalty points for features such as markings outside the silhouette and the use of arrows, the pain drawings were classified as organic and nonorganic. This scoring system is, however, time consuming, and therefore Mann et al. [16] suggested a system based on short verbal description of a typical nonorganic pain drawing, resulting in a simple dichotomous classification of the pain drawing based on initial impressions. However, results in the literature are still conflicting as to whether pain drawings reflect psychological distress to the same extent as classical psychological instruments.

The purpose of the present study was to investigate possible correlations between patient drawings of nonorganic pain after simple dichotomous assessment and the psychological components of the SF-36 questionnaire in cases of chronic low back pain referred for surgical evaluation.

Material and methods

A total of 128 patients were included in the study, 73 women and 55 men. Median age was 60 years (16–88), and the median pain duration was 3 years (1–38). All patients were referred from other hospitals, with none referred from general practitioners. Twenty-five per cent had undergone previous spinal surgery, primarily for disc herniation, and 59% required daily medication because of low back pain.

All patients completed pain drawings on a silhouette of the human body with a written instruction to depict their symptoms using a set of predefined symbols. The pain drawings were classified as organic or nonorganic according to the principle described by Mann et al. [16]. A typical nonorganic pain drawing is characterised by one or more of the following characteristics:

- An excessive number of pain markings
- A wide distribution of marks over many anatomic regions
- Marks outside the silhouette
- Disregard of instructions on what symbols to use

All patients were also asked to complete the Danish version of the SF-36 questionnaire developed by Bjørner et al. [5].

Statistical methods

Statistical assessment was performed with forward stepwise logistic regression analysis using version 6.1 statistical software (SPSS, Holte, Denmark). Classification of the pain drawing was used as the dependent variable (0=organic, 1=nonorganic). The independent variables were defined as the scores on the eight scales of the SF-36. *P* values of <0.05 were considered significant.

For overall evaluation of the SF-36 results, the mean scores for all patients for each of the eight scales were used. According to Cohen [7], a sample size of 128 enables detection of a difference of at least 10 points between a group mean and a fixed norm, a *P* value of 0.05, and a power of 80%. The Danish normative data for individuals older than 16 were used [5].

The study was approved by the local ethics committee.

Results

Forty-five pain drawings were classified as nonorganic, corresponding to an incidence of 35% among these patients. Figure 1 shows the overall results of the SF-36 compared with Danish norms. On all eight variables, pa-

Table 1 Results of logistic regression analysis. *OR* odds ratio, *CI* confidence interval, *RE* emotional role, *MH* mental health

SF-36 variable	Patients with scores >2 SD below Danish norm (%)	OR of having a nonorganic pain drawing ^a	<i>P</i>	95% CI
RE	34	6.9	0.0001	2.6–18.1
MH	43	4.8	0.0003	1.7–12.3
RE and MH	26	22.0	<0.0000	7.5–65.0

^aCompared to patients scoring within 2 SD of the Danish norm, e.g., an OR of 6.9, indicates that patients who score below 2 SD of the Danish norm on the RE scale have a 6.9-fold probability of having a nonorganic pain drawing compared to patients within 2 SD of the norm

tients in the present series had scores more than 10 points below the norm ($P=0.05$) [27].

The only scales of the SF-36 that correlated with the presence of a nonorganic pain drawing were those of emotional role (RE) ($P=0.0001$) and mental health (MH) ($P=0.0027$). Both scales measured psychological health. The results, expressed as odds ratios (OR), and corresponding P values are shown in Table 1.

Discussion

To our knowledge, this is the first study to establish a positive correlation between nonorganic pain drawings and reduced scores on the psychological variables of the SF-36.

The number of nonorganic pain drawings in the present study corresponds to an incidence of 35%. This is within the range of other studies. There is, however, great variation in the incidence of nonorganic pain drawings [6, 20, 22, 25, 26]. These differences are caused by several factors including variations in patient population and educational background of the observers. Also, there are different methods of interpreting the pain drawings. The method used in this study is modified from that suggested by Udén et al. [25], which includes four categories for evaluating pain drawings: nonorganic, possibly nonorganic, possibly organic, and organic, demonstrating a very low intraobserver variation. The modification into a dichotomous classification in the present study was done for statistical reasons and because it is more applicable to a clinical setting.

