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A SHOULDER PAIN SCORE: A COMPREHENSIVE QUESTIONNAIRE FOR ASSESSING PAIN IN PATIENTS WITH SHOULDER COMPLAINTS

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ABSTRACT. This study describes the validation and application of a comprehensive questionnaire (the shoulder pain score) in assessing pain experienced by patients with shoulder complaints. The shoulder pain score comprised six pain symptom questions selected from the literature, together with a 101-Numerical Rating Scale (NRS-101). The score was tested in a follow-up study of 101 patients with shoulder complaints. The coefficient for the internal consistency of the shoulder pain score was 0.82. A factor analysis disclosed two factors: one containing the NRS-101 with the "active" items of the shoulder pain score and another containing the "passive" items. The shoulder pain score gave a reliable impression of the pain experienced and proved to be a useful instrument for following the course of the disorder over time and giving an indication when a patient feels cured.

Key words: follow-up study, general practice, pain, questionnaire, shoulder complaints.

INTRODUCTION

In a recent study on patients with capsulitis adhesiva, the patients appeared to feel more incapacitated due to pain than to limitation in active or passive motion (6). Is is therefore important for the clinician to gain insight into the pain experienced by patients with shoulder complaints. For measuring pain, various single-item pain scales are used, such as the Visual Analogue Scale (VAS), the four- or five-point Verbal Rating Scale or the 101-point Numerical Rating Scale (NRS-101).

In patients with shoulder complaints, the pain varies considerably; the moment of examination as well as the degree of exertion affect the pain as indicated by the patient. Sometimes the patient only feels pain with a specific motion. It is therefore difficult to get a proper impression of the degree of pain experienced by the patient with a single-item pain scale.

Consequently, in most clinical trials of patients with shoulder complaints, more than just one pain scale is used. Usually, pain at rest, in motion and during the night is recorded. Although this method gives a sounder impression of the pain experienced, it is not conclusive, as the pain is now represented by different scores without anyone knowing how these scores correlate during the course over time of a shoulder complaint.

In a recent review on disease-measuring scales, no specific shoulder-pain-measuring scale was described (2).

In an attempt to get a more reliable assessment of the pain experienced by patients with shoulder complaints, a comprehensive questionnaire on pain was designed, resulting in one single score.

For the development and application of this questionnaire, the shoulder pain score, the following questions were examined:

1. What specific anamnestic questions are relevant for the shoulder pain score?
2. Does the shoulder pain score give a reliable impression of the pain experienced in patients with shoulder complaints?
3. How do these questions interrelate within the total assessment of the shoulder pain score?
4. What is the course over time of the score of the shoulder pain score in a group of patients with shoulder complaints in general practice?

MATERIAL AND METHODS

Shoulder pain score

Questions giving a more detailed description of the pain experienced were selected from the literature (Table I (3, 4, 6, 7, 9)), and along with a NRS-101 a questionnaire was compiled.

The NRS-101 was chosen because it appeared to be the most practical pain scale in a study comparing six single-item pain scales. It was simple to administer and score (there was

Table I. *Origin of anamnestic questions concerning shoulder pain*

Question	Origin
Pain at rest	Cyriax (3), Roy (7), Vecchio (9)
Pain in motion	Gärtner (4), Roy (7), Vecchio (9)
Nightly pain	Vecchio (9), Gärtner (4), De Jong (6)
Heat sensation	Gärtner (4)
Degree of radiation	Cyriax (3), Gärtner (4)
Incapability of lying on the painful side	Cyriax (3), Gärtner (4)
Quickness of development	Gärtner (4)

no correlation with incorrect responding and age, as was seen with the VAS), and it was very sensitive to change (5). The patient could rate his or her pain on the NRS-101 by writing down a number between 0 (no pain) and 100 (unbearable pain) on a line.

This questionnaire was tested in a preliminary study, on the basis of which the questions on heat sensation and quickness of development were omitted and a new question on disturbance of sleep due to pain was added to the questionnaire.

