Int Arch Occup Environ Health (2015) 88:511–519
DOI 10.1007/s00420-014-0978-x

ORIGINAL ARTICLE

Working conditions and effort–reward imbalance of German physicians in Sweden respective Germany: a comparative study

Johan Ohlander · Matthias Weigl · Raluca Petru · Peter Angerer · Katja Radon

Received: 30 October 2013 / Accepted: 3 September 2014 / Published online: 17 September 2014

Abstract
Objective Work stress among physicians is a growing concern in various countries and has led to migration. We compared the working conditions and the work stress between a migrated population of German physicians in Sweden and a population of physicians based in Germany. Additionally, specific risk factors for work stress were examined country wise.
Method Using a cross-sectional design, 85 German physicians employed in Sweden were surveyed on working conditions and effort–reward imbalance and compared with corresponding data on 561 physicians working in Germany. Multiple linear regression analyses were applied on both populations separately to model the associations between working conditions and effort–reward ratio (ERR), adjusted for a priori confounders.
Results German physicians in Sweden had a significantly lower ERR than physicians in Germany: mean (M) = 0.47, standard deviation (SD) = 0.24 vs. M = 0.80, SD = 0.35. Physicians in Sweden worked on average 8 h less per week and reported higher work support and responsibility. Multivariate analyses showed in both populations a negative association between work support and the ERR ($\beta = -0.148$, 95 % CI −0.215 to (−0.081) for physicians in Sweden and $\beta = -0.174$, 95 % CI −0.240 to (−0.106) for physicians in Germany). Further significant associations with the ERR were found among physicians in Sweden for daily breaks ($\beta = -0.002$, 95 % CI −0.004 to (−0.001)) and among physicians in Germany for working hours per week ($\beta = 0.006$, 95 % CI 0.002–0.009).
Conclusion Our findings show substantial differences in work stress and working conditions in favor of migrated German physicians in Sweden. To confirm our results and to explain demonstrated differences in physicians' work stress, longitudinal studies are recommended.

Keywords Physician well-being · Work stress · Migration · Work support · Psychosocial stress

J. Ohlander (✉) · M. Weigl · R. Petru · K. Radon
Institute and Outpatient Clinic for Occupational, Social and Environmental Medicine, Ludwig Maximilians University Munich, Ziemssenstr. 1, 80336 Munich, Germany
e-mail: johan.ohlander@med.uni-muenchen.de

M. Weigl
e-mail: matthias.weigl@med.uni-muenchen.de

R. Petru
e-mail: raluca.petru@med.uni-muenchen.de

K. Radon
e-mail: sekretariat-radon@med.uni-muenchen.de

P. Angerer
Faculty of Medicine, Institute of Occupational and Social Medicine, University of Düsseldorf, Düsseldorf, Germany
e-mail: peter.angerer@uni-duesseldorf.de

Background

An increasing proportion of the labor force in high-income countries is facing potentially health-affecting psychosocial working conditions (Kompier 2006; Rugulies 2012). One risk group is physicians, for whom work stress has become a growing concern in recent years (Bonn and Bonn 2000; Siegrist et al. 2010). Typical stress factors in the physician's workplace include expectations of a high degree of professionalism, responsibility of patients' well-being and concerns about medical errors (Tyssen et al. 2000; Tomioka et al. 2011). Additionally, physicians work in general long hours (Tyssen et al. 2000; Li et al. 2006; Buddeberg-Fischer et al. 2008; Tomioka et al. 2011),

which has been associated with adverse health outcomes (van der Hulst 2003). Overall, these are stressful working conditions, which might increase medical errors (Roseman and Booker 1995), and thus jeopardize patient safety.

