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# Support from Physicians as a Key Enabling Factor for Rehabilitation Utilization in Migrants with Back Pain: A Longitudinal Analysis

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## Abstract

In Germany, medical rehabilitation is provided to promote work ability and health in the case of chronic illness and to avoid early disability pensions. Studies have shown that employees with a history of migration are less likely to seek medical rehabilitation. The aim of this paper was to examine which factors influence the use of medical rehabilitation services in migrants with back pain.

We used data from a German cohort study also including migrant employees aged 45 to 59 years. Participants reported back pain in the last 3 months and completed a baseline questionnaire in 2017. Data on rehabilitation utilization was extracted from administrative records covering the period until the end of 2018. Proportional hazard models were fitted to identify factors that were associated with utilized rehabilitation measures.

Data of 552 participants were included, and 25 individuals utilized rehabilitation during follow-up. Sex (women: HR=3.05; 95% CI: 1.10; 8.45), higher job insecurity (HR=1.02; 95% CI: 1.00; 1.03), support from physicians and therapists (HR=2.22; 95% CI: 1.52; 3.24), proportion of foreigners (HR=3.27; 1.17; 9.15), and the self-reported need for rehabilitation (HR=3.23; 95% CI: 1.12; 8.60) were associated with utilization.

In summary, informational and practical support provided by physicians and therapists on medical rehabilitation services seems to be a key predictor of rehabilitation utilization. Our findings, therefore, support the call for transcultural competence to be more widely incorporated into the education of medical and health professionals to counteract health care disparities.

**Keywords** Health care inequalities · Rehabilitation · Human migration · Back pain · Utilization · Health services use · Transcultural competence

## Introduction

The global impact of chronic diseases on health-related quality of life is one of the core health challenges of the twenty-first century (DeSalvo et al., 2017). Recent epidemiological data show that in Germany, in the 45–64 age group, 58.6% report a chronic condition or a health problem lasting longer than 6 months (Heidemann et al., 2021). Persistent health problems such as chronic low back pain are particularly prevalent in the older working population and can lead to permanent work disability and health-related early retirement from the labor market (d’Errico et al., 2022; Lallukka et al., 2018). Overall, persons with a history of migration seem to be affected by chronic conditions at a similar rate as persons without a migration history with some differences in prevalences depending on the specific disease (Razum & Wenner, 2016; Rommel et al., 2015). In order to prevent the early retirement of workers with persistent health problems and to improve their work ability and participation in the labor market, all socially insured citizens in Germany are entitled to medical rehabilitation benefits in the case of a chronic health condition.

Medical rehabilitation in Germany is a complex measure consisting of different therapeutic services such as physiotherapy, occupational therapy, or psychological offers, mainly inpatient with a duration of 3 to 4 weeks (Mittag & Welti, 2017). In the case of chronic back pain, multidisciplinary rehabilitation programs can achieve pain improvement and prevent early retirement (Kamper et al., 2015). Thus, they offer an opportunity to reduce the risk of poverty in old age due to temporary or permanent loss of income and to ensure participation in life in society. The main provider of medical rehabilitation in Germany is the German Pension Insurance. In total, one million services are performed in Germany per year by the pension insurance agencies, approximately 15% due to back pain (M50-M54; International Statistical Classification of Diseases and Related Health Problems; ICD-10) (Deutsche Rentenversicherung, 2021). Despite formal equity of access, several studies show that employees with a history of migration or foreign citizenship make use of medical rehabilitation less frequently than Germans without a migration history or German citizens (Brzoska et al., 2010; Brzoska & Razum, 2019; Fauser et al., 2022a; Schröder et al., 2020). Given the comparable prevalence of chronic diseases among people with and without a migration history (Razum & Wenner, 2016; Rommel et al., 2015), the lower utilization observed in some studies does not appear to be due to a lower need for rehabilitation services but may indicate barriers to accessing medical rehabilitation. Yet, the identification of factors within the migrant population that contribute to utilization has received less scientific attention. Based on qualitative research, both personal factors, such as limited knowledge of available treatments, and system factors, such as a lack of multilingual documents, appear to play a role (Schwarz et al., 2015). In addition, a recently published study on factors influencing the use of primary care by foreign nationals in Germany showed that women use primary care services more frequently than men (Loer et al., 2022), which is consistent with the observation that women are more interested in health issues and have higher levels of health literacy (Chakraverty et al., 2022; Ek, 2015). However,

a better understanding of which factors within the socioeconomically and biographically heterogeneous group of migrants in Germany have an influence on the use of rehabilitation services is necessary in order to enable responsible institutions as the German pension insurance to develop and implement target-group-specific interventions and changes in the utilization process.

