J Rehabil Med 2016; 48: 903–908

ORIGINAL REPORT

PREVALENCE OF COMORBID DEPRESSIVE SYMPTOMS IN REHABILITATION: A CROSS-INDICATION, NATIONWIDE OBSERVATIONAL STUDY

Martin Brünger, MPH, and Karla Spyra, PhD

From the Institute for Medical Sociology and Rehabilitation Science, Charité - Universitätsmedizin Berlin, Berlin, Germany

Objective: **Patients in rehabilitation with comorbid depressive disorders display increased morbidity, mortality and inability to work. The aim of this study is to determine the prevalence of comorbid depressive symptoms in rehabilitation.**

Methods: **A total of 6,000 patients were contacted by post at the same time as receiving approval for their medical rehabilitation from German Federal Pension Insurance. Depressive symptoms were assessed using the Patient Health Questionnaire (PHQ-2). Results were compared with prevalences in the general population by analysing the German Health Interview and Examination Survey for Adults (DEGS).**

Results: **A total of 2,152 out of 5,891 patients participated in the study (response rate: 36.5%). The prevalence of self-reported depressive symptoms was 33.1% (women 34.1%, men 31.3%). In contrast, 7.8% of the German general population reported depressive symptoms (women 9.4%, men 6.2%). The highest prevalences were found in neurological (36.4%) and orthopaedic (35.6%) rehabilitation, the lowest in cancer rehabilitation (23.0%). Depressive symptoms were significantly associated with higher comorbidity and impairment due to pain, with lower social support and self-efficacy and with specific work-related problems.**

Conclusion: **A short routine screening yielded a positive test result for depressive symptoms in a third of rehabilitation patients, thus approximately four times higher than in the general population. This is valuable information in order to better adjust treatment to patient needs.**

Key words: comorbidity; depression; self-assessment; rehabilitation; screening; cross-sectional studies.

J Rehabil Med 2016; 48: 903–908

Correspondence address: Martin Brünger, Institute for Medical Sociology and Rehabilitation Science, Charité - Universitätsmedizin Berlin, Luisenstraße 13a, DE-10117 Berlin, Germany. E-mail: martin.bruenger@charite.de

Accepted Aug 23, 2016; Epub ahead of print Oct 13, 2016

INTRODUCTION

Medical rehabilitation follows a multidisciplinary approach based on the International Classification of Functioning, Disability and Health (ICF) and its bio-psycho-social model of illness. Rehabilitation should tackle the patient's possible multimorbidity. In this context, comorbid mental disorders play a decisive role. An adverse effect of comorbid depressive disorders on the individual's health and the social security system has been shown in numerous studies. Depressive comorbidity is associated with lower quality of life (1), increased utilization of healthcare benefits, and higher rates of long term sick-leave (2). The number of additional diseases is higher in the presence of depressive comorbidity, and mortality risk is increased (3).

Cancer, cardiac and diabetic patients are hospitalized for a prolonged period of time if they additionally have mental comorbidity (3). Depressive comorbidity is also associated with increased costs of medical care (4), an increased issuing of medical certificates (5), and a higher rate of disability pensions (6).

Numerous prevalence studies of mental disorders were conducted within the general population, many of them under the umbrella of the World Mental Health Survey Initiative (7). Other studies deal with the epidemiology of depressive disorders as a comorbidity of different somatic diseases, such as arthritis (8), chronic back pain (9), heart disease (10), diabetes (11) and multiple sclerosis (12). Reported odds ratios range from 1.4 to 2.3 for major depression and 1.3 to 2.8 for dysthymia compared with healthy individuals. These study participants were not, however, recruited in rehabilitation settings but from the general population.

The comorbidity of depression within different fields of rehabilitation, such as cardiology and oncology, remains uncertain. This is surprising, since depression is widespread within the general population and its adverse health effects are well known. A prevalence estimation of depressive comorbidity could facilitate a more precise planning of requirements in rehabilitation facilities, and thus improve the therapy and recovery of patients. Härter et al. reported a point prevalence of 12.3% for depressive symptoms in rehabilitation. This study was, however, performed in non-randomly selected single inpatient facilities within only one region in Germany (13). Therefore, these results cannot be considered as representative on a nationwide level.

