Vocational rehabilitation of patients with prolonged fatigue

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Evaluating a multidisciplinary treatment programme in patients with prolonged fatigue complaints

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Abstract

Complaints of prolonged fatigue are common in the working population and may lead to functional impairments and work disability. A multidisciplinary treatment programme, consisting of physical training and psychological sessions, was evaluated. Thirty-two new patients of an outpatient institution with prolonged fatigue were included during the period 2002-2006. Fatigue complaints, quality of life and work participation were measured pre- and post treatment and at three months follow-up. Furthermore, patient and employer satisfaction was measured. Fatigue complaints decreased significantly and quality of life and work participation increased significantly after the training period. Furthermore, 90% of the patients reported that their complaints were diminished after the training and 82% of the employers were satisfied with the results achieved. The results suggest that a multidisciplinary treatment programme has significant and clinically relevant influence on decrease of fatigue complaints and improvement of quality of life and work participation in patients with prolonged fatigue complaints.
Introduction

Fatigue is a common complaint in the general population and the working population.\textsuperscript{1-3} Acute fatigue can occur following a period of mental or physical exertion and be of temporary duration. In some cases, however, fatigue is prolonged, with serious effects on personal, social and occupational functioning, which can result in sickness absence and/or work disability.\textsuperscript{4,5} The prevalence of prolonged fatigue is between 10\% and 20\% in the general population\textsuperscript{2,3,6} and 22\% in the Dutch working population.\textsuperscript{1} There is no clear aetiology of fatigue, but it would appear to be multifactorial.\textsuperscript{5} Risk factors for the development of prolonged fatigue are psychosocial factors\textsuperscript{3} and work characteristics.\textsuperscript{7,8} There are also indications that chronic stress and physiological reactions to stress are a factor in the development and persistence of prolonged fatigue.\textsuperscript{9}

In view of the foregoing, treatments for patients with fatigue problems need to target both physiological and psychological aspects of individual and social/occupational functioning. In the Netherlands, patients with prolonged fatigue are offered various treatment cycles based on a multifactorial approach. These differ in the emphasis placed on physical training, cognitive restructuring, relaxation exercises and/or involving the employer/workplace situation in the process. Although a lot is being done in practice to treat patients with fatigue, there has been no research yet into the effectiveness of treatment cycles.

This study evaluates an existing multidisciplinary treatment programme for patients with prolonged fatigue. The aim is to assess the outcomes of the treatment programme on patients with prolonged fatigue by answering the following questions: (1) What effect does a treatment programme have on the degree of fatigue, quality of life and work participation in patients with prolonged fatigue? (2) What are the perceived results of a treatment programme from the point of view of patients and employers?
Method

Population
The research data relates to patients enrolled at a vocational rehabilitation institution (Reaplus BV, Dordrecht) during the 2002-2006 period. They were referred to the institution by an occupational physician, employer or benefits agency. From the total population, the institution selected those patients who had prolonged fatigue upon intake, had a good command of spoken and written Dutch and were motivated to take part in the programme. Patients were excluded if they had a somatic disorder or if the employer or the patient set unrealistic targets regarding return to work.

Design
The study was based on retrospective data. In order to evaluate the effect of the treatment programme, repeated measurements within subjects were carried out. These took place upon intake (t0), six weeks (t1) and 12 weeks (t2) after the start of the programme, upon completion of the programme after a minimum of 18 weeks (t3) and three months after completion (t4).

The following variables were operationalised to answer Question 1 (see Table 1):

Fatigue
In order to ascertain the degree of fatigue, patients completed the Checklist Individual Strength (CIS) at t0, t1, t2 and t3. The total score ranges from 20 to 140, with higher scores reflecting higher degrees of fatigue. The CIS is a reliable tool ($\alpha=0.90$), which has been validated in a Dutch working population.

Quality of life
Quality of life was measured at t0 and t3 using the validated RAND-36. The researchers used five scales in the study: physical functioning, physical role limitation, emotional role limitation, mental health and vitality. The score on each scale ranges from 0 to 100, higher scores being better.
Work participation

Data on work participation comprised the number of contractual hours at t0 and the number of hours the patient was working at t0, t3 and t4. The data were collected in interviews at t0 and t3 and using a questionnaire at t4.