The six remaining questions of the questionnaire were entered onto a four-point scale (none = 1, light = 2, average = 3 and severe = 4). The NRS-101 was also transposed to a four-point scale. (None to very light (0–9 = 1), light (10–39 = 2), average (40–69 = 3) and severe (70–100 = 4)). The minimum score was 7 points the maximum score: 28 (Appendix I).

Patients

The patients with shoulder complaints participating in this descriptive follow-up study were registered patients of four general practitioners in the Netherlands.

Table II. *Characteristics of the survey popularion (n = 101)*

Age (years)	47.3 (S.D. = 15.4)
Women/men	59/42
Right-handed	91
Married or living together	80
Previous complaints	41
History of distortion	18
Working situation	
full time	24
part time	30
no paid work	47
Overhand work	
light	34
medium	13
heavy	7
Left shoulder	
dominant side	4
non-dominant side	37
Right shoulder	60
dominant side	55
non-dominant side	5
Period of complaints before first consultation	
≤ 1 week	26
2–4 weeks	25
5–25 weeks	25
≥ 26 weeks	25

Shoulder complaints were defined as pain localized in the area of the deltoid muscle, the acromioclavicular joint, the superior part of the trapezoid muscle, the scapula with or without radiation in the arm; with or without limitation of motion of the upper arm and/or the shoulder girdle.

The exclusion criteria were: Treatment for shoulder complaints during the last 6 months; double-sided shoulder problems; rheumatic diseases such as polymyalgia rheumatica, rheumatic arthritis, systemic lupus erythematosus (SLE), fibromyalgia; acute severe trauma (fracture, dislocation or rotator cuff rupture. Patients with a history of a minor trauma (distortion) were not excluded); dementia and other psychiatric disorders; cervical herniation.

During a 5-month period, 138 patients came in for consultation because of shoulder complaints. One-hundred-and-one were entered in the study (see Table II for patient characteristics (8)) and filled in the shoulder pain score at admission and weekly there after, until they felt cured or until the end of the follow-up period (25 weeks). Only five patients refused participation. Thirty-two patients were excluded because of the exclusion criteria. There were no drop-outs during the follow-up period. Only patients who considered themselves cured ended participation.

A patient could indicate 'feeling cured' if the shoulder complaints had disappeared or had diminished to such an extent that they were no longer considered inconvenient.

Treatment during the follow-up study consisted of NSAIDs during the first 2 weeks. After these 2 weeks, the patients could be started on therapy as advised by the general practitioner, such as physical therapy, injection therapy or manipulative therapy.

Statistical analysis

Factor analysis and rotation according to the varimax criterion was carried out by means of a simultaneous components analysis of the data of the first 5 weeks (1). This was made in order to test the stability of the factor structure during this period. On the basis of the results of the first data collection (at inclusion t0), the coefficient for the internal consistency (Cronbach's alpha) was determined.

Weekly, the average pain scores were determined of those patients who were still having complaints.

RESULTS

The factor analysis of the results over the first weeks, ($n_0 = 101$, $n_1 = 101$, $n_2 = 99$, $n_3 = 90$, $n_4 = 80$) ($n_{0,4}$ is the number of patients feeling not cured in week 0, 1,