For these reasons, the aim of this work is to determine the prevalence of comorbid depressive symptoms in rehabilitation patients across all major disease groups in a nationwide study in Germany. In addition, it aims to examine the association of self-reported depressive symptoms with other impairments and resources relevant for rehabilitation. A comparison with the German general population will be provided based on analyses of the German Health Interview and Examination Survey for Adults (DEGS).

 doi: 10.2340/16501977-2156

 ISSN 1650-1977

METHODS

Study design

A nationwide observational study was conducted in Germany. A total of 6,000 persons insured with the Deutsche Rentenversicherung Bund (German Federal Pension Insurance) were contacted by post and asked to complete a questionnaire at the same time as they received approval for their medical rehabilitation (between September and November 2011). Patients were included in the study based on approval for their medical rehabilitation according to §15 SGB VI (German social security code). These are rehabilitations with the aim of securing or restoring the ability to work. In Germany, rehabilitation follows a multidisciplinary and multimodal approach that usually lasts 3 weeks in full-time care, although an optional additional week can be requested. Rehabilitation patients are treated in specialized inpatient or outpatient facilities that focus on 1 or more fields of rehabilitation defined by disease groups. Patients who were treated in the 6 most common disease groups were included in the study. These disease groups are: musculoskeletal diseases (admission diagnosis according to the International Classification of Diseases ICD-10: M00–M99), diseases of the circulatory system (I00–I99), gastrointestinal, endocrine, nutritional and metabolic diseases (E00–E90, K00–K93), diseases of the respiratory system (J00–J99), neoplasms (C00–D48), and diseases of the nervous system (G00–G99). The questionnaire had to be completed prior to the start of rehabilitation to rule out effects of the medical rehabilitation on the response.

To allow separate evaluations according to disease groups, random sampling was conducted in combination with stratification according to disease groups of 1,000 insured people each. Within these 6 disease groups the most common diseases include chronic back pain (M50–M54), stroke (I61–I64), coronary heart disease (I20–I25), hypertension (I10–I15), diabetes (E10–E14), asthma (J45), breast cancer (C50) and multiple sclerosis (G35) (14). The chosen sample size allows us to determine the prevalence of depressive symptoms with a confidence level of ± 5 percentage points at the level of single disease groups and of ± 2 percentage points for the combined sample, assuming a response rate of 32% and a prevalence of 30%.

Data collection and instruments

Depressive symptoms were measured using the short version of the Patient Health Questionnaire (PHQ-2) (15). The PHQ-2 is based on the 2 key diagnostic criteria for depressive disorders according to Diagnostic and Statistical Manual (DSM-IV). It allows us to assess both "little interest or pleasure in doing things" and "feeling down, depressed, or hopeless", on 4-point Likert scales referring to a period of the 2 previous weeks. Depressive symptomatology is defined as a total PHQ-2 score of at least 3 points, while the instrument ranges between 0 and 6 points (15).

To include additional impairments and resources relevant for rehabilitation, further instruments were used (16): comorbidity was examined using the Self-Administered Comorbidity Questionnaire (SCQ) (17), impairment due to pain using the Pain Disability Index (PDI) (18), social support with a scale composed of the Indicators of Rehabilitation Status Questionnaire (IRES) (19), self-efficacy using the General Self-Efficacy Scale (GSE) (20), and specific work-related problems using the short version of the Screening Instrument for Detecting the Need of Work-Related Medical Rehabilitation (SIMBO) (21). For 90.8% of the participants we could link the assessment data with sociodemographic variables and medical history data concerning the rehabilitation (by using data from their insurance account). Whatever the reasons, we assume that a large part of the remaining 9.2% of participants did not start their granted medical rehabilitation (22).

Approval was obtained from the ethics committee of the Charité – Universitätsmedizin Berlin for these analyses. All participants gave written informed consent to participate in the study.

Data analyses

As the rate of missing data across all the scales was as low as 7.4%, only participants providing a complete record in terms of the assessment data were included. At first, the non-responses were analysed for essential sociodemographic variables on the basis of χ^2 and Mann-Whitney *U* tests. We established weighting factors to improve the accuracy of the prevalence estimation. These weights account for the varying willingness to participate between men and women and for deviations in the drawn sample that occurred when compared with the sex distribution in rehabilitation in 2011. Due to the stratified sampling, cross-indication analyses were additionally weighted according to the distribution of disease groups in 2011 (14).

Prevalences of self-reported depressive symptoms and their 95% confidence intervals (95% CI) are reported for all rehabilitation patients, and stratified for sex, age and disease groups. Three age categories of approximately equal size were established (20–44, 45–54 and 55–65 years) and a χ^2 test was performed to assess a linear trend.

