

## ASSESSMENT OF PATIENTS WITH CHRONIC BACK PAIN USING THE “FUNCTIONAL STATUS QUESTIONNAIRE”

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**ABSTRACT.** Forty-eight patients with chronic back pain undergoing a rehabilitation program were assessed with the Functional Status Questionnaire (FSQ) during the first week of rehabilitation and after 6 weeks, 6 months and one year. In their first test, all the patients showed diminished functional capacity in at least one of five summary scales, indicating serious health problems and a need for rehabilitation. The test-retest correlation was  $k = 0.96$ , indicating high reliability of the questionnaire. After 6 weeks of rehabilitation the patients estimated significant improvements regarding “Satisfaction with health”, “Mental health” and “Number of close friends”. Some of these improvements were maintained after 6 months and one year. The “Basic ADL” and “Intermediate ADL” scales, however, showed no changes, indicating either low sensitivity or that no real changes had occurred during the rehabilitation period. The FSQ is recommended for use among patients with chronic back pain, but the tests need to be supplemented with other measurements concerning ADL capacity.

**Key words:** occupational therapy, rehabilitation, back pain, assessment, activities of daily living.

In 1990, a new day care unit for chronic back pain patients was opened at the Department of Rehabilitation Medicine, Karolinska Hospital, Stockholm. The rehabilitation follows a multidisciplinary teamwork approach. We looked for a reliable and valid assessment method for evaluating the program introduced (5), for measuring the patients' primary functional/impairment and ability/disability status. Secondly, we wished to obtain the patients' self-assessment of quality of life. Among many available assessment instruments, five translated into Swedish were considered. We found that the “Sickness impact profile” (1) was too extensive and that this and the “Nottingham health profile” (21) primarily measured quality of life. The “Arthritis impact measurement

scale” (14) and the “Fries index” (4) were primarily intended for patients with rheumatoid arthritis and not for those with chronic back pain. Our criteria were best fulfilled in the Functional Status Questionnaire (FSQ) (6, 9) and this scale was therefore chosen. With minor modifications the FSQ has been adapted to Swedish (3) cultural conditions.

The aims of the present study were to estimate the internal consistency of the FSQ and the correlation among its scales, and to determine its test-retest reliability and its usefulness for assessing functional status in chronic back pain patients immediately after a multidisciplinary rehabilitation program and at its 6-month and 1-year follow-ups.

### SUBJECTS AND METHODS

The FSQ was developed by researchers from Boston and Los Angeles (6) and was adapted from available instruments such as the Sickness Impact Profile (1), works by Stewart et al. (19), the Functional Status Assessment Instrument (7) and the Functional Status Index (FSI) (8).

The FSQ is a brief, self-administered screening questionnaire. Its purpose is to provide physicians (6, 15), physiotherapists (9) and nurses with indicators (5) of patients' physical, psychological and social role function, focusing on patterns of function/impairment and activity/disability performance status (WHO) (22).

The FSQ is a 34-item scale comprising six single-item scales (satisfaction with health, frequency of social contact, satisfaction with sexual relations, work situation, bed disability days and restricted activity days) and six summary scales (basic ADL, intermediate ADL, mental health, work performance, social activity and quality of interaction). The summary scales are ordinal Lickert scales. Basic ADL, intermediate ADL and social activity are scored from 0 to 4, Work performance from 1 to 4 (three items 4–1), Mental health from 1 to 6 (two items 6–1) and Quality of interaction from 1 to 6 (two items 6–1). A significant correlation exists between each of these six scales and seven variables estimated to measure function (9), respectively, and three health-related variables (3).

The questionnaire can be completed in the physician's waiting room (6), mailed (3) or used in a telephone interview (20). The collected data are analyzed using IBM-PC micro-computer software (13). The six summary scale scores are

calculated following an algorithm (6, p. 1855) to transform values ranging from 0 to 100:

$$SS = \frac{\sum_{i=1}^n (y_i) - n}{n} \times \frac{100}{k}$$

Where SS is the transformed FSQ scale score,  $y_i$  is the individual questionnaire response score,  $n$  is the number of questions in the scale for which valid information is available, and  $k$  is the maximum minus minimum valid response score.

