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Relation between indicators for quality of occupational rehabilitation of employees with low back pain

Willeke E van der Weide, Jos H A M Verbeek, F J H van Dijk

Abstract

Objective—To assess if the implementation of guidelines for occupational rehabilitation of patients with low back pain by means of process variables—a set of objective criteria for technical performance and continuity of care—led to a better outcome in clinical and return to work variables.

Methods—The study group consisted of 59 patients with at least 10 days of sick leave because of low back pain. Univariate analyses as well as multiple logistic regression and Cox’s regression analyses were performed to assess the relation between quality of care and outcome.

Results—Process indicators for technical competence, continuity of care, and total performance were all significantly related to satisfaction of employees. Continuity of care and total performance were significantly related to working status at 3 months, and time to return to work. None of the process indicators was related to pain or disability after 3 months follow up. Satisfaction was not related to any of the other outcome variables. This indicates that if guidelines for occupational rehabilitation are met, outcome is better.

Conclusion—Quality of the process of care was related to outcome. Interventions of occupational physicians need improvement in the areas of continuity of care and communication with treating physicians. The effectiveness of an improved intervention should be studied in a subsequent randomised clinical trial.

Keywords: occupational rehabilitation; quality of care; low back pain

Occupational physicians in The Netherlands spend almost half of their time on matters concerned with sickness absence and rehabilitation activities, especially during consultation hours.1 2 The goal of these activities is to restrict occupational disability and duration of sick leave by searching for a balance between workload and work ability.3 Recently, quality assessment of these and other tasks of occupational health care professionals has become more important. Because of the increased demands for cost-effectiveness, an occupational health service has to justify the value of all medical services that it provides to companies and their employees. Besides, occupational health services are legally obliged to certify fulfillment of criteria for “good quality”, in the Netherlands. Although this certification process is mainly directed at the quality system of the occupational health service, an assessment of the professional content of care should be incorporated in this system.4 Viewed in this light, it is important to trace deviations from “good quality” to enable improvements.5 6,9

However, the evaluation of occupational rehabilitation is complicated. The desired outcome—that is, a decrease of disability and sick leave—is not only dependent on the process that can be managed by the occupational physician. Other variables—such as the seriousness of the employee’s disability, regulations in the company, availability of light work, etc—influence the process of return to work. Therefore, it is inadequate to assess quality of occupational rehabilitation by its outcome only. Process variables could provide a more sensitive estimator of quality than outcome.7 It is therefore important to investigate the relation between process and outcome.8 We were interested in investigating this relation with a randomised clinical trial about the efficacy of occupational rehabilitation for patients with low back pain (unpublished data).

For the assessment of the process of occupational rehabilitation we first had to define “good practice”. We developed and implemented guidelines among occupational physicians.9 Ideally, these guidelines should be evidence-based, but evidence was not available for all aspects. Therefore, various parts of the guidelines were based on the opinions of experts.10 As variables for the quality of the process a set of objective criteria for seven performance indicators, representing technical performance and continuity of care were derived from the guidelines.11

As another potential variable of quality assessment we measured satisfaction of the employee. An advantage of measuring satisfaction is that a questionnaire can contain aspects other than technical care—such as relational, organisational, and financial aspects. In the patient’s view of quality the relational aspects seem more important than the other two.12 Another potential advantage of measuring satisfaction as a variable of quality is related to the effectiveness of care. Satisfaction has been shown to positively influence patients’ adherence to therapeutic recommendations.13 In occupational rehabilitation this relation has never been investigated.
Indicators for occupational rehabilitation of employees with low back pain

In this paper, we have studied the relation between process and outcome variables. In this way explanations for differences in outcome can be discovered. We measured the following outcome variables: patient satisfaction with the occupational rehabilitation process, intensity of pain, functional disability, rate of return to work at 3 months, and time to return to work.