## Theoretical Framework

The theoretical background for our analysis is the Behavioral Model of Health Services Use (BMHSU) developed by medical sociologist Ronald Max Andersen in 1968. Since then, Andersen's theoretical model has been revised several times (Andersen, 1995; Bradley et al., 2002; Gelberg et al., 2000). The BMHSU is an analytical tool for describing factors that favor or impede the use as well as the appropriateness of health care services (Andersen et al., 2014). The model assumes that the process leading to utilization is driven by (1) predisposing, (2) enabling, and (3) need factors, with both individual and contextual factors determining the process within these three dimensions. Predisposing factors point to the likelihood that people will need health care services. On the individual level, these may include sociodemographic characteristics such as age or sex as well as health behaviors. On the contextual level, the age structure of a region can be a factor or a region as well as health beliefs. Enabling factors can be viewed as a resource that promote the use of health services. On the individual level, enabling resources include factors such as income, as well as support from family and friends. Contextual enabling factors can be, for example, the public transport infrastructure, which determines the possibility of accessing care services. Furthermore, contextual enabling characteristics describe the structure of care in a region or country, such as the density of physicians, the staff ratios of clinics, but also the organization of access routes, e.g., whether utilization is only possible under certain legal insurance conditions. Needs factors refer to the perceived or assessed need for health care services. Individual factors comprise the subjective need for health care based on perceived functional limitations and burdens as well as evaluated needs, for example, through medical diagnostics (Andersen et al., 2014). Meanwhile, population- or region-specific health indicators, such as disease-specific prevalence, are considered needs factors at the contextual level.

In our analysis, we examined the influence of different individual and contextual predisposing, enabling, and need factors on medical rehabilitation utilization within a migrant population with back pain. The analysis is intended to contribute to a better understanding of how to address disparities in utilization and support migrants in their use of medical rehabilitation services.

## Methods

### Study Design

Data for this analysis were derived from a prospective cohort study conducted in northern and eastern Germany to analyze barriers to accessing rehabilitation

(Zimmer et al., 2022) and the effectiveness of medical rehabilitation services (Fauser et al., 2022) for persons with back pain.

In March 2017, baseline questionnaires were sent and linked to administrative data on rehabilitation measures in 2017 and 2018, if responders gave their consent. The initial cohort study was approved by the ethics committee of the University of Lübeck (15-144) and Martin Luther University Halle-Wittenberg (2015-49). The study was registered in the German Clinical Trials Register (DRKS00011554). The manuscript preparation considered the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement for cohort studies.

## Participants

In the initial cohort study, a random sample of 45,000 people was drawn from two pension agencies (German Pension Insurance North and German Pension Insurance Central Germany). Employees aged 45 to 59 years who reported back pain at least once in the past 3 months were included. For the analysis presented in this paper, the sample was restricted to people with a migration background. We used a definition of migration background that followed the recommendations for epidemiological studies by Schenk and colleagues, which considered the country of birth of the parents, in addition to the country of birth of the person (Schenk et al., 2006). Hence, a differentiation is possible between first- and second-generation migrants (Fauser et al., 2022a). In this study, first-generation migrants are defined as persons who were not born in Germany. Second-generation migrants are defined as persons born in Germany with two parents born abroad. People who had applied for or used medical rehabilitation during the previous 4 years or who had ever applied for or received disability pension benefits were excluded.

## Outcome

Data on medical rehabilitation utilization was extracted from the administrative records of the two pension agencies and covered an observation period from study entry in 2017 until the end of 2018. Participation in a rehabilitation program either requires a claim by the person in need or may be initiated directly by the hospital if treatment in a hospital was needed (e.g., spinal fusion). The binary variable indicated whether a rehabilitation measure was granted by the two pension agencies and utilized.

## Covariates

The inclusion of variables in our analysis was driven by the idea to consider relevant factors that can be structured on the basis of Andersen's theoretical model. Table 1 describes variables stratified in three dimensions according to the model assumption into predisposing, enabling, and need factors (Andersen, 1995; Bradley et al.,

2002; Gelberg et al., 2000). Age, sex, and nationality were derived from the participants' administrative insurance data. Urban structure and foreigners' rate were extracted from the INKAR (Indicators, Maps, and Graphics on Spatial and Urban Monitoring) database of the Federal Institute for Research on Building, Urban Affairs, and Spatial Development (BBSR, 2022) for the year 2017 and matched to the study participants using a district key. Since metropolitan structures are associated with structural differences in the availability of healthcare services, the variable on urban structure was dichotomized into more than 100,000 inhabitants and less than 100,000 inhabitants. In statistical reporting, this delimitation is usually made to define large cities (Körösi, 1887). The variable on the proportion of foreigners was dichotomized using a median split. We included this variable to have an indicator of the internationality of the region where participants live. All other variables were obtained from the questionnaire. A detailed description of the used variables, with the exception of the INKAR data, is published elsewhere (Bethge et al., 2017).