To examine the association of depressive symptoms with other impairments and resources relevant for rehabilitation we built a logistic regression model with controls for sex, age, and their interaction. The binary dependent variable was depressive symptomatology, the other reported instruments served as continuous independent variables. The SIMBO was factored in as binary independent variable (specific work-related problem present vs not present). The significance level was defined as $\alpha = 0.05$. The analyses were computed with the SPSS version 23 (IBM Corp.).

Additional analyses

To compare prevalences of depression in rehabilitation with the prevalence in the general population, the public use file of the DEGS was also analysed according to the PHQ-2 (23). The study design, response, weighting, and core characteristics of the sample are described elsewhere (24).

RESULTS

Prevalence of comorbid depressive symptoms in rehabilitation patients

Table I characterizes the study population. Of the 5,891 individuals who were successfully contacted and who met the inclusion criteria, 2,152 participated in the study (response rate 36.5%) (Fig. 1). In the complete case analyses there were 305–365 patients per disease group, and 1,992 participants overall.

The mean age of all participants was 50.4 years (standard deviation (SD) 8.3) (range 20–65 years). Almost two-thirds were women. Twenty percent of participants had no periods of inability to work, and the remaining participants had been unable to work for less than 3 months (48.1%), 3 to under 6 months (10.4%), or at least 6 months (16.7%) during the 12 months prior to rehabilitation. Of all participants, 4.7% registered as unemployed.

The *de facto* duration of rehabilitation was on mean 3 days longer than approved duration of rehabilitation (25.1 (SD 5.6) vs. 22.0 days (SD 3.1)). The non-response analyses did not reveal any significant differences between the included participants and the remaining sample in terms of all examined sociodemographic variables and rehabilitation details (Table I).

The prevalence of comorbid self-reported depressive symptoms was 33.1% (95% confidence interval (95% CI): 31.1–35.2). In women, the proportion was 34.1% (95% CI: 31.6–36.6), and thus numerically, but not significantly, higher than in men (31.3%; 95% CI: 27.7–35.1). The stratification according to age categories indicated a significant gradient ($p = 0.038$). The highest prevalence of depressive symptoms was found among rehabilitation patients under 45 years of age, revealing a proportion of 37.8% (95% CI: 33.0–42.6). Patients aged 55–65 years formed the group with the lowest proportion

Table I. *Description and comparison of included study participants and the remaining sample*

Sociodemographic characteristics and rehabilitation details	Included study participants (n=1,992)		Remaining sample (n=3,899)		
	n	Mean (SD)/ Percentage	n	Mean (SD)/ Percentage	U-test/χ^2-test p-value
Age, years, mean (SD)	1,992	50.4 (8.3)	3,899	49.6 (9.5)	0.069
Sex, %					
Women	1,313	65.9	2,480	63.6	0.080
Men	679	34.1	1,419	36.4	
Settlement structure[a], %					
Urban regions	885	44.4	1,811	46.5	
Regions with urbanization	635	31.9	1,214	31.1	0.303
Rural regions	472	23.7	873	22.4	
Unemployed, %	73	4.0	171	4.9	0.141
Inability to work 12 months prior to rehabilitation, %					
6–12 months	303	16.7	612	18.6	
3 to under 6 months	188	10.4	336	10.2	
Under 3 months	871	48.1	1,474	44.7	0.104
None	362	20.0	688	20.9	
Not working	85	4.7	187	5.7	
Disease groups (weighting factors[b]), %					
Musculoskeletal diseases (3.67)	332	16.7	648	16.6	
Diseases of the circulatory system (0.47)	305	15.3	691	17.2	
Gastrointestinal and endocrine diseases (0.33)	340	17.1	649	16.6	0.061
Diseases of the respiratory system (0.44)	340	17.1	647	16.6	
Neoplasms (0.69)	365	18.3	614	15.7	
Diseases of the nervous system (0.38)	310	15.6	670	17.2	
Approved duration of rehabilitation, days, mean (SD)	1,962	22.0 (3.1)	3,713	21.9 (3.5)	0.060
De facto duration of rehabilitation, days, mean (SD)	1,809	25.1 (5.6)	3,298	25.0 (6.2)	0.170

[a]Classification according to the German Federal Institute for Research on Building, Urban Affairs and Spatial Development. [b]Weighting factors for distribution of sex and disease groups in medical treatment rehabilitations provided by the German Federal Pension Insurance 2011 (14).
SD: standard deviation.

of depressive symptoms (31.2% (95% CI: 27.8–34.6)) (Fig. 2).