Total functional ability has a score of 100. For each of the six summary scale scores, warning zones (15) tell the therapist how serious the functional disability is. The warning zones for all scales were produced from expert consensus statements, but the "mental health scale" is based on US population norms (6). The original version of the FSQ showed good internal consistency, with alpha coefficients ranging from 0.64 to 0.82 (6). In the Swedish version, the alpha coefficients range from 0.77 to 0.88 (3).

The FSQ has earlier been used in primary care for screening patients' functional status (6, 9), comparing different ratings of disability and handicap for poliomyelitis patients (3) and for evaluating elderly patients with critical aortic stenosis (20); but not with younger chronic back pain patients participating in a rehabilitation program.

The FSQ has not yet been used for assessing occupational therapy as a part of rehabilitation, where Activities of Daily Life (ADL) scales (11, 12, 10, 17, 18) are more common.

*Participants*

From January 1990 to June 1991, 48 patients with chronic back pain (36 women and 12 men), average age 39 years (26–57 years), followed a multidisciplinary rehabilitation program at the new Day Care Unit of the Karolinska Hospital Rehabilitation Clinic. Sixteen of the patients were Swedish speaking immigrants from Chile, Finland, Greece, Iran or Yugoslavia. None of the patients were in full-time work; 11 had part-time work or were students, and 37 were receiving sickness benefit. The participants had worked in child care ( $n=8$ ), health care ( $n=5$ ), cleaning ( $n=5$ ), clerical work ( $n=12$ ), assembly work ( $n=4$ ), shops ( $n=5$ ), house building ( $n=6$ ) and other jobs ( $n=3$ ).

*Study design*

A time-serial design with four dependent measurements was used. The participants ( $n=47$ ) completed the first self-

assessment (baseline assessment) regarding the FSQ scale in the ward or at home during the first week before the program began. The second assessment ( $n=48$ ) was run during the sixth week, i.e., immediately after the program was over. Follow-ups were mailed after about 6 months ( $n=45$ ), and one year ( $n=27$ ). The remaining patients have not yet been followed up for one year. The FSQ scale was completed by 44 participants for the three first assessments. In 8 additional patients the test-retest reliability of the FSQ was studied on two consecutive days at the first assessment. These patients did not participate in the study otherwise.

The earlier translated Swedish version (3) of the FSQ was used, with the following differences from the original: the two statements concerning "Intermediate ADL: Walking one block or climbing one flight of stairs, driving a car or using public transportation" were divided into two, and the statements about "Restricted activity days" and "Bed disability days" were excluded. A question "How many near friends or relatives do you have whom you like and can talk sincerely with?" was added. The FSQ version used consisted of 35 items; six single statements and six summary scales.

*Statistics*

The internal consistency of the FSQ was estimated with Cronbach's alpha coefficient (2). Pearson's correlation coefficient was used to estimate the correlation between the FSQ scales and the test-retest reliability measurement. The  $t$  test for dependent measures (assessments one, two and three) (the SAS computer system) (16) was used to estimate the difference between the time-serial measurements and the test-retest assessment.

RESULTS

The results of the FSQ baseline assessment are shown in Table I. The participants' statements place them within one to five of the five warning zones.