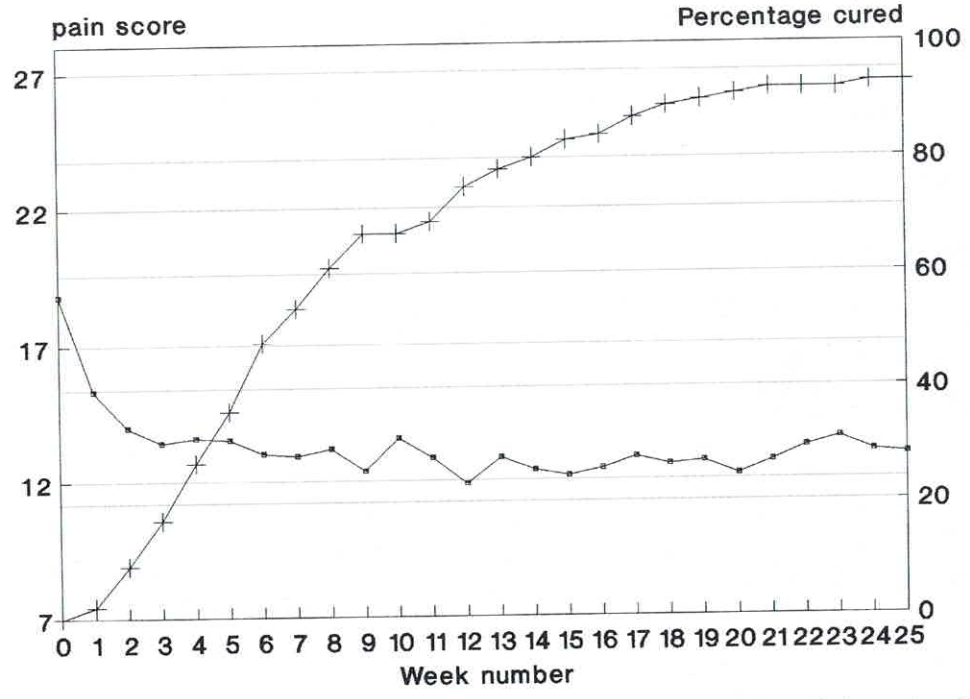

Fig. 1. Average shoulder pain score per week of patients still participating (left y-axis) (-■-) and cumulative number of patients feeling cured per week (right y-axis)(-+-).

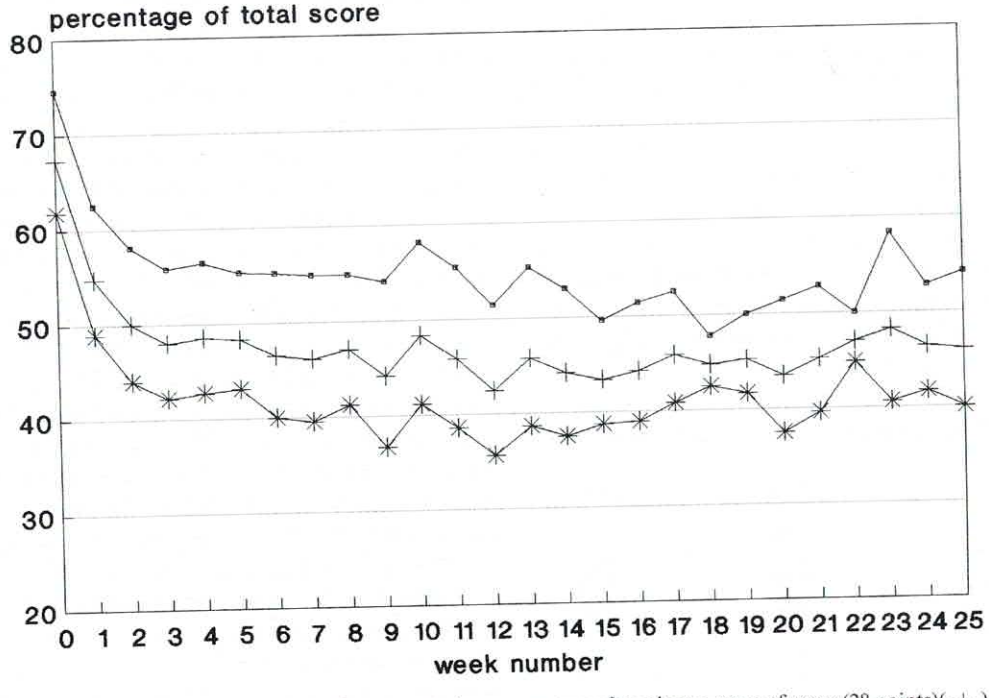

Fig. 2. Average shoulder pain score per week represented as percentage of maximum score of score (28 points)(-+-). Average scores per week of factor one (16 points)(-*-) and factor two (12 points)(-■-) are represented as percentages of maximum score of each factor, respectively.