## Statistical Analysis

Descriptive statistics are reported to describe the total sample and the samples differentiated by utilization and non-utilization. Three proportional hazard models were fitted separately for each dimension of Andersen's theoretical model (e.g., predisposing, enabling, and need factors) to identify factors that are associated with rehabilitation utilization in our sample. Hazard ratios (HR) and corresponding 95% CI were estimated. Time at risk for rehabilitation events was calculated from the date of receipt of the questionnaire. Observations were censored at the end of 2018. We checked proportional-hazard assumptions on the basis of Schoenfeld residuals and by the log-log plot of survival (STATA: `phptest`, `stphplot`) (Cleves, 2008).

Missing values on the variables ranged from 1.5% (social support at work) to 17.9% (work-related negative outcome expectations). The missing data analysis procedures used missing at random assumptions. We tested this assumption by predicting the missingness of values based on our baseline variables in logistic regression models and identified auxiliary variables that are associated with missingness (Enders, 2010), e.g., household net income was significantly associated with the missingness of negative outcome expectations ( $OR=0.44$ ;  $p<0.001$ ). This suggests that household net income is a potential predictor of missingness, which makes the missing at random assumptions more plausible. Missing self-reported baseline data were imputed using chained equations (Royston & White, 2011) to avoid listwise exclusion of cases in the regression models and ensure a sufficient database (Van Ginkel et al., 2020). Independent variables without missing values (age, sex, migration generation, region of residence, foreigners rate, physician density, and our outcome as recommended by Kontopantelis et al. (2017) were included as covariates in the imputation model. We created 20 independent data sets with complete values. Parameter estimates of the proportional hazard and logistic regression models were combined in accordance with Rubin's rules (Little & Rubin, 2014).

**Table 1** Variables used as factors for empirical analysis stratified by dimensions of Andersen's model

Factors	Description (scoring)	Source and reference
Predisposing factors		
Age	Age in years	GPI registers
Sex	Female or male	GPI registers
Educational level	Low, medium, or high	Own development
Partnership	Yes or no	Own development
Size of household	Number of household members	Own development
Native language	German: yes or no	Own development
Nationality	German: yes or no	GPI registers
Migration background	First or second generation	(Schenk et al., 2006)
Job position	Blue or white collar	Own development
Physical demands	Physical job demands (0–15)	FEBA (Slesina, 1987)
Psychological demands	Psychological job demands (0–100)	COPSOQ (Kristensen et al., 2005)
Job insecurity	Perceived job insecurity (0–100)	COPSOQ (Kristensen et al., 2005)
Outcome expectations: family	Expected negative effects of rehabilitation on family situation (0–2)	(Spanier et al., 2016)
Outcome expectations: work	Expected negative effects of rehabilitation on work situation (0–3)	(Spanier et al., 2016)
Enabling factors		
Household net income	< 1500 €, 1500–3000 € or > 3000 €	Own development
Application knowledge	Knowledge of rehabilitation application procedures (0–2)	(Spanier et al., 2016)
Social support at work	Perceived support from employer and colleagues (0–100)	COPSOQ (Kristensen et al., 2005)
Support from family and friends	Perceived support on rehabilitation utilization from family and friends (0–3)	(Spanier et al., 2016)
Support from physician and therapists	Perceived support on rehabilitation utilization from physician and therapists (0–3)	(Spanier et al., 2016)
Outpatient visits to physicians	0 to 4, 5 to 12, or more than 12 physician visits (general practitioners and specialists) in the past 12 months	Own development
Urban structure	Living in a city with $\geq 100,000$ residents: yes or no	INKAR data; (BBSR, 2022)
Proportion of foreigners	$\geq 10\%$ non-German nationals in the living area: yes or no	INKAR data; (BBSR, 2022)
Need factors		
General health	Self-reported subjective health (0–10)	COPSOQ (Kristensen et al., 2005)

Table 1 (continued)

Factors	Description (scoring)	Source and reference
Pain grading	Grade I/II or Grade III/IV	CPQ (Klasen et al., 2004)
Depression	Self-reported depressive symptoms (0–24)	PHQ-8 (Spangenberg et al., 2012)
Rehabilitation needs	Self-reported need for rehabilitation: yes or no	Own development

