ORIGINAL ARTICLE

Work Ability Index Predicts Application for Disability Pension After Work-Related Medical Rehabilitation for Chronic Back Pain

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Abstract

Objective: To determine whether the Work Ability Index (WAI), a short 7-item self-report questionnaire addressing issues of perceived disability, impairment, and expectations for resuming work, predicts application for disability pension, recommendations for further treatment, and other adverse work-related criteria in patients with chronic back pain after rehabilitation.

Design: Cohort study with 3-month follow-up.

Setting: Seven inpatient rehabilitation centers.

Participants: Patients (N=294; 168 women; mean age, 49.9y) with chronic back pain.

Intervention: The WAI was completed at the beginning of rehabilitation. All patients were treated according to the German rehabilitation guidelines for chronic back pain and work-related medical rehabilitation.

Main Outcome Measure: Application for disability pension, as assessed by a postal questionnaire 3 months after discharge.

Results: Receiver operating characteristic curve analysis of the association between the WAI at baseline and subsequent application for disability pension revealed an area under the curve of .80 (95% confidence interval [CI], .62−.97). Youden index was highest when the WAI cutoff value was ≤20 points (sensitivity, 72.7%; specificity, 82.2%; total correct classification, 81.7%). After adjusting for age and sex, persons with a baseline WAI score of ≤20 points had 15.6 times (95% CI, 3.6−68.2) higher odds of subsequent application for disability pension, 4.9 times (95% CI, 1.5−16.8) higher odds of unemployment, and 6 times (95% CI, 2.4−15.2) higher odds of long-term sick leave at follow-up.

Conclusions: The WAI could help rehabilitation professionals identify patients with back pain with a high risk of a subsequent application for disability pension.

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Back pain is the most common health problem in the European workforce.[1] In Germany, it is the leading cause of sickness absence[2,3] and a main cause of health-related early retirement.[4] About 10% of all disability pensions in persons aged ≥60 years are granted because of *International Classification of Diseases—10th Revision* (ICD-10) back pain diagnoses M50 to M54.[4]

To prevent health-related early retirement and to promote participation in working life, social security agencies in many Western countries provide rehabilitation services for persons who temporarily lose all or some work ability but can be expected to return to work after rehabilitation. In Germany, 2 types of rehabilitation services, general medical rehabilitation and work-related medical rehabilitation (WMR), are provided to different groups of employees according to the degree of limitation of functioning. The objectives of both rehabilitation strategies are to achieve long-term improvement in work capacity and reduce the risk of disability pension. Patients with severe limitations of work-related functioning receive WMR, which is a multimodal rehabilitation program that follows the principles of functional restoration[5] and work hardening.[6]

Randomized controlled trials have proven the effectiveness of WMR programs in terms of work-related participation.[7,8] However, some patients will require further services (eg,

professional training measures) after discharge, because they can no longer perform their former job, and some will be unable to return to any form of full-time employment. These patients have a high risk of disability claim, and special attention is needed to clarify their potential for future participation in the workforce. For these patients, the current guideline of WMR recommends to consider measures as full functional capacity evaluation or capacity assessments in real job environments as part of WMR. Because these measures are usually extensive, costly, and time consuming, the careful selection of measures according to the intended aims of rehabilitation and proper preparation of the patients is essential for cost-effectiveness. Thus, it is necessary to identify patients in need of these measures as early as possible.[9,10] In Germany, there are, however, no recommendations for concrete screening tools that could help rehabilitation professionals determine the risk of adverse rehabilitation outcomes and decide which patients need additional measures during WMR in order to prepare job modifications or professional training measures afterward.

