Research

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Job stress among GPs:

associations with practice organisation in 11 high-income countries

Abstract

Background
Job stress among GPs is an issue of growing concern.

Aim
To investigate whether the structural and organisational features of GPs' practices were associated with job stress in 11 countries.

Design and setting
Secondary analysis of the 2015 Commonwealth Fund International Health Policy Survey of Primary Care Physicians, an international cross-sectional study. A total of 11 Western countries participated in the 2015 edition.

Method
Random samples of practising GPs were drawn from government or private lists in each country (N = 12 049). Job stress was measured by the question: 'How stressful is your job as a GP?' (5-point Likert scale). Numerous practices' organisation and functioning characteristics were considered. Multilevel mixed-effects ordered logistic regression was performed.

Results
The prevalence of job stress varied from 18% to 59% according to country. Job stress was higher among GPs aged 45–54 years (middle age) (odds ratio [OR] 1.35, 95% confidence interval [CI] = 1.07 to 1.70) and those practising in an urban area (OR 1.23, 95% CI = 1.15 to 1.31). It was also associated with a high weekly workload (OR 2.88, 95% CI = 2.38 to 3.50) if >50 hours/week workload, large administrative burden (OR 1.65, 95% CI = 1.44 to 1.89), long delays in receiving hospital discharge, poor possibilities in offering same-day appointments (OR 1.74, 95% CI = 1.18 to 2.56), and performance assessment (OR 1.15, 95% CI = 1.05 to 1.24). Finally, long consultations (OR 0.64, 95% CI = 0.53 to 0.76) and working with a case manager attached to the practice were associated with a lower job stress. The vast majority of results were consistent across the countries.

Conclusion
Heavy workloads and time pressure are clearly associated with GP job stress. However, organisational changes such as employing case managers and allowing longer consultations could potentially reduce this burden.

Keywords
general practitioners; international comparisons; occupational stress; organisational characteristics; primary care.

INTRODUCTION

Stress at work, whatever the sector of activity, has been one of the major occupational health issues in high-income countries since the early 1980s. Healthcare professionals, including GPs, seem to be highly exposed to stress in comparison with the working population.[1–3] Feelings of job stress characteristically occur when working conditions are perceived to be too challenging to cope with.[4] Chronic exposure to job stress has been shown to lead to adverse consequences to workers' health.[5–7] Among many reported problems, mental health syndromes, such as burnout and depressive syndromes, have been the most frequently studied in the recent literature.[8–12] Another consequence may be the falling quality of work carried out possibly impacting on patient safety.[13] There is a large body of literature about the frequency with which GPs suffer burnout and, more generally, about the consequences of GPs' job stress on their mental health.[14–16] Repercussions on the quality of patient care, medical errors, and patient–physician relationships have been reported on to a lesser extent.[17–20] Finally, personal experiences of job dissatisfaction or even stories of job-related constraints may deter medical students from choosing a career as a GP or may convince others to give up this specialty.[21–24] This problem could become particularly acute for certain healthcare systems given the reported shortages of GPs in many countries and is of growing concern.

In contrast to the consequences of job stress caused by GPs' exposure, relationships between their actual working conditions and their perceptions of stress have been studied to a lesser degree.[19,25] In addition, the effects of interventions to improve working conditions and reduce occupational stress are unclear.[26–28]

Understanding these links is crucial to finding solutions. This issue is particularly acute in the current context of reinforcing primary health care in order to face the demographic and health challenges of ageing populations. Healthcare systems will have to adapt rapidly. Many countries have already made significant changes to the organisation of their healthcare systems to address these challenges and contain costs, particularly by reinforcing primary care and thus the role of GPs. Western countries have adopted different strategies, for example, the creation of group practices and healthcare centres, the use of new technologies, the introduction of new professionals in GP practices (case managers), and the development of interprofessional coordination. These innovations may affect the practice of general medicine and, thus, generate stress among GPs.[28]

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The present study aimed to investigate the structural and organisational factors associated with primary care physicians' perceptions of job stress in high-income countries.