Work stress is advantageously assessed using the effort–reward imbalance (ERI) model by Siegrist (1996). The model assumes that employees expect invested efforts at work to be compensated with adequate rewards (i.e., salary, promotion, job security and esteem). High efforts in relation to low amounts of perceived rewards imply work stress. Alternatively, the model includes the overcommitment scale that measures an employee's inability to withdraw from stressful situations (Siegrist 1996). ERI has been linked to various adverse health outcomes, such as stress-related disorders (Nieuwenhuijsen et al. 2010) and coronary heart disease (Kuper et al. 2002).

In Germany, hospital working conditions leading to ERI are particularly pronounced, characterized by increasing number of patients in hospitals with shorter stays (von dem Knesebeck et al. 2010), longer working hours and increasing administrative tasks (Rosta 2006; Rosta and Gerber 2007; Rosta and Aasland 2011). Studies of German physicians in surgical fields (von dem Knesebeck et al. 2010), in intensive care units (Jasper et al. 2012) and in private practices (Voltmer et al. 2012) showed a critical ERI in up to 28 % of the study population. Moreover, a comparison of ERI in the USA, the UK and the German health care systems showed that Germany had the highest country-specific work stress level (Siegrist et al. 2010).

Partly as a consequence of stressful working conditions, organizational problems in the health care system (Koch et al. 2011) and increased mobility of physicians (Garcia-Perez et al. 2007), Germany experiences a substantial loss of physicians due to migration (Kopetsch 2004a, b; Fuss et al. 2008). Studies indicate that this migration is permanent; 82 % of German physicians working abroad did not want to return due to a good adaptation to the foreign country, career opportunities, compatibility between work and family life, and income (Fuss et al. 2008). Of approximately 17,000 German physicians practicing abroad, 546 were in 2009 situated in Sweden (Kopetsch 2010). The question arises as to whether German physicians in Sweden experience more favorable working conditions and less work stress than their colleagues in Germany.

Thus, we compared the working conditions and the ERI of a migrated population of German physicians employed in Swedish health care with those of German physicians working in Germany. Additionally, associations between working conditions and ERI were investigated in each physician population separately.

Methods

Design and participants

Cross-sectional survey data on working conditions and work stress of migrated German physicians employed in Sweden were compared with corresponding data from a study on physicians working in Germany ($N = 561$), described in detail elsewhere (Weigl et al. 2012). Briefly, the sample of physicians in Germany was derived from a large cohort study of hospital physicians made in 2004–2007, with particular focus on physicians' work stress and well-being. Constituting the second of in total three follow-ups, the data in this study correspond to the complete answers of a questionnaire mailed to 561 junior doctors (2nd wave response 56.1 %) who in 2005 were mainly in their second or third year of medical residency.

Study participants in the Swedish setting were recruited between February and June 2011 through contacting HR managers of all 21 Swedish county councils and six hospitals. Subsequently, cooperating councils and hospitals distributed study information, enabling physicians to report interest in study participation. Eligible participants were German-speaking physicians working in Sweden who ever lived in Germany. Data were collected online between August and November 2011 using two reminders.

Both studies obtained ethics approval by the ethics commission of the Ludwig-Maximilians University in Munich (German working physicians: No. 016/04 and Swedish working physicians: No 332/11) and were conducted in accordance with the Helsinki declaration.

Study instruments

For both surveys, identical instruments were applied. The questionnaire comprised five categories: working conditions, work stress, personal stressors and resources, demographics and—solely in the Swedish survey—questions on study eligibility. The last category measured German residency, country of medical education, post gradual German employment, time worked in Germany, year of migration, reason for migration, current working country, employment duration and partnership status.

Work stress measures

Physicians' work stress was assessed using the 17-item German version of the ERI questionnaire (Siegrist et al. 2004). Efforts and rewards were measured by six and eleven items, respectively, each item rated on a 5-point Likert scale ranging from 1 "item does not apply," 2 "item does apply, but not distressed" to 5 "item does apply and very distressed." Higher ratings indicate toward higher efforts and rewards,

respectively. The effort–reward ratio (ERR) was calculated through dividing the sum score of the effort scale with the sum score of the reward scale, adjusted for the unequal amount of items. ERR values beyond 1 imply substantial stress at work. Reliabilities were established: Cronbach's alpha (CA) 0.74 for the effort scale and CA = 0.83 (reward) for German physicians in Sweden and CA = 0.75 (effort) and CA = 0.83 (reward) for physicians in Germany.