One of the most common internationally used work ability screening tools is the Work Ability Index (WAI). This instrument is based on the work ability concept of Ilmarinen[11] from the Finnish Institute of Occupational Health. Ilmarinen[11] described work ability as the interaction of individual determinants (health, competence, and attitudes) and the work environment. Several studies have confirmed that a low WAI score predicts productivity loss at work, retirement intentions, long-term sickness absence, early retirement, and need for rehabilitation.[12-19] Because most of these studies were epidemiologic studies in the working population, it is unclear whether the WAI is also useful for risk assessment within a rehabilitation setting. Therefore, the aim of the present study was to identify the best WAI cutoff score for a risk classification in order to predict follow-up application for disability pension in patients with chronic back pain. Moreover, we examined whether classification of work ability according to this cutoff score was associated with the physician-reported work ability assessment at discharge and whether the WAI predicted other work- and health-related outcomes 3 months after WMR.

Methods

Setting and participants

Participants were recruited at 7 inpatient rehabilitation centers in Germany, which tested the feasibility of the implementation of the German guidelines for WMR. The cohort considered patients with ICD-10 back pain diagnoses M50 to M54. Patients were treated according to the German rehabilitation guidelines for chronic back pain[20] and WMR.[21] Individuals who started

> **List of abbreviations:**
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> | | |
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> | AUC | area under the curve |
> | HRQOL | health-related quality of life |
> | ICD-10 | *International Classification of Diseases−10th Revision* |
> | ROC | receiver operating characteristic |
> | SES | standardized effect size |
> | SF-36 | Medical Outcomes Study 36-Item Short-Form Health Survey |
> | WAI | Work Ability Index |
> | WMR | work-related medical rehabilitation |

rehabilitation immediately after a stay in an acute care hospital were excluded from this study, because the new WMR guidelines for these patients still needed revision at the time of our study. We also excluded patients who had applied for disability pension prior to entering the program. The intended sample size per center was 50 patients. Recruitment was done by the staff of the rehabilitation center at the beginning of rehabilitation. Patients were informed of the study issues, both orally and in writing. Study participation was voluntary. After the staff received written consent, the patients were handed the baseline questionnaire and asked to complete it on the same day. The baseline questionnaire included the WAI as well as other health- and work-related questions. After 3 months, the research team sent a postal questionnaire to the participants to collect the dependent variables. The 3-month period of follow-up was chosen, because the study was primarily established to assess the short-term effects of WMR implementation. Finally, baseline and follow-up data were linked to physician-reported data that we extracted from the standardized discharge form.[22]

Ethical approval was obtained from the Hannover Medical School. Additional approval was obtained from the data protection commissioners of the participating pension insurance agencies.

Work Ability Index

Work ability was assessed using the German version of the WAI questionnaire,[23,24] which contains the following 7 items: (1) current work ability compared with lifetime best, (2) work ability in relation to the demands of the job, (3) number of current diseases diagnosed by a physician, (4) estimated work impairment because of diseases, (5) sick leave during the past year, (6) own prognosis of work ability 2 years from now, and (7) mental resources.

The WAI yields a continuous score of 7 to 49 points, where higher scores indicate better work ability. WAI scores can be classified as excellent (44−49 points), good (37−43 points), moderate (28−36 points), and poor (7−27 points).

Dependent variables

Physician-reported work ability assessment at discharge
Each patient's medical work ability assessment, as determined by the attending physician at discharge, was extracted from the standardized discharge form. This expert opinion can be used as evidence for appraisal of subsequent requests for further services and benefits (eg, vocational rehabilitation or disability pension). The form requires the physician to specify further treatment recommendations (need for further diagnostic testing, psychological counseling, and/or vocational rehabilitation, etc), the patient's daily work time capacity for current job demands (<6h/d vs ≥6h/d), and reasonable estimates of future work load (light vs medium/heavy).

Work-related outcomes 3 months after discharge
Participation in working life was measured using the following indicators: employment status (employed vs unemployed), sick leave (≤6wk vs >6wk), application for vocational rehabilitation (no vs yes), application for disability pension (no vs yes), and intention to apply for disability pension (no vs yes) 3 months after discharge.