The means and standard deviations of the summary scales and the single FSQ items for the baseline assessment, the post-intervention assessment, the 6-month follow-up and the 1-year follow-up are presented in Table II. Here the baseline assessment

Table I. *The Functional Status Questionnaire (FSQ) base-line assessment (n=47)*

Note: every patient (except one) is represented in or at the level of the warning zone to at least one summary scale. The questions concerning "Work performance" are excluded because 37 patients were receiving sickness benefits and were not doing paid work at the time of the study.

| FSQ summary scales     | Range of the warning zone level | Patients' range points | Number of patients at or in the warning zone | Number of patients in the acceptable zone |
|------------------------|---------------------------------|------------------------|----------------------------------------------|-------------------------------------------|
| Basic ADL              | 0–89                            | 51–100                 | 41                                           | 6                                         |
| Intermediate ADL       | 0–72                            | 17–95                  | 33                                           | 14                                        |
| Social activity        | 0–78                            | 17–100                 | 31                                           | 16                                        |
| Mental health          | 0–66                            | 8–100                  | 31                                           | 16                                        |
| Quality of interaction | 0–61                            | 48–100                 | 10                                           | 37                                        |
| Work performance       | 0–75                            |                        |                                              |                                           |

Table II. *The mean, standard deviation and internal consistency (homogeneity) of the FSQ*

| FSQ summary scales and single items   | Number of items | Assessment 1 |     |      |      |          | Assessment 2 |     |      |      |          | $\alpha$ | Assessment 3 |      |      |      |          | Assessment 4 |      |      |      |          |
|---------------------------------------|-----------------|--------------|-----|------|------|----------|--------------|-----|------|------|----------|----------|--------------|------|------|------|----------|--------------|------|------|------|----------|
|                                       |                 | min          | max | mean | s    | $\alpha$ | min          | max | mean | s    | $\alpha$ |          | min          | max  | mean | s    | $\alpha$ | min          | max  | mean | s    | $\alpha$ |
| Basic ADL                             | 3               | 56           | 100 | 84.7 | 11.7 | 0.35     | 33           | 100 | 82.0 | 15.5 | 0.67     | 33       | 100          | 80.2 | 16.1 | 0.70 | 44       | 100          | 82   | 15.2 | 0.67 |          |
| Intermediate ADL                      | 8               | 12           | 95  | 63.3 | 11.4 | 0.84     | 22           | 100 | 65.2 | 17.7 | 0.80     | 33       | 100          | 63.1 | 19.1 | 0.85 | 4        | 100          | 65   | 23.0 | 0.80 |          |
| Social activity                       | 3               | 17           | 100 | 74.2 | 21.1 | 0.78     | 0            | 100 | 74.6 | 23.2 | 0.70     | 0        | 100          | 71.0 | 27.0 | 0.87 | 11       | 100          | 78   | 25.6 | 0.70 |          |
| Satisfaction with health              | 1               | 1            | 4   | 2.2  | 0.9  |          | 1            | 5   | 2.5  | 1.0  |          | 1        | 5            | 2.4  | 1.1  |      | 1        | 5            | 2.6  | 1.3  |      |          |
| Mental health                         | 5               | 8            | 100 | 57.7 | 22.1 | 0.89     | 15           | 96  | 63.3 | 20.0 | 0.90     | 0        | 100          | 59.3 | 24.7 | 0.90 | 16       | 100          | 67.7 | 18.5 | 0.84 |          |
| Quality of interaction                | 5               | 48           | 100 | 74.7 | 13.3 | 0.61     | 48           | 100 | 76.7 | 13.1 | 0.78     | 40       | 100          | 75.8 | 18.2 | 0.78 | 48       | 100          | 80.2 | 13.7 | 0.65 |          |
| Number of close friends and relatives | 1               | 1            | 15  | 7.3  | 3.9  |          | 0            | 15  | 7.6  | 4.0  |          | 2        | 15           | 8.2  | 3.7  |      | 4        | 15           | 8.7  | 3.3  |      |          |
| Frequency of social contact           | 1               | 2            | 6   | 5.2  | 0.9  |          | 2            | 6   | 5.1  | 1.9  |          | 2        | 6            | 5.2  | 1.0  |      | 2        | 6            | 5.2  | 1.0  |      |          |
| Satisfaction with sexual relations    | 1               | 1            | 5   | 3.8  | 0.8  |          | 2            | 5   | 3.4  | 0.8  |          | 1        | 5            | 3.4  | 1.1  |      | 1        | 5            | 3.8  | 0.8  |      |          |
| Work situation                        | 1               | 1            | 7   | 3.6  | 1.3  |          | 2            | 4   | 3.8  | 0.6  |          | 1        | 7            | 3.5  | 1.6  |      | 1        | 7            | 3.1  | 1.6  |      |          |