Working conditions measures

The following working conditions were measured: total working hours/week (including overtime), compensated, respectively, paid for working hours/week, number of on-call duties/month (during scheduled working hours and leisure time, respectively), minutes of break/day, number of patients/day, place of physicians' patient contact (hospital, outpatient clinic, hospital and outpatient clinic, no contact), type of employment (part time vs. full time), employment duration (permanent vs. limited), work position and shift work exposure (no, yes without night shifts and yes with night shifts). Physicians' perceived responsibility at work (CA = 0.82 for physicians in Sweden and CA = 0.89 for physicians in Germany) and support at work for lacking knowledge (CA = 0.86 for physicians in Sweden and CA = 0.73 for physicians in Germany) were assessed using two established scales with three items, respectively. All items were rated on a 5-point Likert scale ranging from 1 "disagree" to 5 "agree."

Personal stressors and resources measures

To obtain information on personal stressors and resources, over commitment (Siegrist 1996) and social support (Fydrich et al. 1999) were measured. Social support was measured with 14 items, each with a statement on the participants' relation to important people, such as family, friends and colleagues (CA = 0.94 for physicians in Sweden and CA = 0.92 for physicians in Germany). Over-commitment was measured with six items graded on a 4-point Likert scale ranging from 1 "strongly disagree" to 4 "strongly agree" (CA = 0.85 for physicians in Sweden and CA = 0.79 for physicians in Germany).

Statistical analyses

For both populations, descriptive analyses were conducted calculating means and standard deviations for continuous variables and scales, as well as absolute and relative frequencies for categorical variables. Further, comparisons of working condition variables and perceived work stress between the two populations were made using one-way ANOVA tests and chi-square tests.

Before analyzing the associations between working conditions and ERR, missing values in the datasets corresponding to the two populations (Tables 1, 2, 3) were imputed through multiple imputation (MI) (Sterne et al. 2009), using the R-package Amelia (version 1.6.3) (Honaker et al. 1998–2002). The MI procedure assumes that the data have a multivariate normal distribution and are missing at random (Sterne et al. 2009). The MI yielded for both datasets, respectively, another ten imputed datasets with no missing values.

The imputed datasets were further analyzed separately for each population, albeit with the same method. Bivariate and multivariate linear regression models were made to investigate associations between working condition variables and the ERR. The R-package Zelig (version 3.5.5) (Kosuke et al. 2007; Imai et al. 2008) enabled a combined analysis of all imputed datasets. Primarily, inclusion ($p < 0.2$) of covariates for the multivariate model was based on bivariate associations. Secondly, backward elimination of nonsignificant ($p \geq 0.05$) variables was made. The achieved model was adjusted for a priori confounders age, sex and smoking status (none, ex and current). All statistical analyses were made with SPSS 20 and R Statistical Software (version 2.15.1).

Results

Descriptive comparison

In total 87 German physicians working in Sweden responded (response, 84 %), of whom 2 were excluded

Table 1 Specific demographics for migrated German physicians working in Sweden $N = 85$

	Mean	SD	*N*	%	%NA
Ever worked in Germany as physician (yes)			69	83.1	2.4
Years worked in Germany	4.87	3.60			16.5
Country of medical education					0
Germany			82	96.5	
Other country			3	3.5	
Current working country					0
Sweden			83	97.6	
Sweden and Germany			2	2.4	
Time lived in Sweden (years)	6.61	3.78			0
Reason for migration					0
Work			43	50.6	
Work and family			29	34.1	
Family			8	9.4	
Other			5	5.9	
Years at current work	4.87	3.60			0

