



# General practitioner visits and physical activity with asthma—the role of job decision authority: a cross-sectional study

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## Abstract

**Purpose** Psychosocial working conditions—in terms of job decision authority, among others—may influence asthma self-management at work and in leisure time, as recent qualitative research has shown. We sought to statistically investigate potential relationships between job decision authority and two types of self-management behaviours: physical activity (PA) and visits to the general practitioner (GP).

**Methods** We combined data from waves 1 and 2 of the Survey of Health, Ageing and Retirement in Europe (SHARE) for cross-sectional analyses. The sample was restricted to participants who were employed and reported asthma but no other chronic lung disease ( $n = 387$ ). The three key variables were each measured by one item. We estimated the prevalence ratios of adequate PA (i.e., more than once a week) and regular GP visits (i.e.,  $\geq 4$  per year) according to job decision authority (low vs. high) using Poisson regression with the robust variance.

**Results** We found no evidence of a relationship between job decision authority and PA. However, employees with low levels of job decision authority had a higher prevalence of reporting that they consulted their GP at least four times per year (prevalence ratio = 1.30; 95% confidence interval = 1.03–1.65).

**Conclusions** This study was the first to quantitatively investigate the relationship between job decision authority and PA specifically among individuals with asthma. Our results contradict prior epidemiological studies among general working populations, which reported a positive relationship between job decision authority and PA. Our results concerning the association between low job decision authority and more GP visits are inconsistent with our qualitative findings but supported by epidemiological studies among general occupational samples.

**Keywords** Asthma · Health care utilization · Job decision authority · Physical activity · Self-management · Survey of Health, Ageing and Retirement in Europe

## Introduction

Asthma can considerably affect patients physically, psychologically, and socially, and, thus, may impair their quality of life (Loerbroks et al. 2012, 2018; The global asthma report 2018). In most individuals, the illness can be well controlled though by effective self-management behaviour (Kotses and Creer 2010; The global asthma report 2018). Besides strategies to cope with acute symptoms (e.g., breathing techniques), asthma self-management, among others, covers strategies related to symptom prevention (e.g., trigger avoidance or physical exercise) and symptom monitoring (e.g., peak flow meter use or physician visits) (Global Initiative for Asthma 2018; Mammen and Rhee 2012).

Earlier qualitative research from our research group explored how working conditions may influence asthma

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self-management at work according to affected individuals (Heinrichs et al. 2018). In that study, employees with asthma reported that low decision authority over their tasks and when and how to complete them impaired their asthma self-management at the workplace and in leisure time (Heinrichs et al. 2018). Job decision authority is a key component in well-established work stress models: together with a second sub-scale (“skill discretion”), it forms the concept of job decision latitude (Karasek et al. 1998). In our study, working time regulations seemed to particularly affect asthma self-management in terms of symptom prevention (i.e., trigger avoidance and exercise), symptom monitoring (i.e., medical check-ups), and acute symptom management (i.e., the opportunity to take breaks, to leave work early, or to stay at home as required due to one’s asthma symptoms) (Heinrichs et al. 2018). For example, employees with asthma who experienced low levels of job decision authority reported that they (a) found it difficult to participate in regular leisure-time physical activity (PA), e.g., because of their long or irregular working hours, and (b) felt that they were less likely to see their treating physician for their asthma on a regular basis, e.g., because they had to make up for the lost hours (Heinrichs et al. 2018).

In this study, we aim to statistically examine the following hypotheses, which can be derived from prior qualitative evidence: among individuals with asthma, (1) there is a positive relationship between job decision authority and PA (i.e., employees with low job decision authority report less PA) and (2) there is a positive relationship between job decision authority and the number of physician visits (i.e., employees with low job decision authority report fewer visits).