*COPSOQ* Copenhagen Psychosocial Questionnaire; *CPQ* Chronic Pain Grade Questionnaire; *GPI* German Pension Insurance; *FEBa* Fragebogen zur subjektiven Einschätzung der Belastungen am Arbeitsplatz (questionnaire on job demands); *PHQ-8* Patient Health Questionnaire (8-item version); *WASWork* Ability Score; *IN/KAR* Indikatoren und Karten zur Raum- und Stadtentwicklung (indicators and maps of spatial and urban development)

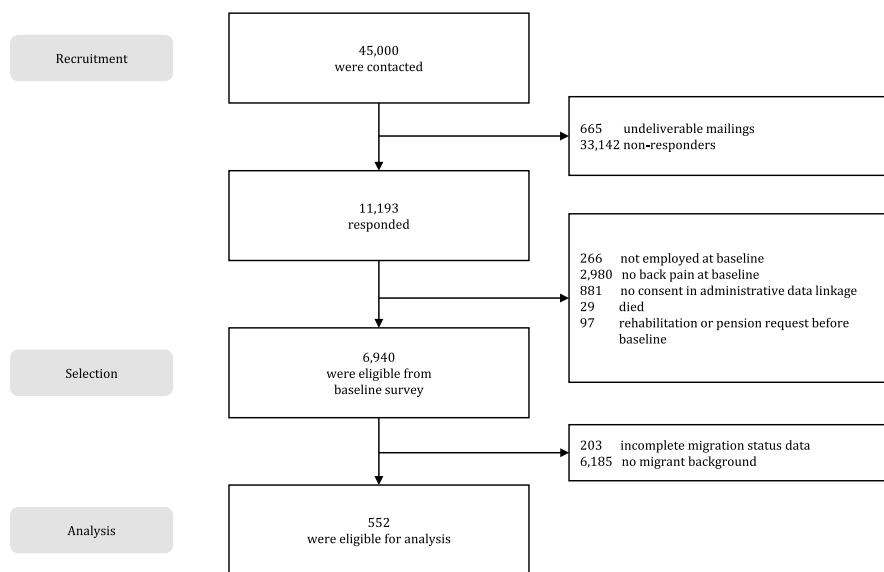


The statistical test results were regarded as statistically significant if the two-sided  $p$  value of a test was less than 0.05. All calculations were performed in Stata SE 15.

## Results

### Recruitment and Participants

Forty-five thousand persons were contacted via postal questionnaires. A total of 11,193 persons completed the baseline questionnaire between March and August 2017. We excluded 881 persons due to the lack of consent to the linkage of questionnaire and administrative data or non-availability of their administrative data. Another 266 persons were excluded since they were not employed. Twenty-nine persons died. Two thousand nine hundred eighty persons did not report back pain at baseline. An additional 97 persons were excluded as they applied for a rehabilitation measure or a disability pension before the receipt of the baseline questionnaire. Another 6185 persons without a migration background were excluded. Finally, 203 persons were excluded due to missing data on migrant background. Finally, a total of 552 individuals were considered for analysis (Fig. 1). The mean age was 52.3 years ( $SD=4.1$ ), and 59.4% were women. About 84.2% were first-generation migrants, and 15.8% were second-generation migrants. Table 2 presents sample characteristics and outcomes stratified for utilizers and non-utilizers of rehabilitation. In particular, differences with regard to nationality, education level, job insecurity, outpatient visits to physicians, proportion of foreigners in the living area, and health indicators