Table III. *Intra-correlations of the summary scales and of the single items of the FSQ scale. Assessment 1. (Pearson Correlation Coefficients)*

|                                       | Basic ADL | Intermediate ADL | Social activity | Satisfaction with health | Mental health | Quality of interaction | Nos. of close friends and relatives | Frequency of social contact | Satisfaction with sexual relation | Work situation |
|---------------------------------------|-----------|------------------|-----------------|--------------------------|---------------|------------------------|-------------------------------------|-----------------------------|-----------------------------------|----------------|
| Basic ADL                             |           |                  |                 |                          |               |                        |                                     |                             |                                   |                |
| Intermediate ADL                      | 0.61***   |                  |                 |                          |               |                        |                                     |                             |                                   |                |
| Social activity                       | 0.35**    | 0.71***          |                 |                          |               |                        |                                     |                             |                                   |                |
| Satisfaction with health              | -0.09     | 0.24             | 0.24            |                          |               |                        |                                     |                             |                                   |                |
| Mental health                         | 0.04      | 0.13             | 0.35*           | 0.32*                    |               |                        |                                     |                             |                                   |                |
| Quality of interaction                | 0.05      | 0.22             | 0.32*           | 0.23                     | 0.68***       |                        |                                     |                             |                                   |                |
| Number of close friends and relatives | 0.03      | 0.01             | 0.18            | 0.14                     | 0.25*         | 0.13                   |                                     |                             |                                   |                |
| Frequency of social contact           | 0.22      | 0.24             | 0.13            | -0.09                    | 0.09          | 0.25                   | 0.08                                |                             |                                   |                |
| Satisfaction with sexual relation     | 0.14      | 0.00             | 0.16            | 0.17                     | 0.39**        | 0.39**                 | 0.24                                | -0.03                       |                                   |                |
| Work situation                        | -0.07     | -0.20            | -0.20           | -0.19                    | -0.16         | -0.07                  | -0.13                               | 0.09                        | -0.27                             |                |
| Work performance                      | 0.04      | 0.18             | -0.07           | -0.58                    | -0.06         | -0.38                  | -0.13                               | 0.07                        | -0.16                             | -0.70          |

\* =  $p < 0.05$ .\*\* =  $p < 0.01$ .\*\*\* =  $p < 0.001$ .

Table IV. The overall changes of FSQ scores between post-test and base-line assessment and between follow-up and baseline assessment (t-test) of the FSQ, respectively

| FSQ summary scales and single items   | Mean 2-1 | Mean 3-1 | Mean 4-1 |
|---------------------------------------|----------|----------|----------|
| Basic ADL                             | -0.26    | -1.80    | -1.7     |
| Intermediate ADL                      | 2.51     | 1.14     | -2.0     |
| Social activity                       | 2.48     | -1.3     | -1.7     |
| Satisfaction with health              | 0.40*    | 0.29*    | 0.5*     |
| Mental health                         | 7.89**   | 4.76     | 9.4*     |
| Quality of interaction                | 1.72     | 1.26     | 3.0      |
| Number of close friends and relatives | 0.94**   | 1.11*    | 0.8      |
| Frequency of social contact           | 0.17     | 0.00     | -0.17    |
| Satisfaction with sexual relation     | 0.00     | 0.00     | 0.33     |
| Work situation                        | 0.08     | -0.22    | -0.36    |

includes the 8 additional participants mentioned above. The means of the FSQ variables had small variations and the standard deviations showed tendencies to greater individual variations over time.