Methods

STUDY POPULATION
The study group consisted of 59 employees who visited their occupational physician because of sick leave with low back pain. It is a subgroup of employees who were recruited into the active arm of a randomised trial among 120 employees in eight occupational health services for hospital and university employees. Within 2 weeks after reporting sick with low back pain, the employees were asked to participate in the study. Of these employees 15% refused to participate. The employees who refused to participate did not differ significantly from those who participated in sex, age, occupation, return to work, or sick leave for a period of 1 year. After giving informed consent the employees were randomly assigned to a group actively rehabilitated by an occupational physician or to a reference group. The group with the occupational physician did not differ significantly (p<0.05) from the other participants in the trial in demographic factors, perception of working conditions, characteristics related to low back pain, psychosocial characteristics (except palliative coping reactions, which were lower among this study group, p=0.03), pain, functional disability at baseline and after 3 months, rate of return to work at 3 months, and time to return to work. In the group with an occupational physician (n=61) the employees were invited for the consultation as soon as possible after inclusion in the study. From that group 59 employees visited their occupational physician because of low back pain during the first 3 months. Two employees did not (one because the occupational physician’s appointment schedule was full, the other because the primary diagnosis was changed). Therefore, the group for this study consisted of 59 employees.

DATA COLLECTION
The employees received a questionnaire at baseline about demographic factors, perception of working conditions, characteristics of low back pain, intensity of pain, functional disability, general health perception, coping, and health locus of control. Pain intensity during the week before measurement was assessed on a 100 mm line, ranging from no pain to very severe pain. The Roland disability questionnaire (RDQ) was used to assess functional disability. It has been reported to be a reliable, valid, and responsive instrument. The RDQ contains 24 yes or no questions. The total score can range from 0 to 24 and we transformed this to a 0–100 range. Scores on the scales for perception of working conditions were also expressed on a 0–100 continuum. Coping and health locus of control were dichotomised: problematic cases were defined as those above the 75th percentile score.

Every month the participant noted whether he or she had returned to work, with or without adaptations. Return to work was also determined from computerised record systems. Duration of sick leave was measured over a 1 year period. After 3 months data were collected from questionnaires on patient satisfaction with occupational rehabilitation and again on pain and functional disability. The patient satisfaction questionnaire consisted of 24 statements about several aspects (communication, interpersonal approach, professional knowledge, usefulness) with a five point rating scale, from totally agree to totally disagree. Thirteen questions were formulated positively and 11 negatively to prevent a trend in answering. A total score was calculated by summarising the items and assuming an interval scale. The total score was expressed on a scale from 0 (very dissatisfied) to 100 (very satisfied). The questionnaire had a high internal consistency as reflected by a Cronbach’s α for the completed questionnaire of 0.96 and a mean (SD) corrected item total correlation of 0.68 (0.14). The SD was around 1.0 scale point for most items and never below 0.65, indicating a range of opinions for all statements.

The occupational physicians were instructed about the guidelines for occupational rehabilitation of patients with low back pain in two meetings before the trial, and in follow up meetings during the research period. During the first 3 months the occupational physician registered his or her activities in occupational rehabilitation on a special form for each participant when the employee came to the consultation. This form was used to derive data for the calculation of performance indicators for each patient.

PROCESS AND OUTCOME VARIABLES
On the basis of the guidelines for occupational rehabilitation we defined seven performance indicators with explicit criteria for good or deviant performance of the occupational physician for specific rehabilitation activities. The criteria for each performance indicator were formulated in “if then” statements—the so called “criteria mapping” or “branching logic” method. Each statement could be met, be deviant, or be inapplicable. Performance for an indicator deviated from the guidelines if one or more of the criteria for that indicator were not met. Six indicators reflect the various areas in the guidelines: encouragement of activity, assessment and action for psychosocial problems, curative treatment, the work site, the work organisation, and advice on returning to work. These six indicators were summarised in a performance score for the technical competence of the occupational physician and differentiated in a 0–1 score (0=no deviance in any of the six indicators, 1=deviant in at least one indicator). The seventh indicator reflected continuity of care. This indicator can also be met, not met (deviant), or not applicable. Total performance was assessed as a summary of
Table 1  Physician performance indicators (PIs) and criteria for good performance for rehabilitation of workers with low back pain