The following variables were used to answer Question 2 (see Table 1):

Perceived outcome from the patient’s perspective

At t4, patients stated how much their symptoms had changed during the programme and in the three months afterwards. Scoring was on a five-point scale, ranging from 1 = ‘seriously deteriorated’ to 5 = ‘highly diminished’. Upon completion of the programme (t3), there was a written evaluation of the personal targets set at t0. Patients scored each target separately on a five-point scale, ranging from 1 = ‘fully met’ to 5 = ‘not met’.

Perceived outcome from the employer’s perspective

The employer indicated how satisfied he was with the outcome in a questionnaire (at t4). Scoring was on a five-point scale, ranging from 1 = ‘very dissatisfied’ to 5 = ‘very satisfied’. If the employer did not return the questionnaire the researchers contacted him by telephone.

| Table 1. Overview of measuring points and variables measured |
|------------------|------------------|------------------|------------------|------------------|------------------|
|                  | T0               | T1               | T2               | T3               | T4               |
|                  | Intake           | 6 weeks after start | 12 weeks after start | Completion (>18 weeks) | 3 months after completion |
| Fatigue (CIS)    | X                | X                | X                | X                |                  |
| Quality of life (RAND-36) | X               |                  |                  | X                |                  |
| Work participation | X               |                  |                  | X                |                  |
| Changes in symptoms: patient’s perspective |                  |                  |                  |                  | X                |
| Targets met: patient’s perspective | X               |                  |                  |                  |                  |
| Satisfaction: employer’s perspective |                  |                  |                  |                  | X                |
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Analysis

Fatigue
The CIS total scores were subjected to a General Linear Model analysis for repeated measurements. The scores at t1, t2 and t3 were compared with the score at t0. If there were values for t0 and t3 and no more than one missing value for either t1 or t2, the data were included in the analysis. For any missing values the researchers inserted the average of the surrounding CIS scores.

Quality of life
The RAND-36 scores for each sub-scale were checked using the Shapiro-Wilk test\textsuperscript{13} for the normal distribution of the scores that differed between t3 and t0. A paired t-test was carried out where the distribution was normal, and a Wilcoxon signed-rank test where it was not.

Work participation
The number of hours worked at t0, t3 and t4 was compared with the number of hours in the employment contract at t0. As the data were not distributed normally they were tested using a non-parametric Friedman test.

Perceived outcome
The scores for the target were transformed into dichotomous data. Original scores of 1 (= ‘fully met’) and 2 (= ‘largely met’) were interpreted as ‘target met’. The analyses of both the outcomes of the targets and patient and employer satisfaction were descriptive. All the statistical analyses were performed in SPSS 12.0.1 (SPSS Inc., Chicago, IL, USA). A significance level of $\alpha=.05$ was maintained.

Treatment
The aim of the treatment was to vitalise patients and enable them to participate optimally at work.

Intake
Each patient was seen by a multidisciplinary team at an intake procedure that took four hours. The psychologist carried out a psychological examination, ascertaining
during the interview whether the patient had any mental needs and whether there were any mental aspects that had a negative influence on the present situation and potential recovery. The patient also talked to the occupational and organisational expert about work-related matters. The (occupational) physiotherapist carried out a mobility test and assessed activity pattern in terms of exertion and relaxation. There was also a physiological examination: a human movement scientist or physiotherapist checked lung function and the breathing pattern at rest (Ergostar, Energy Control, Weesp). The patient also took a submaximal exertion test on the bicycle ergometer to ascertain his or her physical condition in terms of peak oxygen uptake (VO$_2$peak) and peak resistance (P$_{peak}$). The aerobic threshold was determined on the basis of breathing pattern (an exponential increase in respiratory rate).

The aim of the intake procedure was to gain an understanding of the patient’s current situation and how it developed. This information was incorporated in the ‘treatment plan’. The participants also set targets relating to physical condition, mental condition and the work situation. The employer’s target was then set at an interview with him. The treatment duration and programme were drawn up based on the complexity and diversity of the problems as estimated by the team. A treatment cycle could take 18 to 24 weeks. Once the treatment plan had been approved by the patient and the employer, treatment commenced. The time between intake and start (averaging 32 days) depended mainly on the speed with which the employer acted.