Analyses according to disease groups showed the lowest prevalence of depressive symptomatology in cancer rehabilitation (23.0%; 95% CI: 18.7–27.3). The percentages were highest in neurological (36.4%; 95% CI: 31.1–41.8) and orthopaedic rehabilitation (35.6%; 95% CI: 30.4–40.7). In rehabilitation of patients with diseases of the circulatory or respiratory system and with gastrointestinal, endocrine, nutritional or metabolic diseases, the mean prevalences ranged from 29.6% to 33.1% (Fig. 3).

The regression model showed that depressive symptoms are significantly associated with higher comorbidity (OR=1.09; 95% CI: 1.06–1.12) and higher impairment due to pain (OR=1.05; 95% CI: 1.04–1.06), lower social support (OR=0.94; 95% CI: 0.92–0.96), lower expectations of self-efficacy (OR=0.91; 95% CI: 0.87–0.95) as well as with the presence of specific work-related problems (OR=1.36; 95% CI: 1.08–1.71) (Table II).

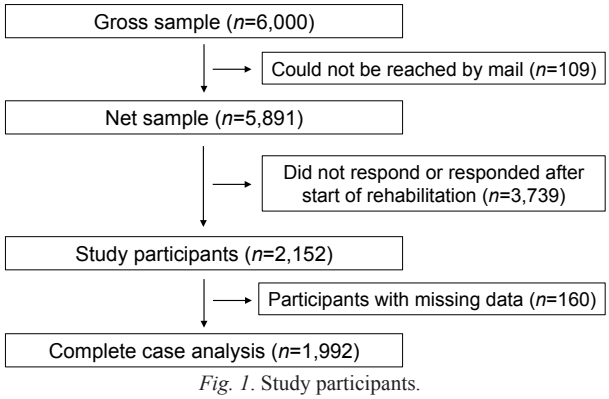

Fig. 1. Study participants.

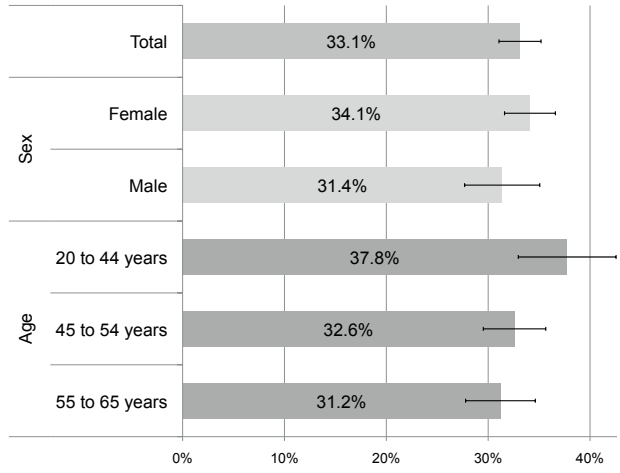

Fig. 2. Prevalence of comorbid depressive symptoms in rehabilitation patients stratified by sex and age (with 95% confidence intervals, n=1,992). Weighted for disease groups in medical treatment rehabilitations provided by the German Federal Pension Insurance 2011, cross-gender analyses additionally weighted for distribution of sex (14).

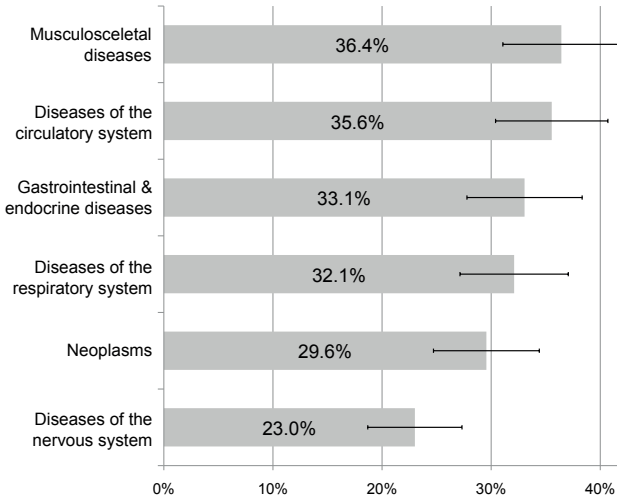

Fig. 3. Prevalence of comorbid depressive symptoms in rehabilitation patients stratified by disease groups (with 95% confidence intervals, $n = 1{,}992$). Weighted for distribution of sex in medical treatment rehabilitations provided by the German Federal Pension Insurance 2011 (14).