<table>
<thead>
<tr>
<th>Performance indicator</th>
<th>Criteria for good performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Performance on encouragement of activity (applicable for non-specific low back pain only)</td>
<td>A Actions prescribed in every contact: Advice to stay active, or Advice to return to work (with or without adaptations)</td>
</tr>
<tr>
<td>2 Performance on psychosocial problems</td>
<td>A asked for psychosocial problems or illness behaviour in first contact If problems exist in any contact, then B Actions in same or next contact should be: Advice to stay active, or Advice to contact work, or Advice to return to work (with or without adaptations), or Referral to company welfare worker, physiotherapist, psychologist, or superior, or Confer with company welfare worker, personnel officer or superior If consultation is planned, then C New appointment with patient should be made</td>
</tr>
<tr>
<td>3 Performance on inadequate therapy</td>
<td>A Assessment of adequacy of treatment in first contact If patient is not under treatment, but treatment is necessary, then B1 Patient should be referred to treating physician If patient is under treatment and inadequate treatment is an impediment to return to work, then B2 Confer with treating physician, and a new appointment with patient should be made</td>
</tr>
<tr>
<td>4 Performance on occupational disabilities</td>
<td>A Assessment of disabilities in first contact If change in workload are appropriate in any contact, then B Actions in same contact should be: Advice to confer with superior for change in workload, or Advice to return to work (with or without adaptations), or Referral to personnel officer, occupational nurse, physiotherapist, or superior, or A work site visit, or Confer with personnel officer or superior If consultation is planned, then C New appointment with patient should be made</td>
</tr>
<tr>
<td>5 Performance on organisational impediments</td>
<td>A Assessment of organisational problems in first contact If problems exist, then B Actions in same contact should be: Advice to return to work (with or without adaptations) Referral to personnel officer, occupational nurse, physiotherapist, superior, company welfare worker, or psychologist, or Confer with personnel officer, occupational nurse, physiotherapist, superior, company welfare worker, or psychologist If consultation is planned, then C New appointment with patient should be made</td>
</tr>
<tr>
<td>6 Performance on advice for return to work</td>
<td>A Advice to return to work If advice is part time return, or nothing was advised on return to work, then B New appointment with patient should be made</td>
</tr>
<tr>
<td>7 Performance on continuity of care (not applicable if return to work full time within 2 weeks was advised)</td>
<td>A1 New appointment is within 3 weeks If diagnosis was not non-specific low back pain and patient waits for results of tests or treatment, then A2 New appointment (no time restriction)</td>
</tr>
</tbody>
</table>

The performance scores for technical competence were constructed on the basis of an assumed relation between a deviant score on every indicator and outcome of care. However, it is possible that some indicators did not contribute to this relation and that the analysis with this totalled score concealed real relations between the separate indicators and outcome. Therefore, we also performed analyses for the separate performance indicators with $\geq 15\%$ deviant scores (encouragement of activity and inadequate treatment).

For the multivariate analyses, the performance scores as well as other prognostic factors were included. To reduce the number of variables in the multivariate analysis only those prognostic factors that were related to the outcome in the univariate analysis ($p<0.15$) were included in the model. The selection of variables for entry into the model in the manual forward stepwise selection procedure ($p_{in}<0.05; p_{out}>0.10$) was based on statistical reasoning as well as on practical relevancy to the work of an occupational physician. The following prognostic factors were entered into the model with patient satisfaction as the outcome: work speed and work quantity, lack of variation in work, social isolation, duration before first...
Table 2
Characteristics of study population at baseline (n=59)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean (SD)</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient age (y)</td>
<td>38 (7.9)</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>23 (39)</td>
<td>1</td>
<td>56</td>
</tr>
</tbody>
</table>

Low back pain related characteristics:
- Diagnosis at first consultation (n (%)):
  - Non-specific low back pain: 46 (78)
  - Nerve root compression: 12 (20)
  - Unclear: 1 (2)

History of low back pain:
- Sick leave last year (n (%): yes): 18 (31)
- Sick leave ever (n (%): more than once): 23 (40)
- Work related cause of low back pain (n (%)): 19 (33)
- Duration of sick leave at first consultation (mean (SD)): 28 (16)
- Mean (SD) pain intensity: 56 (22)
- Mean (SD) functional disability: 57 (21)

Work experience in present position (y, n (%)):
- <5: 24 (42)
- 5–10: 15 (25)
- >10: 20 (34)

Table 3
Care (from baseline to 3 months) and outcome characteristics of the study population (n=59)

<table>
<thead>
<tr>
<th>Care characteristics</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of contacts with occupational physician/patient (n (%)):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>20 (34)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14 (24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;2</td>
<td>25 (42)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance indicators (n (%): deviant):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity of care</td>
<td>24 (49)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical competence (sum of 6 indicators):</td>
<td>22 (38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total performance (sum of 7 indicators):</td>
<td>36 (62)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work adaptations at return to work (n (%)):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In tasks</td>
<td>18 (36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In working hours</td>
<td>37 (70)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In work tempo</td>
<td>21 (44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Mechanical) devices</td>
<td>2 (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any adaptation</td>
<td>41 (77)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outcome variables:
- Patient's satisfaction (mean (SD)): 66 (16)
- Pain intensity at 3 months (mean (SD)): 31 (25)
- Functional disability at 3 months (mean (SD)): 26 (23)
- Return to work status at 3 months (n (%)): 26 (44)
- Not returned                            | 3 (5)  |     |     |
- Time to return to work (median (interquartile ranges)): 51 (22–112)