NA missing value

Table 2 Demographics and group comparisons for German physicians working in Sweden and German physicians working in Germany

	Physicians working in Sweden ($N = 85$)					Physicians working in Germany ($N = 561$)					MI[a]	p value
	Mean	SD	N	%	%NA	Mean	SD	N	%	%NA		
Age	40.47	5.86			0	31.63	2.63			0	Yes	<0.001
Gender (male)			50	58.8	0			272	48.5	0	Yes	0.081
Smoking status					8.2					4.1	Yes	0.009
No			66	84.6				391	72.7			
Ex			10	12.8				65	12.1			
Current			2	2.6				82	15.2			
Social support[b]	4.20	0.65			14.2	4.28	0.60			0.7	Yes	0.277
Overcommitment[c]	12.40	3.80			9.4	14.55	3.75			4.6	Yes	<0.001
Partner (yes)			74	94.9	8.2			421	78.4	4.3	Yes	<0.001

NA missing value

[a] MI multiple imputation. Column states whether the variable was included in the imputation (yes) or not (no)

[b] Figures calculated based on the mean sum score of the scale

[c] Figures calculated based on the sum score of the scale

since they had never lived in Germany (Table 1). Their mean time lived in Sweden was 6.6 years, and their mean professional tenure in Sweden was 4.9 years. The most common reason for migrating to Sweden was related to work (50 %) as well as work and family life (34 %).

The mean age of physicians in Sweden was 40.5 years (SD = 5.9), and approximately 60 % were male (Table 2).

Physicians working in Germany ($N = 561$) were on average younger ($M = 31.6$ years, SD = 2.6) and encompassed less males (48.5 %) (Table 2). The degree of social support was close to equal in both samples. Physicians in Germany reported higher overcommitment scores than their colleagues in Sweden ($M = 14.6$, SD = 3.7 vs. $M = 12.4$, SD = 3.8).

German physicians in Sweden reported a statistically significantly lower ERR than physicians in Germany ($M = 0.47$, SD = 0.24 vs. $M = 0.80$, SD = 0.35). Additionally, only 3.5 % of physicians in Sweden had an ERR > 1, compared with 22.8 % among physicians in Germany (Table 3).

Further analyses showed that German physicians in Sweden perceived on average lower efforts ($M = 12.7$, SD = 4.4 vs. $M = 16.9$, SD = 4.4) and higher rewards ($M = 51.5$, SD = 5.8 vs. $M = 41.8$, SD = 8.3) than their colleagues in Germany. Additionally, all three reward subscales were rated higher among physicians in Sweden, in particular financial rewards ($M = 18.6$, SD = 3.0 vs. $M = 13.6$, SD = 3.9) (Table 3).

Approximately 25 % of physicians in Sweden worked part time, compared with only 4 % of physicians in Germany (Table 3). Physicians in Germany worked on average approximately 8 h more per week and received less overtime compensation in leisure time ($M = 2.4$ h per week, SD = 3.6 h, vs. $M = 3.0$ h, SD = 2.3 h), however, more paid overtime compensation ($M = 2.3$ h, SD = 4.5 h vs. $M = 1.9$ h, SD = 4.8 h). Physicians in Germany had fewer minutes of breaks per day compared with their colleagues in Sweden ($M = 28.2$ min/day, SD = 18.1 min/day vs. $M = 40.4$ min/day, SD = 20.9 min/day). As given in Table 3, work support was rated lower among physicians in Germany than in the Swedish group, both in situations of lacking knowledge ($M = 3.7$, SD = 0.7 vs. $M = 4.5$, SD = 0.6) and in new and difficult tasks ($M = 3.3$, SD = 0.7 vs. $M = 3.9$, SD = 0.7).

Associations between working conditions and ERR

The adjusted regression model showed in both populations a statistically significant negative association between work support and the ERR ($\beta = -0.148$, 95 % CI −0.215 to (−0.081) for physicians in Sweden and $\beta = -0.174$, 95 % CI −0.240 to (−0.106) for physicians in Germany) (Table 4).