Prevalence of depressive symptoms in the general population

Out of 5,938 persons aged 18–64 years who are enlisted in the DEGS, those 98% with complete PHQ-2 data-sets were included in the analyses of the public use file. Overall, the prevalence of self-reported depressive symptoms was 7.8% (95% CI: 7.0–8.7). Women had a significantly elevated prevalence of 9.4% (95% CI: 8.2–10.8) compared with the men's prevalence of 6.2% (95% CI: 5.3–7.3).

Mean prevalences were approximately 7% or 8% for each of the age groups; 8.0% for 18–44-year-old individuals (95% CI: 6.9–9.4), 7.3% for 45–54-year-olds (95% CI: 5.8–9.2), and 7.7% for 55–64-year-olds (95% CI: 5.8–10.1).

Table II. *Association of depressive symptoms and other impairments and resources relevant for rehabilitation*

Instruments (range)	OR (95% CI)	*p*-value
Constant	0.32	0.066
Comorbidity SCQ (0–39)	1.09 (1.06–1.12)	<0.001
Impairment due to pain PDI (0–70)	1.05 (1.04–1.06)	<0.001
Self-efficacy GSE (10–40)	0.94 (0.92–0.96)	<0.001
Social support IRES (0–10)	0.91 (0.87–0.95)	<0.001
Specific work-related problems SIMBO (yes/no)	1.36 (1.08–1.71)	0.009

Multivariate binary logistic regression adjusted for age, sex and its interaction; reciprocally adjusted effects of stated impairments and resources ($n = 1{,}992$). Corrected $r_2 = 0.293$. Weighted for distribution of sex and disease groups in medical treatment rehabilitations provided by the German Federal Pension Insurance 2011 (14).
95% CI: 95% confidence interval; GSE: General Self-Efficacy Scale; IRES: Indicators of Rehabilitation Status Questionnaire; OR: odds ratio; PDI: Pain Disability Index; SCQ: Self-Administered Comorbidity Questionnaire; SIMBO: Screening Instrument for Detecting the Need of Work-Related Medical Rehabilitation.

DISCUSSION

Approximately one-third of patients in rehabilitation were assessed as having depressive symptoms according to the PHQ-2. Therefore, the proportion of people with depressive symptoms is increased by a factor of approximately 4 in rehabilitation compared with the prevalence in the general population. A prevalence of 8.1% with depressive symptoms in the general population was ascertained in the DEGS (25). A marginally lower prevalence of 7.8% was found in our analyses of self-reported depressive symptoms within the DEGS by using the short version of the PHQ-2 instead of its original instrument PHQ-9. This is in accordance with a study comparing different instruments measuring depression, including PHQ-2 and PHQ-9 (26).

Gender differences were not statistically significant in rehabilitation despite the fact that in the general population women have a higher risk of depression than men (9.4% of women vs 6.2% of men show depressive symptoms). Higher rates of depressive symptoms in women and in younger patients are in accordance with other surveys (25).

The particularly high prevalences in orthopaedic and neurological rehabilitation seem plausible. In fact, the most frequent diagnoses in these areas of rehabilitation are chronic back pain and multiple sclerosis (14). For these 2 diagnoses, a high prevalence of depressive comorbidity has been described in epidemiological population-based studies (9, 12). The significant correlation between depressive symptoms and other examined impairments and resources confirms preliminary studies (27–31). In this study, the prevalence of self-reported depressive symptoms in rehabilitation was examined for the first time based on a nationwide data collection. Another German study was conducted in single rehabilitation hospitals between 1998 and 2004, reporting a point prevalence of 12.3% for depressive symptoms (13). Due to the selective sampling in single inpatient facilities confined to a certain region only, the results cannot, however, be considered as representative. Moreover, they used different instruments from the ones in our study. It therefore remains uncertain whether the identified differences in prevalences are due only to methodological reasons or reflect reality.

Strengths and limitations of the study

In our study, we depict medical rehabilitation throughout Germany across all essential disease groups. Inpatient, as well as outpatient, rehabilitation settings were included. The 6 disease groups that were included represent a total of 95.7% of all rehabilitation measures realized by the German Federal Pension Insurance (excluding rehabilitation due to mental disorders) (14). The stratified study design allowed additional evaluations for single disease groups. The response rate of 36.5% is comparable with other epidemiological studies (32). Due to the limited time between approval and start of rehabilitation it was not possible to send out follow-up letters. The extensive non-response analyses based on sociodemographic data and duration of rehabilitation did not provide an indication for a relevant selection bias (Table I). For the cross-gender analyses, the slight variation in willingness to participate between

men and women was factored in correspondingly. Additional analyses, which compare participants with the remaining sample with regard to rehabilitation variables that are significantly related to the presence of depressive symptoms, also did not show any significant differences (data not shown). This includes the amount of psychotherapeutic therapy during the rehabilitation, reduced psychological resilience, and the recommendation for a psychological counselling or treatment after rehabilitation by the responsible physician or psychologist at the end of rehabilitation. Selection bias cannot be ruled out completely, but there is no evidence for substantial selection bias. Nevertheless, both a higher as well as a lower prevalence of depressive symptoms is possible.