A number of studies have disputed the value of pain drawings for assessing psychological characteristics in patients with chronic low back pain. Parker et al. [21] evaluated three methods of scoring pain drawings, comparing their ability to predict psychological distress. The authors conclude that none of them could identify distressed patients with an acceptable degree of sensitivity or specificity. They do, however, report a relatively low false positive rate of 6.5% (i.e. patients incorrectly classified as distressed on pain drawing). Von Bayer et al. [26] also disputed pain drawings as a method of assessing psychological involvement in low back pain, since more than half of the patients meeting the MMPI criteria for psychological distress were incorrectly identified as normal. Inspection of the raw data reveals that the predictive value of the pain drawing regarding normal MMPI scores was 80%. A similar result was obtained by Greenough and Fraser [10], who assessed eight psychometric instruments in 274 patients. Although pain drawings had a sensitivity of only 42% in detecting patients with psychological disturbances, the specificity was 91%. These studies indicate that pain drawings alone are suitable for identifying patients *without* psychological distress, but that the drawings should be combined with another instrument to define patients *with* psychological distress. The SF-36 could prove to be such an instrument.

Grevitt et al. [11] introduced the use of SF-36 in spinal surgery. Comparing it with the Oswestry Disability Index, they found a significant correlation between all SF-36 variables and scores of disease-specific questionnaires, with the weakest correlation in mental health items. Taylor et al. [24] also included the Oswestry Disability Index in their comparison with the SF-36 and concluded that the individual scales of the SF-36 showed equal or greater sensitivity to change in patients with low back pain and sciatica after both conservative and surgical treatment. Combined with our findings, this could indicate that the SF-36 together with pain drawings is a powerful tool for evaluating possible candidates for spinal surgery.

The SF-36 as a predictor of success after surgical treatment in patients with chronic low back pain is relatively new. Glassman et al. [8] showed that low preoperative scores on the scales measuring social function and pain were predictive of reoperation in patients undergoing lumbar spinal fusion. In a prospective study, the same group assessed the SF-36 as a measurement of outcome after lumbar fusion in patients with prior lumbar discectomy [9]. One year postoperatively, there was statistically significant improvement on the scales measuring physical and social function and bodily pain. The present study was not designed to assess the combination of pain drawings and SF-36 regarding prediction of surgical outcome, but our results suggest that such a study is relevant.

The fact that norm data has been developed also makes cross-sectional studies possible. Nork et al. [18] used the SF-36 to assess outcome in a group of patients who had undergone instrumented spinal fusion for degenerative spondylolisthesis. Ninety-three per cent of the patients were satisfied with outcome and, on seven of the eight variables of the SF-36, there was no difference between the study group and the general population. This indicates that the SF-36 is sensitive enough to be used for outcome measurement in spinal surgery. It is, however, suggested that it be used in combination with disease-specific questionnaires.

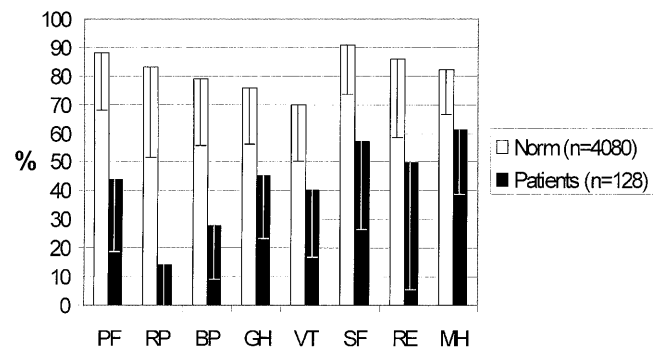


Fig. 1 Overall result of the SF-36 questionnaire. The X axis illustrates the eight variables of the SF-36, and the Y axis indicates mean score for each variable in the two populations. Vertical line within each bar indicates 1 SD

The overall results of the SF-36 in the present study shows that the mean scores on all eight scales are lower than Danish norm data by more than 10 points (Fig. 1), which is significant at the 5% level. This corresponds to previous data on a Danish population with chronic low back pain [15].

Logistic regression analysis revealed that only two variables fit the logistic model, RE and MH, both measuring psychological well-being. Table 1 presents the results as odds ratios (OR) and illustrates that a score within 2 standard deviations (SD) of the Danish norm on one of these variables greatly increases the probability of having a nonorganic pain drawing. This is even more pronounced if both scores are less than 2 SD of the Danish norm, illustrated by an OR of 22 for the combination of low RE

and MH and the probability of having a nonorganic pain drawing. The relatively wide confidence interval (CI) reflects the limited statistical power of small studies. This could also explain why only two of the four psychological variables fit into the model.

We conclude that there is a correlation between low scores on the psychological scales of the SF-36 and the presentation of nonorganic pain drawings in patients with chronic low back pain referred for surgical evaluation. Prospective studies are necessary to demonstrate the possible predictive value of combining these two instruments regarding success after spinal fusion.

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