Specifically for physicians in Sweden, a significant negative association with work stress was found for break duration per work day ($\beta = -0.002$, 95 % CI −0.005 to (−0.001)) and permanent employment ($\beta = -0.318$, 95 % CI −0.554 to (−0.092)). For physicians in Germany, work stress was positively associated with working hours per week ($\beta = 0.006$, 95 % CI 0.002–0.009) and work responsibility ($\beta = 0.058$, 95 % CI 0.018–0.097). Finally, a negative association with work stress was found for night shift work ($\beta = -0.215$, 95 % CI = −0.398 to (−0.033)).

To test the robustness of our findings and to address potential spurious correlations between the work support scale and the ERI instrument, we performed additional

Table 3 Descriptive data on physicians' perceived efforts, rewards, working conditions and effort–reward ratio (ERR) according to country of employment with corresponding ANOVA or chi-square test

	Physicians working in Sweden ($N = 85$)					Physicians working in Germany ($N = 561$)					MI[a]	p value
	Mean	SD	N	%	%NA	Mean	SD	N	%	%NA		
ERR	0.47	0.24			0	0.80	0.35			6.1	Yes	<0.001
Effort[b]	12.73	4.35			0	16.94	4.37			4.8	No	<0.001
Reward[b]	51.48	5.80			0	41.83	8.33			5.9	No	<0.001
Reward subscale finance[b]	18.55	2.97			0	13.57	3.93			4.6	No	<0.001
Reward subscale esteem[b]	23.81	2.66			0	20.26	4.10			5.3	No	<0.001
Reward subscale job security[b]	9.12	1.44			0	8.01	2.16			4.5	No	<0.001
ERR > 1			3	3.5	0			120	22.8	6.1	No	<0.001
Total work (hours/week)	42.97	7.55			8.2	50.35	11.10			5.0	Yes	<0.001
Compensated overtime (hours/week)	3.02	2.36			12.9	2.35	3.79			7.1	Yes	0.140
Overtime paid (hours/week)	1.94	4.83			16.5	2.33	4.55			6.8	Yes	0.504
On-call duties during work (n/month)	1.75	1.91			9.4	3.24	2.42			5.9	Yes	<0.001
On-call duties during leisure time (n/month)	2.01	2.78			9.4	0.69	1.92			6.6	Yes	<0.001
Break (min/day)	40.36	20.86			9.4	28.15	18.12			4.3	Yes	<0.001
Patients cared for/day	13.75	12.98			9.4	18.27	10.76			5.2	Yes	0.001
Responsibility at work[c]	3.46	1.26			9.4	3.68	1.05			4.6	Yes	0.091
Work support (lacking knowledge)[c]	4.52	0.64			9.4	3.70	0.71			4.8	Yes	<0.001
Work support (new and difficult tasks)[c]	3.88	0.72			9.4	3.34	0.74			4.5	Yes	<0.001
Patient contact at					1.2					0.9	Yes	<0.001
Hospital			59	70.2				490	88.1			
Outpatient clinic			21	25.0				27	4.9			
Hospital and outpatient clinic			2	2.4				0	0			
No contact			2	2.4				39	7.0			
Shift work					8.2					5.9	Yes	<0.001
No shift work			63	80.8				335	63.4			
Yes, without night shift			5	6.4				14	2.7			
Yes, with night shift			10	12.8				179	33.9			
Type of employment					8.2					4.6	Yes	<0.001
Full time			65	74.7				512	95.7			
Part time			13	25.3				23	4.3			
Employment duration					8.2					5.2	Yes	<0.001
Limited			3	3.8				470	88.3			
Permanent			75	96.2				62	11.7			
Work position					8.2					5.0	Yes	<0.001
Junior			29	37.2				526	98.7			
Senior			49	62.8				7	1.3			