Programme

Depending on the physical, mental and/or work-related problems and issues, treatment could consist of a combination of various group modules (with a maximum of six patients) and individual sessions (see Table 2). The group sessions and disciplines involved were as follows:

(1) Two (occupational) physiotherapists ran the ‘physical training’ group module. Based on the results of the exertion test during the intake procedure (heart rate corresponding with aerobic threshold), a progressive personal workout scheme was drawn up to improve physical condition. Heart rate limits were used as a reference, and patients were given a heart rate monitor (Polar Electro) to monitor their limits. The two-hour condition training session was increased by two minutes a week from 20 minutes to a maximum of 40 per session. Exercises designed to improve strength, coordination, stability and
mobility of muscle and joint and exercises to improve perception of exertion and relaxation were done on a power station (Bowflex®, USA). Training sessions took place three times a week in the first six weeks of the programme, twice a week in the second six weeks and once a week in the third (and where appropriate fourth) six-week period. Once the patient had completed the second period he or she was expected to make up the number of sessions to twice a week.

(2) Five sessions included one-hour education on sickness behaviour and training theory.

(3) Another five hours were spent on the Breathing, Awareness and Relaxation module (where this was indicated), the aim of which was to increase body awareness and reduce any tensions.

(4) The Group Coaching module, based on the principle of Neuro-Linguistic Programming (NLP), was run by two NLP coaches. The purpose of these sessions was to gain fresh insights into problems and how to function with them.

In addition to these group modules, the programme included the following individual sessions:

(1) Work and organisation: the occupational and organisational expert discussed work-related matters, such as returning to work, communication, work ethos and character traits that can be an impediment (e.g. extreme perfectionism).

(2) The psychologist worked on aspects that could be improved to enable patients to function the way they would like in their working and private lives, such as setting boundaries, self-respect and overcoming negative patterns that have crept in.

(3) If the patient was no longer able to properly interpret mental or physical signals of overload, the coach provided assistance with body awareness.

(4) Patients who had physical problems, or who needed to change their attitude or behaviour in order to reduce the problems being experienced, received treatment or coaching from the physiotherapist.

The number of sessions required for the various individual modules was estimated during the intake procedure. If it emerged during treatment that additional sessions were needed in order to achieve the target or maintain the outcome, these were scheduled at no additional cost to the employer. At six-week intervals in the
programme, respiratory variables were measured and the submaximal exertion test was repeated in order to detect changes in physical condition so that the personal workout scheme could be adjusted if necessary. If $P_{\text{peak}}$ had remained the same or gone down (whereas the session length had increased) there was a risk of over-training.\textsuperscript{14} In this case, the session length was reduced by eight minutes so that it could subsequently be increased by two minutes a week. If $P_{\text{peak}}$ had gone up the session was increased by two minutes a week up to a maximum of 40 minutes.

### Table 2. Modules used to treat employees with prolonged fatigue

<table>
<thead>
<tr>
<th>Module</th>
<th>Provided by</th>
<th>Time per session</th>
<th>Number of sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group sessions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical training</td>
<td>2 physiotherapists</td>
<td>2 hours</td>
<td>30–36</td>
</tr>
<tr>
<td>Theory lessons</td>
<td>Physiotherapist</td>
<td>1 hour</td>
<td>5</td>
</tr>
<tr>
<td>Breathing, Awareness and Relaxation</td>
<td>Physiotherapist</td>
<td>1 hour</td>
<td>5</td>
</tr>
<tr>
<td>Group coaching</td>
<td>2 NLP coaches\textsuperscript{1}</td>
<td>2 hours</td>
<td>5</td>
</tr>
<tr>
<td><strong>Individual sessions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work &amp; Organisational</td>
<td>Occupational and organisational expert</td>
<td>1 hour</td>
<td>Determined individually</td>
</tr>
<tr>
<td>Psychologist</td>
<td>Psychologist</td>
<td>1 hour</td>
<td>Determined individually</td>
</tr>
<tr>
<td>Body awareness</td>
<td>Coach</td>
<td>1 hour</td>
<td>Determined individually</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>Physiotherapist</td>
<td>20–30 minutes</td>
<td>Determined individually</td>
</tr>
<tr>
<td>Physical coaching</td>
<td>Physiotherapist</td>
<td>30–60 minutes</td>
<td>Determined individually</td>
</tr>
<tr>
<td>Exertion test</td>
<td>Human movement scientist</td>
<td>1 hour</td>
<td>At 6-week intervals</td>
</tr>
<tr>
<td></td>
<td>Physiotherapist</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{1} Neuro-Linguistic Programming
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Results