**Fig. 1** Flow of participants

**Table 2** Sample characteristics stratified by participants with and without utilization during follow-up

	Total sample		Non-utilization		Utilization	
	<i>n</i> = 552		<i>n</i> = 527		<i>n</i> = 25	
	<i>n</i>	M (SD) or %	<i>n</i>	M (SD) or %	<i>n</i>	M (SD) or %
Predisposing factors						
Sex: female	328	59.4	308	58.4	20	80.0
Age	522	52.3 (4.1)	527	52.3 (4.1)	25	52.1 (4.2)
Partnership: yes	470	87.0	447	86.8	23	92.0
Native language: German	254	46.7	242	46.6	12	48.0
Nationality: German	342	62.0	322	61.1	20	80.3
Migration status: 1st generation	465	84.2	444	84.3	21	84.0
Educational level						
Low	160	29.4	156	30.1	4	16.0
Medium	296	54.4	277	53.4	19	76.0
High	88	16.2	86	16.6	2	8.0
Size of household						
1 person	80	14.6	77	14.8	3	12.0
2 persons	239	43.7	226	43.3	13	52.0
3 and more persons	228	41.7	219	42.0	9	36.0
Job position: blue-collar	271	50.1	259	50.2	12	48.0
Social support at work (0–100)	546	50.0 (27.6)	521	50.2 (27.5)	25	45.5 (28.6)
Physical job demands (0–15)	503	8.3 (5.2)	478	8.2 (5.2)	25	10.0 (4.5)
Psychological job demands (0–100)	543	48.2 (19.7)	519	48.1 (19.7)	25	49.0 (20.8)
Job insecurity (0–100)	540	44.6 (31.1)	515	43.9 (30.9)	25	59.0 (32.0)
Knowledge of rehabilitation (0–2)	502	0.3 (0.7)	479	0.3 (0.7)	23	0.3 (0.7)
Negative outcome expectations						
Family (0–2)	462	0.6 (0.7)	442	0.6 (0.8)	20	0.5 (0.7)
Work (0–3)	453	1.2 (1.1)	435	1.2 (1.1)	18	1.1 (1.0)
Enabling factors						
Household net income						
< 1500 €	122	22.8	115	22.5	7	29.2
1500–3000 €	293	54.8	281	55.0	12	50.0
> 3000 €	120	22.4	115	22.5	5	20.8
Support for rehabilitation utilization						
From family and friends (0–3)	506	0.5 (0.9)	482	0.4 (0.9)	24	1.0 (1.2)
From physician and therapists (0–3)	509	0.2 (0.7)	485	0.2 (0.6)	24	1.2 (1.4)
Outpatient visits to physicians						
0 to 4 visits	283	52.7	276	53.9	7	28.0
5 to 12 visits	170	31.7	162	31.6	8	32.0
More than 12 visits	84	15.6	74	14.5	10	40.0
Urban structure						
≥ 100,000 residents	248	44.9	236	44.8	12	48.0
< 100,000 residents	304	55.1	291	55.2	13	52.0

**Table 2** (continued)

	Total sample		Non-utilization		Utilization	
	<i>n</i> = 552		<i>n</i> = 527		<i>n</i> = 25	
	<i>n</i>	<i>M</i> ( <i>SD</i> ) or %	<i>n</i>	<i>M</i> ( <i>SD</i> ) or %	<i>n</i>	<i>M</i> ( <i>SD</i> ) or %
Proportion of foreigners						
Under 10%	279	50.5	271	51.4	8	32.0
10% and more	273	49.5	256	48.6	17	68.0
Need factors						
Pain grading						
Grade I or II	370	67.0	357	67.7	13	52.0
Grade III or IV	182	33.0	170	32.3	12	48.0
General health (0–10)	540	6.0 (1.9)	517	6.0 (1.9)	23	5.1 (2.2)
Depressive symptomatology (0–24)	528	7.1 (5.0)	504	7.0 (4.9)	28	10.0 (6.4)
Self-reported need for rehabilitation: yes	540	43.7	217	42.1	19	76.0

*M* mean; *SD* standard deviation; valid percentages were reported

like general health, back pain grading, depressive symptoms, and subjective need for rehabilitation were observed.

### Utilization of Medical Rehabilitation

Time at risk for rehabilitation events considered a maximum follow-up time of 21 months. In total, 25 persons (4.5%) used a rehabilitation service (Table 2). Eleven rehabilitation services (44.0%) were granted due to diseases of the musculoskeletal system (M00-M99; International Statistical Classification of Diseases and Related Health Problems, ICD-10), five (20%) due to cancer (C00-D48), and three services due to mental disorders (F01-F99). One quarter (24%; *n* = 6) of the treated subjects received a post-acute rehabilitation, i.e., a rehabilitation measure starting within 14 days after discharge from a hospital for persons who were hospitalized for acute care or surgery. The absolute risks of a rehabilitation event were 4.5 and 4.6% for first- and second-generation migrants, respectively. This difference was not statistically significant (*p* = 0.973).