Descriptive data are based on data prior to imputation

NA missing value

[a] *MI* multiple imputation. Column indicates whether variable was imputed (yes) or not (no)

[b] Figures calculated based on the sum score of the scale

[c] Figures calculated based on the mean sum score of the scale

analyses, particularly because the ERI esteem reward sub-scale contains statements about support from colleagues. We conducted a sensitivity analysis by excluding the esteem reward sub-scale from the overall ERI outcome. Thereafter, we tested whether our multivariate associations between the personal and work-related determinants and the overall ERI score were replicated. Similar results were observed such that our above-reported findings were robust

Table 4 Multiple linear regression modeling associations between country-specific working conditions and the effort–reward ratio: forced-in variables (age, sex and smoking status) and stepwise backward selected factors statistically significantly predicting the ERR in the two physician populations, respectively

Variable	German physicians working in Sweden ($N = 85$)						German physicians working in Germany ($N = 561$)					
	Unadjusted			Adjusted[a]			Unadjusted			Adjusted[b]		
	β	95 % CI	p value	β	95 % CI	p value	β	95 % CI	p value	β	95 % CI	p value
Age[c]	0.008	−0.001 to 0.016	0.070	0.005	−0.002 to 0.012	0.187	0.005	−0.009 to 0.018	0.489	0.006	−0.006 to 0.019	0.318
Sex[c]												
Male	1			1			1			1		
Female	0.048	−0.054 to 0.151	0.356	0.030	−0.054 to 0.115	0.483	0.036	−0.035 to 0.106	0.321	0.073	0.006 to 0.140	0.003
Smoking status[c]												
No	1			1			1			1		
Ex	0.006	−0.142 to 0.154	0.938	−0.055	−0.181 to 0.071	0.394	−0.001	−0.121 to 0.120	0.992	−0.010	−0.121 to 0.100	0.857
Current	0.530	0.212 to 0.846	0.001	0.391	0.123 to 0.659	0.004	0.033	−0.079 to 0.145	0.559	0.040	−0.066 to 0.146	0.452
Break per day (min)[d]	−0.005	−0.007 to (−0.002)	<0.001	−0.002	−0.005 to (−0.001)	0.030	na	na	na	na	na	na
Work support[d] (lacking knowledge)	−0.171	−0.244 to (−0.100)	<0.001	−0.148	−0.215 to (−0.081)	<0.001	−0.191	−0.258 to (−0.123)	<0.001	−0.174	−0.240 to (−0.106)	<0.001
Employment duration[d]												
Limited	1			1			na	na	na	na	na	na
Permanent	−0.300	−0.580 to (−0.018)	0.037	−0.318	−0.554 to (−0.092)	0.006						
Work per week[d] (hours)	na	na	na	na	na	na	0.008	0.005 to 0.012	<0.001	0.006	0.002 to 0.009	<0.001
Shift work[d]	na	na	na	na	na	na						
No							1			1		
Yes (no night)							0.022	−0.043 to 0.087	0.509	−0.001	−0.067 to 0.066	0.989
Yes (night)							−0.211	−0.418 to (−0.003)	0.047	−0.215	−0.398 to (−0.033)	0.021
Work responsibility[d]	na	na	na	na	na	na	0.070	0.032 to 0.1084	<0.001	0.058	0.018 to 0.097	0.004

CI confidence interval

[a] R^2 for adjusted model = 0.167 (average R^2 for all ten models from corresponding imputed datasets)

[b] R^2 for adjusted model = 0.461 (average R^2 for all ten models from corresponding imputed datasets)

[c] Forced-in adjustment variable

[d] Variable selected through stepwise backward selection procedure made separately in each physician sample, respectively

to these changes, showing the same statistically significant associations as reported in Table 4 (data not shown).