Regarding the internal consistency (homogeneity) (Table II) of the FSQ summary scales, the alpha coefficients varied from 0.35 (basic ADL) to 0.90 (Mental health) in the baseline assessments. For the first two assessments (Table III), there was a significant correlation between five groups of the FSQ scales. The first group showed interaction between "Basic ADL", "Intermediate ADL" and "Social activity". The second group showed interaction between "Social activity" and "Mental health" and "Quality of interaction", and the third group an interaction between "Satisfaction with health" and "Mental health". In the fourth group the variables "Mental health" and "Quality of interaction" and "Number of close friends and relatives" and "Satisfaction with sexual relations" interacted, while in the fifth group "Quality of interaction" and "Satisfaction with sexual relations" showed significant correlation. The test-retest ( $n=8$ ) showed good general correlation ( $k=0.96$ ) between the first measurement and the second.

The relevance of the FSQ scale for chronic back pain patients following a multidisciplinary rehabilitation program is shown in Table IV. There were significant ( $p<0.05$ ) short-term improvements for FSQ scales "Satisfaction with health", "Mental health" and "Number of close friends and relatives". The other changes did not reach statistical significance. There was a significant ( $p<0.05$ ) long-term effect (6-month and 1-year follow-ups) for the summary scales "Satisfaction with health" and "Number of close friends" and "Mental health". The results of

assessing "Social activity" and "Work situation" showed a decrease between the end of the rehabilitation period and the 6-month follow-up.

## DISCUSSION

The FSQ scale is judged to be a useful instrument for chronic back pain patients taking part in a multidisciplinary rehabilitation program. In addition, the FSQ warning zones (Table I) help identify those patients in need of the rehabilitation program. The reliability measured by a test-retest after two days was satisfactory. A longer interval would have been preferable but in this study it was not possible because the patients' pain symptoms changed from week to week. The homogeneity of the FSQ variables seems to increase when the questionnaire is used repeatedly and the patients become familiar with its use. It is therefore recommended that one assessment should be run on referral and one at the beginning of the rehabilitation period. One advantage of the FSQ is that it covers many aspects of health. Of these, "Basic ADL" and "Intermediate ADL" are of special value for the occupational therapy member of the rehabilitation team. In any reorganization of the FSQ it is recommended that these two be combined since their intercorrelation is high ( $p=0.61^{***}$ ) (Table III) and the homogeneity of the variable "Basic ADL" is very low (alpha 0.35). Where the patient falls within the warning zone for the variables "Basic ADL" and "Intermediate ADL", an intervention program should be planned in occupational therapy.

Except for the first measurement of the "Basic ADL" variable, the internal consistency of the FSQ in this study (alpha 0.35-0.89) is comparable with that

found in previous studies (6, 3). This supports the assumption that the FSQ is suitable for describing the health status of chronic back pain patients. An earlier study (3) showed highly correlated inter-index relationships between all but one of the various FSQ summary scales, which was not the case in the present study (Table III). It cannot be concluded that the FSQ is entirely suitable for demonstrating positive changes in chronic back pain patients, since changes attributable to rehabilitation have been shown only in the three summary scales "Satisfaction with Health", "Mental health" and "Number of close friends". The indication that the FSQ is a rather insensitive instrument lies in the varying alpha-coefficients (alpha 0.35–0.89) for the summary scales. The high internal consistency for "Mental health" (alpha > 0.85) where changes have been demonstrated supports this assumption. However, the assumption cannot be confirmed without an experimental study.

The group studied was relatively small and it is possible that changes between measurement occasions would be demonstrable in a larger group; alternatively, there may have been no real changes between measurements!

In conclusion, the FSQ is recommended for use with patients suffering from chronic back pain, especially to find those areas of the patient's health status that should be the object of more detailed assessment and of intervention by specialists of the multidisciplinary rehabilitation team.

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