### Predictors of Medical Rehabilitation Utilization

Schoenfeld residuals and log-log plots of survival showed that there is no evidence that the proportional-hazard assumption has been violated in any model. In model 1 (predisposing factors), women (*HR* = 3.05; 95% *CI*: 1.10; 8.45) and people with higher job insecurity (*HR* = 1.02; 95% *CI*: 1.00; 1.03) had a statistically significant greater risk of using rehabilitation than men and people with lower job insecurity. In addition, migrants in a partnership (*HR* = 1.77; 95% *CI*: 0.32; 9.76), migrants with German nationality (*HR* = 2.01; 95% *CI*: 0.68; 5.99), and with higher physical job

demands (HR = 1.07; 95% CI: 0.98; 1.18) had an increased risk of rehabilitation utilization, but these effects were not statistically significant. In model 2 (enabling factors), support for medical rehabilitation from physicians and therapists was a positive statistically significant predictor of utilization (HR = 2.22; 95% CI: 1.52; 3.24). There was also a statistically significant association between the proportion of foreigners of a region and the probability of utilization (HR = 3.27; 1.17; 9.15). In addition, reporting more than 12 visits to a doctor in the past 12 months compared with a maximum of 4 visits (HR = 2.45; 95% CI: 0.81; 7.09) as well as living in larger cities (HR = 0.57; 95% CI: 0.21; 1.56) showed an effect on using medical rehabilitation, but these associations were not statistically significant. In model 3 (need factors), subjective need for rehabilitation was statistically significant associated with rehabilitation utilization (HR = 3.23; 95% CI: 1.12; 8.60) (Table 3).

## Discussion

Health equity is a human right; therefore, the WHO stated in its “Framework of Priorities and Guiding Principles to Promote the Health of Refugees and Migrants” that societal efforts should be directed towards the goal of reducing health inequalities for all people (World Health Organization, 2017). However, for institutions and policymakers to act, potential inequalities and barriers to rehabilitation utilization must be identified beforehand. This study analyzed predisposing, enabling, and need factors according to the BMHSU that influence the rehabilitation utilization in employed migrants reporting back pain.

Among the predisposing factors, gender was one of the strongest predictors of rehabilitation utilization. Women had a three times higher risk than men to use medical rehabilitation. Many studies have confirmed that women in the general population are more likely to use health promotion, prevention, and health care services than men (Keil et al., 2020; Ladwig et al., 2000; Robert-Koch-Institut, 2020). There is evidence that both men and women with a non-German nationality or migrant background show lower uptake of medical rehabilitation measures than people without a migrant background (Brzoska & Razum, 2019). Within the group of migrants, however, women seem to make more frequent use of health services, as is also the case for non-migrants (Niedermaier et al., 2020). Even though the association was not statistically significant, migrants with German nationality were twice as likely to use rehabilitation than migrants with a different nationality. This is in line with other studies that showed that non-Germans use medical rehabilitation services less frequently than Germans (Brzoska & Razum, 2019; Dyck et al., 2020; Fauser et al., 2022a). It seems that nationality has a higher influence on rehabilitation utilization than other migration indicators such as native language and migrant generation. Since nationality is recorded in the insured person accounts of the German Pension Insurance, this information could be used to make targeted offers to non-Germans with a high risk of permanent work disability (Bethge et al., 2021) to support their application for medical rehabilitation.

**Table 3** Predictors of rehabilitation utilization in migrant employees with back pain

	HR	95% CI	<i>p</i>
Model 1: predisposing factors			
Migration background: second generation	0.73	0.21; 2.50	0.616
Sex: female	3.05	1.10; 8.45	0.032
Age	0.95	0.85; 1.06	0.363
Partnership: yes	1.77	0.32; 9.76	0.512
Native language: German	0.90	0.35; 2.27	0.817
Nationality: German	2.01	0.68; 5.99	0.208
Educational level			
Low	Ref.		
Medium	2.08	0.66; 6.53	0.210
High	1.04	0.18; 6.02	0.963
Size of household			
1 person	Ref.		
2 persons	1.02	0.23; 4.47	0.984
3 and more persons	0.80	0.17; 3.73	0.772
Job position: blue-collar	0.88	0.37; 2.10	0.770
Physical job demands	1.07	0.98; 1.18	0.120
Psychological job demands	0.99	0.97; 1.02	0.594
Job insecurity	1.02	1.00; 1.03	0.026
Negative outcome expectations			
Family	0.75	0.38; 1.48	0.401
Work	0.90	0.57; 1.41	0.636
Model 2: enabling factors			
Household net income			
< 1500 €	Ref.		
1500–3000 €	0.90	0.34; 2.34	0.822
> 3000 €	1.44	0.42; 4.91	0.560
Social support at work	0.99	0.98; 1.01	0.253
Support for rehabilitation utilization			
From family and friends	1.13	0.75; 1.68	0.565
From physician and therapists	2.22	1.52; 3.24	<0.001
Knowledge of rehabilitation application	0.96	0.53; 1.75	0.894
Outpatient visits to physicians (12 month)			
0 to 4 visits	Ref.		
5 to 12 visits	1.56	0.55; 4.43	0.408
more than 12 visits	2.45	0.81; 7.09	0.115
Urban structure			
≥ 100,000 residents	0.57	0.21; 1.56	0.274
Proportion of foreigners			
≥ 10%	3.27	1.17; 9.15	0.024
Model 3: need factors			
Pain grading			
Grade III or IV	1.07	0.47; 2.45	0.866
General health (0–10)	0.88	0.70; 1.11	0.267
Depressive symptomatology (0–24)	1.05	0.97; 1.13	0.239
Self-reported need for rehabilitation: yes	3.23	1.12; 8.60	0.019