Table 4
Relation between performance indicators (not deviant v deviant score) and outcome variables (satisfaction score 0–100, percentage of workers not returned to work at three months, days off work):†

<table>
<thead>
<tr>
<th>Performance indicator</th>
<th>Not deviant score</th>
<th>Deviant score</th>
<th>Mean difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient satisfaction (mean (SD)):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity of care</td>
<td>71 (11)</td>
<td>59 (11)</td>
<td>12 (2.0 to 22)*</td>
</tr>
<tr>
<td>Technical competence</td>
<td>71 (14)</td>
<td>58 (17)</td>
<td>13 (3.5 to 22)**</td>
</tr>
<tr>
<td>Total performance</td>
<td>73 (11)</td>
<td>62 (18)</td>
<td>11 (2.5 to 20)*</td>
</tr>
<tr>
<td>No full time return to work (% (n)):</td>
<td>Odd ratio (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity of care</td>
<td>20 (5)</td>
<td>58 (14)</td>
<td>5.6 (1.6 to 20)**</td>
</tr>
<tr>
<td>Technical competence</td>
<td>33 (12)</td>
<td>32 (7)</td>
<td>0.93 (0.30 to 2.9)</td>
</tr>
<tr>
<td>Total performance</td>
<td>14 (3)</td>
<td>44 (16)</td>
<td>5.1 (1.3 to 20)*</td>
</tr>
<tr>
<td>Time to full time return to work (median (interquartile range)): Hazard ratio (95% CI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity of care</td>
<td>34 (25 to 64)</td>
<td>95 (59 to 168)</td>
<td>0.47 (0.26 to 0.86)**</td>
</tr>
<tr>
<td>Technical competence</td>
<td>32 (12 to 99)</td>
<td>59 (47 to 131)</td>
<td>0.74 (0.42 to 1.3)</td>
</tr>
<tr>
<td>Total performance</td>
<td>21 (11 to 32)</td>
<td>77 (48 to 131)</td>
<td>0.43 (0.24 to 0.75)**</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01.
†The analyses of the relation between performance scores on the one hand and satisfaction and outcome on the other hand were performed with different numbers of patients, depending on the outcome parameter.

Table 4 presents the significant results of the complete multiple logistic regression model with patient satisfaction as the dependent variable. A higher risk of dissatisfaction was found when patients had a deviant technical competence score (odds ratio (OR) 9.3, 95% confidence interval (95% CI) 1.2 to 71), a deviant continuity of care score (OR 10.4, 95% CI 1.4 to 75), or a work related cause (OR 2.1, 95% CI 1.1 to 6.0).

Performance indicators and outcome
Performance for technical competence, continuity of care, and total performance were all significantly related to patient satisfaction in the univariate analysis (table 4). Of the separate performance indicators for technical competence only, inadequate treatment was marginally related to patient satisfaction.

Table 5 presents the significant results of the complete multiple logistic regression model with patient satisfaction as the dependent variable. A higher risk of dissatisfaction was found when patients had a deviant technical competence score (odds ratio (OR) 9.3, 95% confidence interval (95% CI) 1.2 to 71), a deviant continuity of care score (OR 10.4, 95% CI 1.4 to 75), or a work related cause (OR 2.1, 95% CI 1.1 to 6.0).

Performance of the model with working at 3 months as an outcome: functional disability at baseline, lack of energy, sleep problems, social isolation, and radiating pain were entered into the model. For the model with time to return to work as the outcome, number of contacts with occupational physi-
related to time to return to work. The figure shows longer times to return to work among those patients with deviant total performance scores. In the multivariate analyses, not working full time after 3 months was mainly explained by deviant continuity of care (OR 12, 95% CI 2.0 to 71), high disability at baseline (OR 1.05, 95% CI 1.0 to 1.1), and social isolation at baseline (OR 6.7, 95% CI 1.1 to 41, table 5). Also, the time to return to work was substantially longer among patients with deviant continuity of care scores as reflected by a hazard ratio of 0.41 (95% CI 0.20 to 0.81), high disability at baseline (hazard ratio 0.97, 95% CI 0.96 to 0.99), and radiating pain (hazard ratio 0.32, 95% CI 0.16 to 0.63). A hazard ratio <1 indicates that the variable is associated with a longer time to return to work. For instance, a hazard ratio of 0.41 means that the estimated risk of return to work is 0.41 for patients with deviant continuity of care, compared with a person with a non-deviant score. In other words, the chance of return to work is 2.4 higher for patients with a non-deviant score.