Discussion

To the best of our knowledge, this is the first study to compare working conditions and ERI between migrated German physicians working in Sweden and physicians working in Germany. Physicians in Germany had an ERR of 0.80 (SD = 0.35), whereas physicians in Sweden had an ERR of 0.47 (SD = 0.24), implying a far lower work stress in the migrated population. Furthermore, multivariate analyses showed individual and common factors that potentially contribute to reduced work stress in terms of reduced effort–reward ratios. Adjusted linear regression showed separately in both populations that increased work support was associated with decreased work stress.

Physician migration is a major problem for various health care systems around the globe. Our study emphasizes that work life factors are important determinants of physicians' migration. It also provides an insight into the working conditions of two populations of physicians operating in different healthcare systems and yields estimates of country-specific associations with physicians' mitigated work stress. As physicians' work stress clearly has been linked to the degree of medical errors (Roseman and Booker 1995), our results might ultimately help increase the safety of clinical care in Sweden and Germany, respectively, e.g., through informing interventions targeting work stress (Weigl et al. 2013). The population working in Sweden was recruited with a nationwide, structured procedure and resulted in a high response (84 %; 13 of 21 county councils involved). Further, the migrated population comprises potentially almost one-sixth of the total population of migrated German physicians working in Sweden (Kopetsch 2010). Similarly, the German sample was derived from a large cohort study of junior physicians who underwent specialty training in numerous hospitals in Germany (Weigl et al. 2012). Thus, we assume a high generalizability of our findings. In terms of methodological rigor, we applied standardized and well-established measures and used multiple imputation, which has proven to generate less bias compared with the complete case analysis (Sterne et al. 2009).

Despite these strengths, our cross-sectional study design rules out causal inference, and our methods do not statistically provide explanations for the differences in work stress reported between the German and the Swedish populations. Moreover, none of the populations were sampled randomly and non-response by some physicians may have biased our results. One consequence might be an underestimated ERR, as highly stressed physicians probably did not participate. Further, regarding the Swedish sample, it is reasonable to assume that migrant physicians generally possess a certain socioeconomic status and other characteristics that may result in more favorable working conditions and less work stress compared with the less experienced population in Germany. Consequently, in the Swedish sample, we might have underestimated both ERR and poor working conditions. Further, it should be noted that 67 % of participating physicians originated from only four county councils (data now shown). This limits the generalizability of our findings related to the overall population. Among eligible participants in the Swedish study were also physicians who had their medical degree in Germany, however, without subsequent work experience at a German employer. Nonetheless, German medical students are obliged to take part in various internships and bedside teaching seminars and thus gain quickly meaningful insights into the work environment in German hospitals. Regarding both samples, all study variables were assessed through self-report, which increases the risk of spurious results due to common method variance.

Concerning the comparability of our populations, we acknowledge differences in some socio-demographic characteristics. The sample in Germany was comparably younger with shorter professional tenure, and we cannot rule out that physicians' working conditions are dependent of these factors. The difference in level of seniority might also have influenced the ERI; senior physicians generally experience to a higher extent than junior physicians increased rewards, e.g., increased salary and status, whereas junior physicians generally experience high work stress due to high workloads and demanding specialty training. However, level of seniority showed in none of our analyses significant associations with ERI (data not shown). Nevertheless, given these socio-demographic differences, we performed our multivariate analyses on the two physician populations separately.

Regardless these limitations, the ERR of 0.47 (SD = 0.23) among physicians in Sweden can still be considered low, both in comparison with the ERR of our surveyed physicians in Germany ($M = 0.80$, SD = 0.35) and in comparison with previous studies of physicians' work stress in Swedish and German settings, respectively. Birgit et al. (2012) examined the ERI among Swedish physicians 4 years after their graduation and found a mean ERR of 0.66 among women and 0.67 among men. Regarding ERI studies on physicians in Germany, a mean ERR of 0.87 among doctors in surgical fields (von dem Knesebeck et al. 2010) and 1.5 among physicians and nurses in intensive care units (Jasper et al. 2012) have been reported. One might hypothesize that the lower ERR found among our physicians in Sweden, compared with our physicians in Germany, is attributable to the high degree of perceived rewards ($M = 51.5$ for physicians in Sweden, $M = 41.8$ for

physicians in Germany). This seems consistent with the findings of Siegrist et al. (2010), who found that physicians working in German health care perceive comparatively low rewards.