*HR* hazard ratio; *CI* confidence interval

In terms of enabling factors, the proportion of foreigners and the support provided by physicians and therapists were significantly associated with higher rehabilitation utilization among migrants. The more frequent utilization in regions with a higher proportion of foreigners may be explained by the fact that these regions offer more migration-sensitive health services. For example, doctors and therapists as well as the staff in health facilities and counseling centers in these regions could more often have a history of migration themselves or have more experience in counseling people from different social and cultural backgrounds and thus promote utilization. In addition, there may be more migrant organizations or migration-sensitive advisory services in these regions, which are funded by public and private organizations. The fact that the effect of internationality is significant while controlling for urban structure supports the assumption that this is not solely an indirect effect of urban conditions (e.g., more general consulting services).

The support provided by physicians and therapists in applying for medical rehabilitation was an important and robust predictor of rehabilitation utilization in our analyses. This is consistent with a previous analysis that lack of support is also a key barrier in individuals with severe back pain (Zimmer et al., 2022). While there are no migrant-specific data on the importance of physician support on the use of medical rehabilitation, studies suggest a positive impact of informative support on the use of preventive services such as immunizations or cancer screenings (Bremer et al., 2019; Schmitt et al., 2021; Zimmer et al., 2022). The number of visits to physicians also had an impact on the rehabilitation utilization. Migrants with more than 12 visits to doctors and therapists in the last 12 months were twice as likely to utilize rehabilitation as those with a maximum of four visits. However, this effect was not statistically significant, which could partly be a consequence of the small number of cases and the few events. We included this factor in the enabling model because we assumed that the chance of support would increase with the number of contacts, but also to ensure that perceived support or quality of support was not simply a surrogate of frequency of contact. From our perspective, the number of contacts could also be grouped under need factors, since the number of visits to the doctor can generally also be read as an indicator of the subjective health burden. That aside, the fact that the number of physician visits and perceived support from physicians and therapists were predictors of utilization in our enabling model suggests that the relevance of support stems not from quantity alone but from the quality of interactions. This is particularly plausible as studies show that a good relationship between physician and patient can have a positive impact on adherence (Orom et al., 2018).

Among the need factors, self-reported need for rehabilitation was significantly associated with rehabilitation utilization, consistent with previous findings from the general population (Mittag et al., 2007). In contrast to our previous analyses (Fauser et al., 2022), the severity of back pain was not significantly associated with rehabilitation utilization, which is likely due to the fact that we are examining an overall higher burdened sample in the current analysis (about one third with back pain grade III or IV and four in ten with subjective rehabilitation need), compared with our other analyses. Although our analysis confirms previous findings on the association between self-reported need for rehabilitation and utilization (Mittag et al., 2007), there is still a clear discrepancy between self-reported need and actual rehabilitation requests. Therefore, further efforts are necessary to facilitate and actively

promote the request for persons in need of rehabilitation. In addition to recently implemented pilot initiatives such as multilingual information about rehabilitation services and proactive request support (Banaschak et al., 2023; Remus et al., 2022), transcultural self-assessments could be developed and used to determine personal rehabilitation needs. This could encourage potential rehabilitation applicants and better identify previously undetected rehabilitation needs.