## Methods

### Study population

We used data from the Survey of Health, Ageing and Retirement in Europe (SHARE). SHARE is a panel database that contains data on health, socio-economic variables, and social factors, among others, from Europeans aged 50 and above or living with a person aged 50 and over in one household (Börsch-Supan et al. 2013). We used data from waves 1 and 2 since only those waves contained all the variables needed for our analyses. Data were collected in 2004 and 2005 in 12 countries (wave 1) and in 2005 and 2006 in 15 countries (wave 2). We combined the data from the two waves into a single data set for cross-sectional analyses. In total, 67,608 records resulted from the two waves, and the response rate was around 61% at both time points (Börsch-Supan et al. 2013). First, we removed double cases (using the data from wave 1, complemented by the data from wave 2, e.g., in case of new participants, remaining  $n = 37,175$ ). Then, we

reduced the sample to participants who reported asthma (remaining  $n = 3231$ )—but no other chronic lung disease diagnosed by a physician (remaining  $n = 2446$ )—and who were in employment or working as civil servants (remaining  $n = 505$ ). These numbers imply that only 20.6% of the participants with asthma and no other chronic lung disease were employed or working as civil servants. This estimate is in keeping with the respective proportion in the overall sample (i.e., 25.6%) and is explained by the high percentage of retired people (47.7%) and homemakers (14.5%). After elimination of cases with missing values on the exposure, outcome, or control variables (mainly body mass index and GP visits), the final data set contained 387 records. An alternative approach had been to use wave 1 and wave 2 data to conduct prospective analyses. The number of remaining participants for such analyses was too low though ( $n = 84$ ).

### Measures

Job decision authority was measured by one item, which had also been used in prior studies (e.g., Loerbroks et al. 2017; Mäcken 2019): “I have very little freedom to decide how I do my work.” Possible answers were: 1: strongly agree; 2: agree; 3: disagree; 4: strongly disagree. Job decision authority was considered low when agreement was reported (answers 1 or 2) and high in case of disagreement (answers 3 or 4). The following item assessed PA: “How often do you engage in vigorous PA, such as sports, heavy housework, or a job that involves physical labour?” One of the following answers was to be selected: (1) more than once a week; (2) once a week; (3) one-to-three times a month; (4) hardly ever, or never. This single-item variable has been used in previous publications based on the SHARE data (Marques et al. 2018; Memel et al. 2016). To minimize potential misclassification bias (i.e., implying that physically inactive individuals are mistakenly classified as physically active and vice versa) (Cheval et al. 2017), we defined adequate vigorous PA, such as sports, heavy housework, or a job that involves physical labour, as “more than once a week”. Another reason for the dichotomization of PA at that cut-off (instead of using all four levels) is that systematic reviews showed that physical training at least twice a week is beneficial to asthma (Carson et al. 2013; Eichenberger et al. 2013). This was reflected most suitably by the highest measured PA level (“more than once a week”). Two consecutive items assessed the number of GP visits, as used in another SHARE-based study (Bíró 2016): “About how many times in total have you seen or talked to a medical doctor about your health?” and “How many of these contacts were with a general practitioner or with a doctor at your health care centre?”. We defined at least one visit per quarter—that is, four or more visits per year—as an adequate number of GP visits for individuals with a chronic disease such as asthma.

## Data analysis

Poisson regression analyses with the robust variance using SPSS 25 were conducted to investigate the relationships of low job decision authority (reference category: high job decision authority) with reported PA (dependent variable: more than once a week) and number of GP visits (dependent variable:  $\geq 4$  GP visits per year) (Barros and Hirakata 2003). We initially estimated unadjusted prevalence ratios (PRs) and 95% confidence intervals (CIs), which were subsequently adjusted for wave, country, gender, age, highest educational degree, body mass index, and smoking status (never, current, and former).

## Results

Sample characteristics are listed in Table 1 ( $n = 387$ ). The mean age was 55.1 years (standard deviation: 5.3 years, range: 36–76 years). The sample comprised 55.8% women, and 74.7% of the participants experienced high levels of job decision authority. The latter estimate was comparable to that in the entire—and representative—SHARE sample (73.1% in wave 1 and 72.3% in wave 2). Less than half of the sample reported vigorous PA more than once a week (45.2%) and to see their GP at least four times per year (42.1%).

As shown in Table 2, there did not seem to be a relationship between job decision authority and reported PA, neither in unadjusted nor in adjusted analyses. Low job decision authority was, however, associated with a higher prevalence of reporting an adequate number of visits to the GP ( $\geq 4$  visits per year) in both unadjusted (PR = 1.34; 95% CI = 1.06–1.71) and adjusted (PR = 1.30; 95% CI = 1.03–1.65) analyses.