Population
Data was collected on 32 patients with prolonged fatigue, 23 female and 9 male. The average age was 37 years (SD = 11.3), ranging from 21 to 58 years. Average sick leave up to t0 was 27 weeks (SD = 18.5), with three patients not on sick leave and 21 on full sick leave. The diagnoses with which they were enrolled were burn-out, frequent absences from work, mental problems, stress or tension problems, Chronic fatigue syndrome (CFS) and fibromyalgia.

Fatigue
Data were available for analysis on 21 patients. Eleven patients did not complete (or fully complete) the questionnaire at both t1 and t2. The average CIS score reduced significantly during treatment (see Table 3).

Quality of life
Twenty-three patients fully completed the RAND-36 at t0 and t3. During the period from intake to completion of the treatment, the average score rose significantly (p<0.01) on the five sub-scales: physical functioning, vitality, mental health, physical role limitation and emotional role limitation (see Table 4).

Work participation
This analysis contained complete data on 31 patients. One patient did not have a permanent employment contract at t0 but had previously been working freelance. At t0 the patients were working 21.9% (SD = 34.03) of their contractual hours, on average; this percentage had increased significantly by t3 and t4 (see Table 5). In the case of three of the 31 patients the number of contractual hours was reduced at their request between t0 and t4. Another three patients had their employment contracts terminated: one was dismissed and two resigned. The work participation percentage at t4 compared with the number of contractual hours at t4, i.e. adjusted for the changed contracts (n = 28), shows that the patients were working 96.0% (SD = 11.86) of their contractual hours.
Table 3. Degree of fatigue as measured using the Checklist Individual Strength (CIS) during a treatment programme

<table>
<thead>
<tr>
<th>Measuring points</th>
<th>n</th>
<th>Fatigue (M, SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake (t0)</td>
<td>21</td>
<td>102 (19.0)</td>
</tr>
<tr>
<td>6 weeks after start (t1)</td>
<td>21</td>
<td>87 (33.8)*</td>
</tr>
<tr>
<td>12 weeks after start (t2)</td>
<td>21</td>
<td>76 (36.0)*</td>
</tr>
<tr>
<td>Upon completion (t3)</td>
<td>21</td>
<td>64 (35.0)*</td>
</tr>
</tbody>
</table>

The table shows numbers (n), average total scores (M) and standard deviations (SD). The higher the value, the more fatigue problems.

1 General Linear Model for repeated measurements (compared with t0); * p<.01

Table 4. Quality of life as measured using RAND-36 prior to and after completion of a treatment programme

<table>
<thead>
<tr>
<th>Quality of Life</th>
<th>Intake (t0)</th>
<th>Upon completion (t3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
</tr>
<tr>
<td>Physical functioning</td>
<td>23</td>
<td>58.3</td>
</tr>
<tr>
<td>Vitality</td>
<td>23</td>
<td>33.3</td>
</tr>
<tr>
<td>Mental health</td>
<td>23</td>
<td>57.2</td>
</tr>
<tr>
<td>Physical role limitation</td>
<td>23</td>
<td>9.8</td>
</tr>
<tr>
<td>Emotional role limitation</td>
<td>23</td>
<td>44.9</td>
</tr>
</tbody>
</table>

The table shows numbers (n), average scores (M) and standard deviations (SD). The higher the score, the higher quality of life.

1 Wilcoxon signed-rank test, two-sided or 2 paired t-test, two-sided; *p<.05 and **p<.01

Table 5. Work participation percentage during the treatment programme

<table>
<thead>
<tr>
<th>Measuring points</th>
<th>n</th>
<th>Work participation (M, SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of hours worked at t0</td>
<td>31</td>
<td>21.9 (34.03)</td>
</tr>
<tr>
<td>Percentage of hours worked at t3</td>
<td>31</td>
<td>65.7 (29.30)*</td>
</tr>
<tr>
<td>Percentage of hours worked at t4</td>
<td>31</td>
<td>84.1 (30.61)*</td>
</tr>
</tbody>
</table>

The table shows numbers (n), averages (M) and standard deviations (SD).