Overall, this analysis shows that proper counseling and education on medical rehabilitation by physicians and therapists can be a critical component in improving the utilization by migrants. Successful active support for migrants in accessing health care services such as medical rehabilitation is in our view determined by two factors: First, migrants must find their way to a counseling or support situation. In the case of medical rehabilitation, for example, this relates to access to key stakeholders such as medical specialists, general practitioners, and rehabilitation counselors. In the European context, studies on the use of general practitioners and specialists suggest that migrants do not use these services less frequently than the non-migrant population (Graetz et al., 2017). However, migrants are significantly less likely to use preventive services such as screenings and general health checks (Graetz et al., 2017; Starker et al., 2021). Accordingly, measures to promote access to preventive and counseling services for migrants should be strengthened. One possible strategy for this is community-based projects, such as the Neighborhood Mothers' project from Berlin, Germany. In the project, mothers with migration experience were trained on education and health topics in order to pass this information on to newly arrived and often isolated families (World Health Organization, 2018). Second, key stakeholders must have the competence to provide migration- or diversity-sensitive counseling and support (Baumeister et al., 2021). However, a 2014 study from the Netherlands, for example, concluded that medical students and physicians have deficits in culturally sensitive knowledge and behavior (Seeleman et al., 2014). A study from Israel also reported that physicians tend to rate their cultural competence higher than the patients they treat (Ohana & Mash, 2015). Implementing cultural competency training in education and training curricula of healthcare professionals could be one approach to improving the quality of counseling. In this context, findings on risk groups for underutilization within the migrant population (e.g., men) should also be considered, for example, so that healthcare professionals learn to identify high-risk patients in order to provide them with suitable support. Outside of academic programs, transcultural communication could be anchored in the quality circles of the National Association of Statutory Health Insurance Physicians (NASHIP). In these quality circles, primary physicians and psychotherapists regularly exchange knowledge on everyday practice topics. The meetings are led by trained moderators who have access to various topic-specific working and information materials from the NASHIP (Rohrbasser et al., 2018).

## Future Research

Future research should increase focus on the role of physicians in the application process. For example, qualitative interviews with rehabilitation applicants could be used to explore what concrete support people with a migration background

experienced when applying for rehabilitation and what was perceived as helpful. In addition, interviews with primary care physicians could be conducted to better understand what changes are needed from the perspective of the medical profession in order to provide good counseling to patients. Furthermore, samples of persons with a history of migration should be followed up over longer periods of time to assess, for example, the pattern of disability pension claims and whether the rehabilitation potential was exhausted prior to a disability pension and on what factors this depends. In this context, a larger sample of people could also be used to investigate whether factors influencing utilization change depending on migration variables, such as the length of time spent in the destination country since migration. The potential for length of stay to be a factor in the utilization of healthcare services was recently shown in studies on the use of primary and preventive care in Germany (Loer et al., 2022; Starker et al., 2021). Moreover, both our results and studies on other healthcare services (Keil et al., 2020; Loer et al., 2022) have shown that women are more likely to use these services than men. In addition to biological reasons for a certain level of utilization (e.g., regular visits to gynecologists by women), this may also be related to differences in health awareness. Explorative qualitative studies could further help to better understand the gender gap in utilization and work out how health awareness of men, in particular, can be positively strengthened.

## Strengths and Limitations

The results of the current analysis must be interpreted in the light of the following limitations: Firstly, the baseline survey was conducted in German. This may have led to a lower study participation by people with a migration background due to language problems. There might be unobserved differences between responders and non-responders. Selection bias, due to selective non-participation, might have biased the estimates. Secondly, our data only allowed us to consider whether individuals or their parents were not born in Germany, but not in which country. However, country of origin could also be an important predisposing factor for rehabilitation utilization. Thirdly, the size of the groups and the number of outcome events included in the proportional hazard models were partly very low. This should be considered when interpreting the results and addressed in future studies with longer observation periods and larger samples.

In contrast, there are several strengths. Firstly, the sample was restricted to persons aged 45 to 59 years, which are the primary consumer of rehabilitation services. Furthermore, we considered individuals with self-reported back pain (i.e., a group with a health problem and possible risks of early retirement and permanent work disability) (Zimmer et al., 2022). Second, we combined aggregate spatial data, questionnaire data, and administrative data on rehabilitation utilization, which allowed us to follow up without loss of sample as well as to account for contextual factors. Thirdly, in using administrative data, we could avoid recall bias and misclassification of rehabilitation utilization.



## Conclusions

In summary, informational and practical support provided by physicians and therapists on medical rehabilitation services seems to be a key predictor of rehabilitation utilization in migrants. Our findings, therefore, support the call for transcultural competence to be more widely incorporated into the education of medical and health professionals to counteract health care disparities (Grewal et al., 2021). In addition, migration- or culturally sensitive advisory services, such as multilingual counseling centers for people with chronic diseases or outreach support for employees (for example, by actively promoting medical rehabilitation in companies or industries with a high proportion of migrants), could enhance the utilization of medical rehabilitation.

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**Data Availability** The datasets generated for this study are available on request to the corresponding author.

## Declarations

**Ethical Approval** The study received ethical approval by the ethics committee of the University of Lübeck (file number: 15-144) and by the ethics committee of the Martin Luther University Halle-Wittenberg (file number: 2015–49).

**Consent to Participate** All participants were informed about the content and objectives of the study as well as the voluntary nature of participation and gave their written consent to participate.

**Conflict of Interest** The authors declare no competing interests.

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