Overall, our population of physicians in Sweden seemed to experience relatively good working conditions. In particular, they did not work excessively many hours per week, which seems to be the case for many other physicians (Tyssen et al. 2000; Li et al. 2006; Buddeberg-Fischer et al. 2008; Tomioka et al. 2011). Indeed, our surveyed physicians in Germany worked on average approximately 8 h more per week than did the physicians in Sweden.

In agreement with McCalister et al. (2006), we found for both physician populations a significant negative association between degree of work support and the ERR. Regardless of population under study, the estimates of the association between work support and the ERR agreed well in magnitude both in the bivariate and multivariate models and might potentially be an independent and important mitigator of physicians' work stress. Thus, regardless of health care setting, sufficient support from colleagues might generate beneficial buffering effects for physicians' work stress. The ERI instrument measures both stressors (e.g., working conditions) and work stress. Thus, we acknowledge the potential overlap of measured working conditions and the ERI. This increases the risk of spurious results concerning associations of work-related determinants and work stress. Our additional analyses with revised measures showed that the impact of common measure variance (especially concerning social support at work) did not affect the robustness of our findings. However, one needs to be cautious when interpreting reported associations.

Nevertheless, we argue that the positive association between work per week and ERR seen among physicians in Germany might be alarming. It is possible that the detection of this association only in the German population might be due to the higher workload reported in our German physician sample, compared with the Swedish. Thus, given this association, and as German physicians in general experience longer working hours (Rosta 2006; Rosta and Gerber 2007; Rosta and Aasland 2011), work stress in this group might be widespread and on the rise. In contrast, the absence of any positive association between work hours and the ERR among physicians in Sweden is possibly explained by the Swedish statutory working time restrictions of maximum 40 regular working hours per week (Ministry of Employment 2008), in combination with the higher seniority and thus potentially higher control over work hours surveyed physicians in Sweden had.

Furthermore, the negative association between night shift work and work stress seen among physicians in Germany seems plausible, as this group tends to possess a higher influence on their working situation (i.e., due to seniority and experience) compared with junior day shift workers who usually are at the very beginning of their careers in medicine.

Among physicians in Sweden, a negative association between breaks per day and the ERR was found. This result seems plausible as breaks during work per se implies less exposure to work and increases psychophysical recovery from work. In contrast, it is possible that the limited amount of breaks per day seen in the German sample ($M = 28.2$ min/day) is insufficient to enable a similar significant buffering effect on work stress as found in physicians working in Sweden. Thereto, as with work breaks, it is also possible that physicians working in Sweden due to a higher level of seniority possess the authority to take breaks when needed and therefore more efficiently compensate and regulate their individual work stress.

Conclusion

Our findings show substantial differences in work stress and working conditions in favor of migrated German physicians in Sweden. To confirm our results and to explain demonstrated differences in physicians' work stress, we recommend longitudinal comparisons of national resident physicians and emigrated national resident physicians. This in turn might inform interventions targeting work stressors aimed at retaining physicians in their home countries. Our results further suggest that the potential benefits seen in countries with health care systems that encompass improved working conditions and less risk of psychosocial stress at work may contribute to physicians' willingness to emigrate and practice abroad.

Acknowledgments The study coordinators would like to thank all study participants and cooperating HR managers at the different Swedish county councils. The study on the physicians in Germany was partly funded by the German Medical Association, the German Academic Exchange Service and Marburger Bund. The study on migrated German physicians in Sweden received no funding.

Conflict of interest The authors declare that they have no competing interests.

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