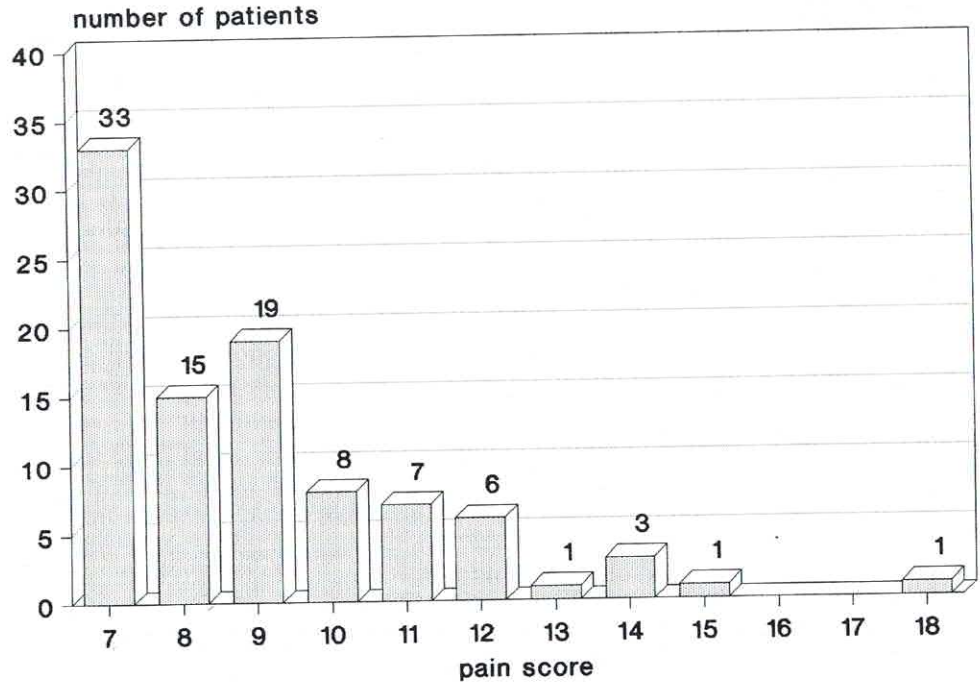

Fig. 3. Number of patients feeling cured in the follow-up period ($n = 94$) and their shoulder pain score at the moment the patients considered themselves cured.

2, 3, and 4) disclosed two factors. Factor one contained four questions; pain at rest, nightly pain, pain while lying and sleeping disturbance due to pain. Factor two contained three items; the NRS-101, pain in motion and the degree of radiation (see Table III). Cronbach's alpha for this seven-item questionnaire was 0.82; for the four items of factor one 0.84; for the three items of factor two 0.69.

Fig. 1 shows the average scores of the shoulder pain score per week of the patients still participating (not cured), with the cumulative number of patients cured per week. After a high average score (19 points) upon entering the survey, the average score dropped to 13–15 in patients still participating. This pattern continued during the remainder of the survey. Acute and average to severe at the onset, the shoulder complaints became light to average in two weeks after treatment with NSAID. Subsequently, the shoulder complaints remained at this level for a long time in those not cured, despite treatment by a physiotherapist, injections or manipulations. After 6 weeks, 50% of the patients and after 12 weeks 75% considered themselves cured.

Table III. *Factor analysis of the shoulder pain score*

	Factor 1	Factor 2
Pain at rest	**0.51**	0.50
Pain in motion	0.31	**0.71**
Nightly pain	**0.90**	0.18
Radiation	0.06	**0.78**
Pain while lying	**0.79**	0.28
Sleeping poorly	**0.89**	0.15
Pain scale	0.37	**0.71**

Total percentage of explained variance is 65.9%. The figures in bold type belong to the factor at the top of the column.