In terms of generalizability it must be considered that the results cannot necessarily be transferred to so-called follow-up rehabilitation into which patients are moved directly from a hospital. Follow-up rehabilitation may be applied, for example, in patients having had an implantation of an endoprosthesis or chemotherapeutic treatment. The limitation of this study to conventional medical rehabilitations might also explain why the prevalence of depressive symptoms was less elevated in cancer rehabilitation compared with the other disease groups. We believe that this is because usually approximately one year passes from the time when cancer was diagnosed until one enters a non-follow-up rehabilitation, which is a considerable period of time for adapting to normal life. The exclusion of follow-up rehabilitations resulted from the differing application procedure and the insurants' accessibility via the post (14).

We are aware of the limitations of this study, which arise due to the method of recruitment of patients. The German Federal Pension Insurance is by far the largest payer of medical rehabilitation; it insures approximately 34 million people (out of a total of 81 million citizens in Germany) and realizes approximately 450,000 medical rehabilitations per year (14). Nonetheless, the results cannot be transferred unconditionally to rehabilitation patients sponsored by other payers. This applies in particular to the statutory health insurance, which is primarily responsible for rehabilitations realized at *post*-working age, while the German Pension Insurance focuses on rehabilitation for the working-age population.

Another limitation could be that our measurement is a scale of self-reported depressive symptoms. It has to be emphasized that PHQ-2 does not deliver a diagnosis of clinical depression. According to a validation study, PHQ-2 provides a sensitivity of depressive disorders of 79% and a specificity of 86% (15). PHQ-2 has a similar diagnostic accuracy as other self-evaluation instruments, such as PHQ-9 and the Hospital Anxiety and Depression Scale (HADS) (33, 34). PHQ-2 can be applied as a first-stage screening instrument, but further diagnostic steps should follow.

Conclusion

The prevalence of comorbid depressive symptoms in rehabilitation is 33.1%; approximately 4 times higher than in the German general population. A significant association of depressive symptoms with impairment due to pain, specific work-related problems, a higher comorbidity score, lower self-efficacy and lower social support was observed. Thus, a routine depression screening of all rehabilitation patients seems appropriate, since depressive impairments in rehabilitation seem to have a substantial prevalence. Patients could benefit if treated appropriately, since mental comorbidity can have adverse effects on rehabilitation outcomes (35). The German Pension Insurance developed recommendations for a screening of mental comorbidity in rehabilitation facilities (36). A corresponding screening for psychological symptoms implemented already into the application process for medical rehabilitation could improve the future distribution to suitable rehabilitation facilities offering specific and well-structured treatment concepts customized to patients with mental comorbidity. In some orthopaedic and cardiac rehabilitation facilities in particular, these structured and prolonged (4 weeks in full-time) behavioural-medical rehabilitation programmes have already been established (37). In addition, there are practical recommendations for psychological interventions in multidisciplinary rehabilitation concerning various somatic diseases (38, 39). The concept of medical rehabilitation in Germany is based on the ICF and its bio-psycho-social model. It offers a solid general framework of integrated rehabilitation care for somatic and mental impairment. Systematic reviews support that multidisciplinary rehabilitation including psychological interventions improves patient outcomes, e.g. concerning chronic low back pain (40).

In Germany, the payer is responsible both for the approval of a medical rehabilitation and for selecting an appropriate inpatient or outpatient rehabilitation facility (based on application documents). Unlike, for example, for work-related impairments, self-evaluation instruments for the assessment of depressive symptoms, such as the Patient Health Questionnaire, have not yet been implemented routinely into the application documents. A screening for mental comorbidities could provide the payer with information about a potential comorbid mental impairment when a suitable rehabilitation facility is needed. An economic screening instrument is available with, for example, the PHQ-2 (33). A more differentiated allocation to rehabilitation facilities corresponding to the patient's impairment situation could potentially lead to a more needs-oriented care in medical rehabilitation.