## Discussion

This study was the first to quantitatively investigate the relationship between job decision authority and PA specifically among individuals with asthma. We did not find evidence of a meaningful relationship between the two variables. This is not only inconsistent with our initial hypothesis derived from qualitative findings (Heinrichs et al. 2018) but also in disagreement with results from several epidemiological studies (Choi et al. 2010; Kouvonen et al. 2005, 2012). Those studies, which did not specifically focus on individuals with asthma though, suggested that increasing job decision authority may be associated with higher PA levels. However, those studies addressed leisure-time PA only, whereas, in SHARE, job-related PA was included in the item. It is unclear if or to what extent

**Table 1** Participants' characteristics ( $n = 387$ )

	No.	%
Age		
< 50	35	9.0
50–59	280	72.4
60–69	66	17.1
> 70	6	1.6
Sex		
Women	216	55.8
Men	171	44.2
Highest educational degree		
Secondary education and below	239	61.8
Post-secondary education	146	37.7
Other	2	.5
Smoker status		
Current	73	18.9
Former	133	34.4
Never	181	46.8
Body mass index (BMI)		
Underweight (BMI < 18.5)	6	1.6
Normal (18.5 < BMI < 25)	147	38.0
Overweight (25 < BMI < 30)	173	44.7
Obese (BMI > 30)	61	15.8
Wave		
Wave 1	242	62.5
Wave 2	145	37.5
Little freedom to decide (job decision authority)		
Strongly disagree (= high authority)	122	31.5
Disagree (= high authority)	167	43.2
Agree (= low authority)	69	17.8
Strongly agree (= low authority)	29	7.5
Physical activity		
More than once a week (= active)	175	45.2
Once a week (= inactive)	49	12.7
One-to-three times a month (= inactive)	36	9.3
Hardly ever, or never (= inactive)	127	32.8
Visits to general practitioner		
Four times a year or more	163	42.1
Less than four times a year	224	57.9

an interrelationship between the two could have affected our findings: for instance, a manual worker with high occupational PA may report less leisure-time PA while a white-collar worker may report higher leisure-time PA. Concerning cardiovascular disease, leisure-time PA was shown to lower the risk of the illness whereas occupational PA slightly increased it (the so-called PA paradox) (Ferrario et al. 2018; Li et al. 2013). However, it remains unclear if this effect would also be found among workers with asthma because some of the possible explanations for this finding are very specific for cardiovascular disease

**Table 2** Prevalence ratios and 95% confidence intervals for self-reported physical activity or number of GP visits according to job decision authority ( $n = 387$ )

	PA more than once a week				Four or more GP visits per year				
	Unadjusted		Adjusted <sup>a</sup>		Unadjusted		Adjusted <sup>a</sup>		
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	
Job decision authority									
High	Ref.	–	Ref.	–	Ref.	–	Ref.	–	
Low	0.96	0.74, 1.24	0.97	0.76, 1.25	1.34	1.06, 1.71	1.30	1.03, 1.65	

PA physical activity, GP general practitioner, PR prevalence ratio, CI confidence interval

<sup>a</sup>Adjusted for wave, country, gender, age, highest educational degree, body mass index, and smoker status

(e.g., concerning elevated heart rate and blood pressure due to occupational PA) (Holtermann et al. 2018).

We observed that low job decision authority was related to a higher prevalence of visiting the GP at least four times per year. This is inconsistent with our second hypothesis derived from qualitative findings among patients with asthma: our participants explained that they found it difficult to see their GP for their mostly quarter-annual check-ups because of their limited freedom to decide on their own working hours (Heinrichs et al. 2018). Due to this observation, we assumed that more GP visits serve primarily as an indicator of regularly monitored and likely well-controlled asthma and are associated with high job decision authority. Our results do not support this notion but are in keeping with findings from epidemiological studies among general working populations, which showed that employees with low job control were more likely to see their GP (Parslow et al. 2004; Steenbeek 2012). Our findings expand this evidence specifically to individuals with asthma. One explanation for this association could be that employees with low job decision authority experience more strain at work and may, therefore, develop health complaints (possibly due to poorer self-management while being at work) leading to more GP visits. This means that more GP visits could be seen as an indicator of ill-health.