Fig. 2 shows the average scores of the shoulder pain score per week together with the scores of factor one and factor two, represented as percentages of the maximum scores of the shoulder pain score, factor one and factor two. The difference in proportion in which both factors contributed to the shoulder pain score remained constant during the entire survey period, which means that the relation between the two factors remained stable during this period.

During the follow-up period (25 weeks) 94 patients considered themselves cured. Fig. 3 shows the number of patients who considered themselves cured in relation to the score of the shoulder pain score registered at the moment of 'feeling cured'; 80% of the patients considered themselves cured with a score between 7 and 10.

DISCUSSION AND CONCLUSION

Our aim was to develop a concise questionnaire in order to gain a useful insight into the pain perceived by patients with shoulder complaints. Our shoulder pain score had a high internal consistency and can be considered as a reliable instrument in measuring pain in patients with shoulder complaints.

The correlation of the 7 items of the shoulder pain score was expressed in two factors. According to Fig. 2 the relation between these two factors remained constant during the entire survey period. Factor one including the question on sleeping disturbance might be interpreted as pain under passive conditions and factor two, including the NRS-101, as pain when the patient is active. It is therefore evident that with the use of a single item pain scale, which does not make this distinction, a substantial part of the pain experienced is not recorded. This is of importance in studies on pain in patients with shoulder complaints, especially in trials using pain as an outcome variable.

At the moment the patients considered themselves cured, the score results revealed that the patients do not need to be totally free of pain in order to feel cured. The patients mostly considered themselves cured with a score between 7 and 10. The average score of those still having complaints was between 13 and 15. The fact that the margin between having complaints and feeling cured is a very narrow one should be considered.

REFERENCES

1. Berge, J. M. F. ten & Kiers, H. A. L.: Simultane componenten-analyse voor twee of meer groepen personen. (Simultaneous component analysis for two groups of persons or more). Ned Tijdschr Psycho *45:* 221–226, 1989.
2. Bowling, A.: Measuring disease. A review of disease specific quality of life measurement scales. Buckingham Philadelphia: Open University Press, 1995.
3. Cyriax, J.: Textbook of orthopaedic medicine. Volume one. Chapter 9, page 130. 11th edition. London: Baillière Tindall: 1982.
4. Gärtner, J., Blauth, W. & Hahne, H. J.: Die bedeutung der anamnese fur die wahrscheinlichkeits-diagnose von schulterschmerzen. Z Orthop *129:* 322–325, 1991.
5. Jensen, M. P., Karoly, P. & Braver, S.: The measurement of clinical pain intensity: a comparison of six methods. Pain *27:* 117–126, 1986.
6. Jong, B. A. de.: The painful stiff shoulder. Chapter 9, page 132 [dissertation] University of Amsterdam: 1991.
7. Roy, S. & Oldham, R.: Management of the frozen shoulder. Lancet, Volume 1, June *19:* 1322–1324, 1976.
8. Sobel, J. S., Winters, J. C., Arendzen, J. H., et al: Schouderklachten in de huisartspraktijk. (Shoulder complaints in general practice) Huisarts & Wet *38:* 342–347, 1995.
9. Vecchio, P. C., Hazleman, B. L. & King, R. H.: A double-blind trial comparing subacromial methylprednisolone and lignocaine in acute rotator cuff tendinitis. Br J Rheumatol *32:* 743–745, 1993.

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Appendix I. Shoulder pain score

	None	Light	Average	Severe
Pain at rest	☐	☐	☐	☐
Pain in motion	☐	☐	☐	☐
Nightly pain	☐	☐	☐	☐
Sleeping problems caused by pain	☐	☐	☐	☐
Incapability of lying on the painful side	☐	☐	☐	☐
	None	Till halfway the upper arm	Till the elbow	Past the elbow
Degree of radiation	☐	☐	☐	☐

Pain scale: Indicate on the line below the number between 0 and 100 that best describes your pain

no pain is 0——————unbearable pain is 100