ACKNOWLEDGEMENTS

The authors would like to thank all rehabilitation patients for their willingness to participate in this study, as well as the associates from the German Federal Pension Insurance and the Charité – Universitätsmedizin Berlin who provided particular support during the process of data gathering and editing.

The manuscript is based on a research project supported by the German Federal Pension Insurance (grant number: 8011-106-31/31.27.16). The authors' institution received further funding by the German Federal Pension Insurance. The funding agency had no influence of the interpretation of data and the final conclusions drawn.

REFERENCES

1. Baumeister H, Hutter N, Bengel J, Härter M. Quality of life in medically ill persons with comorbid mental disorders: a systematic review

and meta-analysis. Psychother Psychosom 2011; 80: 275–286.
2. Pieper L, Schulz H, Klotsche J, Eichler T, Wittchen HU. Depression as a comorbid disorder in primary care. Bundesgesundheitsbla 2008; 51: 411–421.
3. Baumeister H, Härter M. The impact of comorbid mental disorders in patients with chronic somatic diseases. Z Med Psychol 2005; 14: 175–189.
4. Creed F, Morgan R, Fiddler M, Marshall S, Guthrie E, House A. Depression and anxiety impair health-related quality of life and are associated with increased costs in general medical inpatients. Psychosomatics 2002; 43: 302–309.
5. Söderman E, Lisspers J, Sundin O. Depression as a predictor of return to work in patients with coronary artery disease. Soc Sci Med 2003; 56: 193–202.
6. Schmidt C, Bernert S, Spyra K. Concerning the impact of psychological comorbidity for chronic back pain: frequency, reduced earning capacity pension and rehabilitation aftercare in the course of the rehabilitation cohorts 2002–2009. Rehabilitation 2014; 53: 384–389.
7. Kessler RC, Ustun TB, editors. The WHO World Mental Health Surveys. Global perspectives on the epidemiology of mental disorders. New York: Cambridge University Press, 2011.
8. He Y, Zhang M, Lin EHB, Bruffaerts R, Posada-Villa J, Angermeyer MC, et al. Mental disorders among persons with arthritis: results from the World Mental Health Surveys. Psychol Med 2008; 38: 1639–1650.
9. Demyttenaere K, Bruffaerts R, Lee S, Posada-Villa J, Kovess V, Angermeyer MC, et al. Mental disorders among persons with chronic back or neck pain: results from the World Mental Health Surveys. Pain 2007; 129: 332–342.
10. Ormel J, Von Korff M, Burger H, Scott K, Demyttenaere K, Huang Y-Q, et al. Mental disorders among persons with heart disease: results from World Mental Health surveys. Gen Hosp Psychiatry 2007; 29: 325–334.
11. Lin EHB, Von Korff M. Mental disorders among persons with diabetes: Results from the World Mental Health Surveys. J Psychosom Res 2008; 65: 571–580.
12. Patten SB, Beck CA, Williams JV, Barbui C, Metz LM. Major depression in multiple sclerosis: a population-based perspective. Neurology 2003; 61: 1524–1527.
13. Härter M, Baumeister H, Bengel J. Psychische Störungen bei Rehabilitanden mit einer somatischen Erkrankung. In: Härter M, Baumeister H, Bengel J, editors. Psychische Störungen bei körperlichen Erkrankungen. Heidelberg: Springer, 2007: p. 55–69.
14. Deutsche Rentenversicherung Bund. Rehabilitation 2011. Berlin: Deutsche Rentenversicherung Bund, 2012.
15. Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. Med Care 2003; 41: 1284–1292.
16. Brünger M, Streibelt M, Schmidt C, Spyra K. Psychometric testing of a generic assessment tool for the identification of biopsychosocial impairments in persons with an approval for medical rehabilitation. Rehabilitation 2016; 55: 175–181.
17. Sangha O, Stucki G, Liang MH, Fossel AH, Katz JN. The Self-Administered Comorbidity Questionnaire: a new method to assess comorbidity for clinical and health services research. Arthritis Rheum 2003; 49: 156–163.
18. Tait RC, Chibnall JT, Krause S. The Pain Disability Index: psychometric properties. Pain 1990; 40: 171–182.
19. Bührlen B, Gerdes N, Jäckel WH. Development and psychometric testing of a patient questionnaire for medical rehabilitation (IRES-3). Rehabilitation 2005; 44: 63–74.