Satisfaction of the employee was not related to one of the other outcome variables.

**Discussion**

In this study of the process and outcome of occupational rehabilitation we found deviations in performance of occupational physicians especially in encouragement of activity, inadequate treatment, and continuity of care. Inadequate treatment, continuity of care, and the total performance score were related to the outcome variables patient satisfaction, rate of return to work, and time to return to work.

Potential prognostic factors could bias the results. More serious cases could have a higher risk of both a poor outcome and a deviant performance because it could be more difficult to meet the criteria for performance with these cases. To control for these prognostic factors we performed a multivariate analysis. Only a work related cause, functional disability at baseline, social isolation, and radiating pain were significantly related to the outcome in these models, but performance also remained a significant predictor of outcome. So we could not show that our results were biased by any of the prognostic factors that we could measure.

Another source of bias is the derivation of criteria for the performance indicators from the guidelines. Our criteria for the prescribed actions were formulated broadly, resulting in only a loose definition of deviance. The not deviant group included those cases that also could be qualified as deviant with a more strict definition. However, without this non-differential misclassification the relation would even have been stronger.

This study indicates that contact with the treating physician—that is, a criterion for good performance in adequate treatment—or a follow up every 3 weeks—that is, a criterion for good continuity of care—could be effective for the deviant cases. However, a randomised trial on these aspects is needed to show the efficacy of these interventions. Other studies also indicate that the communication between occupational physician and treating physicians could be improved.27–29

It is noteworthy that we did not find a relation between performance of the occupational physician and pain or functional disability. This might reflect our lack of understanding of the return to work process in employees. It seems logical to assume that a decrease of pain and subsequently a decrease of functional disability would lead to resumption of work. However, cognitive processes such as fear of movement (because of thoughts that all movement will lead to bodily harm) and catastrophising (a way of thinking, in which all events will end in disasters) might be more important predictors of return to work as has been suggested by some authors.30 In a study on stress related complaints it was also found that there was no relation between the level of complaints and return to work.31 Therefore we advocate a more detailed study of the cognitive processes that influence return to work among patients with back pain.

Due to the low number of deviant cases it was not possible to relate all separate performance indicators to the outcome variables. It was not possible to study performance on psychosocial problems, occupational disabilities, organisational impediments for return to work, and advice for return to work. This could be a
Indicators for occupational rehabilitation of employees with low back pain

It has been stated that the relation between satisfaction on the one hand and quality of care or outcome on the other hand is unclear. In our study also this relation was not straight forward. We did find a relation between performance indicators and patient satisfaction, but patient satisfaction was not related to return to work. By contrast with our findings, satisfaction with functional restoration programmes was found to be related to return to work in other studies. These differences between studies probably reflect the complexity of the concept of satisfaction. More research in this field is needed; especially sick workers' expectations of occupational rehabilitation and occupational health care should be studied because these could differ from other fields of health care.

The relation between work relatedness of complaints and patient satisfaction needs to be clarified also. We found that when patients attributed the cause of back pain to work they were less satisfied with the rehabilitation of the occupational physician. This was opposite to findings of an earlier study on occupational rehabilitation in which patients were more satisfied with care if they attributed the cause of their complaints to work. However, in that study only one contact between patient and physician was investigated and patients were not restricted to those with back pain only.

In conclusion, performance scores are useful in the assessment of quality of health care. They give important clues for improvement of the process of occupational rehabilitation. In this study we found that physician performance on adequate treatment and continuity of care were related to an increased return to work and a higher patient satisfaction. Effectiveness of improved guidelines and subsequently of improved performance on these indicators needs to be tested in a randomised trial. Such a trial should be restricted to those patients for which the criteria for performance are the same. For instance patients whose treatment is assessed for improvement tool, American Association of Occupational Health Nurses Journal 1992;40:333–41.