1 Friedman test (compared with t0); *p<.001
Perceived outcome from the patient’s perspective
Twenty patients returned the questionnaire. Two said their symptoms were ‘unchanged’ during the programme, five ‘somewhat diminished’ and 13 ‘greatly diminished’. After completion of the programme, three subjects’ symptoms were ‘somewhat worse’, two ‘unchanged’, eight ‘somewhat diminished’ and seven ‘greatly diminished’ compared with the end of the programme.

Twenty-eight patients set physical targets, e.g. improving their physical condition or reducing pain or physical symptoms, and evaluated them at t3: twenty-one said they had met their physical targets. Twenty-six patients set mental targets, e.g. being able to relax more or becoming more self-confident: at t3 twenty-three said they had met their targets. Twenty-seven patients set work-related targets, e.g. full return to their previous work or exploring the job opportunities: at t3 eighteen said they had met their targets.

Perceived outcome from the employer’s perspective
Twenty-two employers returned the questionnaire or answered it by telephone. In the case of eight patients, the original contact person was no longer working for the company, and two employers could not be contacted even after repeated calls. One employer was dissatisfied with the outcome, three were neutral, nine satisfied and nine very satisfied.

Discussion

This study evaluated the outcomes of an existing treatment programme for patients with prolonged fatigue. The multidisciplinary programme included both physical and cognitive behavioural aspects, with both individual and group sessions taking place. The treatment was expected to influence certain outcome measures, e.g. diminished fatigue problems, better functioning in day-to-day life and return to work. The current research design was selected and the outcome measures were operationalised on the basis of this expectation.

At the start of the treatment programme, the patients were seriously fatigued, with an average CIS score of 102. This is slightly lower than the average CIS score for
CFS patients (average = 113)\(^{15}\), but higher than that for fatigued workers (on sick leave) (average = 90).\(^{15}\) Looking at the initial individual scores, we note that all the patients except one (CIS = 69) had a CIS score of over 76. This was set as the cut-off point for increased risk of sickness absence due to fatigue.\(^{15}\) After completion of the programme, not only had the average CIS score diminished significantly, 14 of the 21 patients also had a CIS score of less than 76.

After completion of the programme, the average score on the RAND-36 physical functioning sub-scale (84.1) was slightly better than for the Dutch population as a whole (83.0).\(^{16}\) The scores after completion of the programme on the vitality (60.2) and mental health (72.9) scales are close to the Dutch norm (68.6 and 75.9 respectively).\(^{16}\) The results show that three months after completion of the programme (t4) work participation rose to 84%. Five patients had their contracts changed during the study period, with the result that at t4 96% of the current contractual hours were being worked at t4. One of the aims of the programme was for patients to gain a better feeling for where their boundaries lay. It may be as a result of gaining this insight that five patients changed their employment contracts.

The following points should be taken into account when interpret the results. First, this was an evaluation study without a control group, so all the results observed cannot necessarily be attributed to the treatment programme. Given the longstanding nature of the problems and the sickness absence at the start of the programme, however, spontaneous recovery from fatigue was unlikely. Second, when collecting data on the outcome measures fatigue and quality of life there were found to be ‘missing values’. The vocational rehabilitation institution added new questionnaires during the 2002-2006 period, with the result that not all 32 patients completed all the questionnaires, leading to a limited sample size. Having analysed the outcome measures, however, we observed a large effect on both fatigue (effect size = 1.41) and quality of life (effect size = 0.68).

Ten patients did not participate in the programme following the intake procedure: two decided not to because they were not confident of achieving a good outcome, and in the case of the other eight, the employer considered that the investment in terms of time or money outweighed the possible benefits. Given this last finding, it would be interesting for future research to examine the cost-effectiveness of the treatment programme. Also, in view of the improvements observed, it would be worthwhile to continue research into treatment programmes for patients with fatigue both in a
controlled setting and in the longer term. This recommendation is being implemented in a follow-up study.

**Conclusion**

The results of this evaluation study suggest that a multidisciplinary treatment programme significantly reduces fatigue problems and improves quality of life and work participation. These outcomes are of clinical relevance. It also emerged that both patients and employers perceived the programme as having had a positive outcome.

**References**