The disagreement of the results from our study with those from our prior qualitative study could be due to the operationalization of job decision authority in the present study. In SHARE, job decision authority was measured as the “freedom to decide *how* I do my work”. However, in our qualitative study, participants explained that their PA and number of physician visits were in particular affected by their working time regulations (thus, *when* they do their work) (Heinrichs et al. 2018). In other studies using the SHARE data, job control was assessed by a combination of “I have very little freedom to decide how I do my work” (decision authority, which we used) and “I have an opportunity to develop new skills” (skill discretion) (e.g., Loerbroks et al. 2017; Mäcken 2019). As mentioned above, we deliberately decided not to combine those two items into a single measure because we aimed to specifically examine the findings from our prior

qualitative study (Heinrichs et al. 2018). Participants in our earlier qualitative study never mentioned their (lacking) opportunities for skill development as a possible determinant of their asthma management. Therefore, we did not include this item in the analyses. There is evidence supporting this strategy of separating decision authority from skill discretion (Bean et al. 2015; Joensuu et al. 2012). Moreover, the differing findings may be partly due to sample differences: SHARE gathered data among a multi-country general population sample whereas our prior qualitative study was conducted among German employees with asthma who were in pulmonary rehabilitation.

## Limitations

First, our study is cross-sectional and does not provide insights into whether associations are causal and if so, into the causal directions. Second, our choice to use job decision authority as an exposure variable was determined by the nature of the available data. There are other concepts related to working conditions and illness at work, which would possibly have been useful as well for our study. For instance, the concept of “adjustment latitude” by Johansson and Lundberg (2004) specifically refers to an employee’s opportunity to alter their work when not feeling well, e.g., going home early or working more slowly. Furthermore, there is the concept of “margin of manoeuvre” which alludes to the “freedom a worker has to develop different ways of working in order to meet production targets, without having adverse effects on his or her health” (Durand et al. 2009). However, adjustment latitude implies that a person is currently not feeling well whereas job decision authority also encompasses aspects which amongst others seem to influence symptom prevention (such as trigger avoidance) among employees with asthma who do not currently suffer from acute symptoms (Heinrichs et al. 2018). In addition, those two alternative concepts cover aspects of asthma self-management, above all acute symptom management such as activity modification by working more slowly or taking breaks

(Heinrichs et al. 2018; Mammen and Rhee 2012). Since those concepts thus cover aspects of both our exposure variable as well as our outcome variables, they did not seem suitable to assess either one of them separately in this study. Third, the key variables were each assessed by one item only. Regrettably, common psychometric properties (e.g., Cronbach's alpha, factorial structures), which are partly interpreted as evidence of the validity of instruments, cannot be estimated for such single-item measures. More comprehensive measures could possibly have provided more detailed insights though. For instance, it would have been worthwhile to measure occupational and leisure-time PA separately. Maybe, this approach would have confirmed the hypothesized relationships or had suggested differential effects by the type of PA documented (Ferrario et al. 2018; Holtermann et al. 2018; Li et al. 2013). Furthermore, the reasons and motivations for GP visits should have been assessed to be able to interpret the patients' consultation-seeking behaviour. If a patient with asthma goes to see their GP for a regular check-up, the visit could be considered as appropriate asthma SMB, i.e., as a favourable event, as it was in our qualitative interview study (Heinrichs et al. 2018). If a patient needs to see their GP because their symptoms worsened, however, the visit needs to be understood as an undesired event. Moreover, we were able to only consider GP visits but no visits to pneumologists. One may assume that patients who consult specialists might display poorer disease control. Asthma is a condition, however, which is supposed to be efficiently handled in primary care (e.g., Grover and Higgins 2016). Moreover, GPs serve as gatekeepers in several countries participating in SHARE (Bíró 2016), which implies that patients are to see their GP before they may consult a specialist. Thus, bias due to the sole reliance on GP visits (i.e., selection according to disease severity) is likely limited. Fourth, since our analyses focused on chronically ill employees, healthy worker effects cannot be ruled out (Dumas et al. 2013). Fifth, asthma was assessed by self-report of physician diagnoses. Medical records would have provided more reliable information. Nonetheless, self-report information on asthma had been shown to be sufficiently reliable (Mirabelli et al. 2014). Moreover, the exclusion of participants reporting other chronic lung diseases likely reduced diagnostic confusion, e.g., between asthma and chronic obstructive pulmonary diseases (Tinkelman et al. 2006).

In conclusion, we did not find evidence of a meaningful relationship between job decision authority and PA but observed that low levels of job decision authority related to a higher prevalence of visiting the GP. Further research is needed to better understand how working conditions may determine different types of asthma self-management.

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## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Waves 1 and 2 received ethical approval by the ethics committee of the University of Mannheim, Germany.

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