20. Schwarzer R, Jerusalem M. Generalized Self-Efficacy scale. In: Johnston M, Weinman J, Wright SC, editors. Measures in health psychology: a user's portfolio. Windsor: NFER-Nelson; 1995, p. 35–37.
21. Streibelt M, Bethge M. Prospective cohort analysis of the predictive validity of a screening instrument for severe restrictions of work ability in patients with musculoskeletal disorders. Am J Phys Med Rehabil 2015; 94: 617–626.
22. Kobelt A, Wasmus A, Grosch E, Glatz KH, Gutenbrunner C. Why do insurants of the pension insurance not accede to a granted medical rehabilitation? Phys Rehab Kur Med 2006; 16: 31–37.
23. Robert Koch Institute, Department of Epidemiology and Health Monitoring. German Health Interview and Examination Survey for Adults (DEGS1). Public Use File first version. 2015; doi: 10.7797/16-200812-1-1-1.
24. Kamtsiuris P, Lange M, Hoffmann R, Schaffrath Rosario A, Dahm S, Kuhnert R, et al. The first wave of the German Health Interview and Examination Survey for Adults (DEGS1): sample design, response, weighting and representativeness. Bundesgesundheitsbla 2013; 56: 620–630.
25. Busch MA, Maske UE, Ryl L, Schlack R, Hapke U. Prevalence of depressive symptoms and diagnosed depression among adults in Germany: results of the German Health Interview and Examination Survey for Adults (DEGS1). Bundesgesundheitsbla 2013; 56: 733–739.
26. Wahl I, Löwe B, Bjorner JB, Fischer F, Langs G, Voderholzer U, et al. Standardization of depression measurement: a common metric was developed for 11 self-report depression measures. J Clin Epidemiol 2014; 67: 73–86.
27. Kruithof WJ, Post MW, Van Leeuwen CM, Schepers VP, van den Bos GA, Visser-Meily J. Course of social support and relationships between social support and patients' depressive symptoms in the first 3 years post-stroke. J Rehabil Med 2015; 47: 599–604.
28. Baumeister H, Balke K, Härter M. Psychiatric and somatic comorbidities are negatively associated with quality of life in physically ill patients. J Clin Epidemiol 2005; 58: 1090–1100.
29. Cocksedge KA, Simon C, Shankar R. A difficult combination: chronic physical illness, depression, and pain. Br J Gen Pract 2014; 64: 440–441.
30. Linder J, Jansen GB, Ekholm KS, Ekholm J. Relationship between sleep disturbance, pain, depression and functioning in long-term sick-listed patients experiencing difficulty in resuming work. J Rehabil Med 2014; 46: 798–805.
31. Hohmann C, Schwarzer R. Self efficacy. In: Bengel J, Jerusalem M, editors. Handbook of health psychology and medical psychology. Göttingen: Hogrefe; 2009, p. 61–67.
32. Galea S, Tracy M. Participation rates in epidemiologic studies. Ann Epidemiol 2007; 17: 643–653.
33. Löwe B, Kroenke K, Gräfe K. Detecting and monitoring depression with a two-item questionnaire (PHQ-2). J Psychosom Res 2005; 58: 163–171.
34. Löwe B, Spitzer RL, Gräfe K, Kroenke K, Quenter A, Zipfel S, et al. Comparative validity of three screening questionnaires for DSM-IV depressive disorders and physicians' diagnoses. J Affect Disord 2004; 78: 131–140.
35. Klesse C, Baumeister H, Bengel J, Härter M. Somatic and mental comorbidity: implications for diagnosis and treatment. Psychotherapeut 2008; 53: 49–62.
36. Deutsche Rentenversicherung Bund. Psychische Komorbidität. Leitfaden zur Implementierung eines psychodiagnostischen Stufenplans in der medizinischen Rehabilitation. Berlin 2011.
37. Mangels M, Schwarz S, Worringen U, Holme M, Rief W. Evaluation of a behavioral-medical inpatient rehabilitation treatment including booster sessions: a randomized controlled study. Clin J Pain 2009; 25: 356–364.
38. Reese C, Mittag O. Development of practice guidelines for psychological interventions in the rehabilitation of patients with chronic low back pain: methods and results. Gesundheitswesen 2013; 75: 832–837.
39. Mittag O, Reese C. The development of practice guidelines for psychological interventions in the rehabilitation of patients with coronary heart disease: methods and results. Rehabilitation 2013; 52: 266–272.
40. Hoffman BM, Papas RK, Chatkoff DK, Kerns RD. Meta-analysis of psychological interventions for chronic low back pain. Health Psychol 2007; 26: 1–9.