METHOD

Commonwealth Fund International surveys

Data from the latest Commonwealth Fund International Health Policy Survey of Primary Care Physicians, conducted in 2015, were used. Since 2006, the Commonwealth Fund has been conducting international surveys of nationally representative, random samples of primary care physicians concerning their practice's preparedness to manage the care of patients with complex needs (both children and adults), communicate with other specialties and community-based providers, and use of health information technology. The survey also collected information about their views on their healthcare system and their satisfaction with aspects of their practice. In total, 11 countries participated in the 2015 edition: Australia, Canada, France, Germany, Netherlands, New Zealand, Norway, Sweden, Switzerland, the UK, and the US.[29]

Population and data collection

The protocol for the present study has already been detailed elsewhere;[29,30] the authors now present its main characteristics. Samples of practising physicians were drawn from government or private lists of primary care doctors in each country (N = 12 049). Different medical specialties of the primary care physicians included were specific to each country. GPs and family physicians were included in all countries, as were internists and paediatricians in Germany, Switzerland, and the US. Survey data collection modes were tailored to each country's best practices for reaching out to physicians. Mail surveys were conducted in Germany, Netherlands, and Norway. Physicians in Australia and New Zealand[29] were recruited by telephone and responded to surveys online or by mail. Online and mail surveys were conducted in Canada, Sweden, and the US, whereas telephone and online questionnaires were conducted in France, the UK, and Switzerland.

Data

A common questionnaire was reviewed by experts in each country, adjusted for country-specific wording and translated as needed to ensure comparability across countries.[30] One question explored job stress: 'How stressful is your job as a GP?' This was measured on a 5-point Likert scale: extremely stressful; very stressful; somewhat stressful; not too stressful; not at all stressful. In addition, numerous questions described the organisation and characteristics of their practice. These factors were classified into four domains (details of the selected questions are shown in Table 1):

- general organisation and workload indicators, including the number of full-time equivalent (FTE) GPs in the practice, weekly workload, percentage of same- or next-day appointments, home visits, consultation lengths, and administrative tasks;

- coordination indicators, including working with a case manager, inter-visit contact with patients, delays to receive hospital discharge information, care coordination with hospitals, contacts with home care providers;

- quality-of-care indicators, including information on clinical outcomes and preventive targets, patient satisfaction surveys, patients admitted to hospital and use of emergency department, targeted performance, and comparisons with other practices; and

- use of electronic tools, including electronic health records (EHRs) and prescribing alerts.

Independent variables also included GPs' sociodemographic characteristics including sex, age, and location of practice in rural or urban areas.

Table 1. Selected questions from the Commonwealth Fund International Health Policy Survey questionnaire, included as independent variables in present study

Questions	Answer's items	Grouping item in the multivariate analysis
Are you?	Male/female	
How old are you?	<35, years 35–44 45–54 55–64 ≥65	
Where is your practice located?	City Suburb Small town Rural area	Urban Rural
General organisation and workload indicators		
How many full-time equivalent (FTE) doctors, including yourself, are in your practice? *n*	Continuous	<3/3–5/>5
On average, how much time are you able to spend with a patient during a routine consultation?	Continuous	<10 minutes/10–20 minutes/>20 minutes
Thinking about your medical practice, estimate how many hours a week you typically work	Continuous	≤40 hours per week/41–50 hours per week/>50 hours week
In a typical week, about what percentage of time do you spend on the following: administrative issues	Continuous	≤10%/11–20%/>20%
What proportion of your patients who request a same- or next-day appointment can get one?	Almost all (>80%) Most (60–80%) About half (about 50%) Some (20–40%) Few (<20%)	>50% About 50% 20–40% <20%
Do you and/or other personnel that work with you in your practice provide care in any of the following ways? — Make home visits	Yes, frequently Yes, occasionally No	Yes, frequently Yes, occasionally No
Coordination indicators		
Do you and/or other personnel that work with you in your practice provide care in any of the following ways? • Coordinate follow-up care with hospitals for patients being discharged • Contact patients between visits to monitor their condition	Yes, frequently Yes, occasionally No	Yes/no Yes/no
Do you or other personnel in your practice communicate with your patient's home care provider about your patient's needs and the services to be provided?	Routinely Occasionally Never	Yes/no
Does your practice use personnel, such as nurses or case managers, to monitor and manage care for patients with chronic conditions that need regular follow-up care?	Yes, within practice Yes, outside of practice Yes, within and outside No	Yes, within practice Yes, outside No
After your patient has been discharged from the hospital, on average how long does it take before you receive the information you need to continue managing the patient, including recommended follow-up care?	<24 hours 24–48 hours 2–4 days 5–14 days 15–30 days >30 days Rarely or never	≤2 days 2 days–2 weeks 3–4 weeks >1 month or never

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General strategy of analysis

The main objective of the analysis was to investigate the associations between job stress (dependent variable) and structural and organisational factors (independent variables). The authors' hypothesised: workload and quality of care indicators were positively associated with job stress; indicators related to care coordination and use of electronic tools were negatively associated with job stress. Personal demographic variables were also included as confounders. However, the authors were also interested in studying the relationship between job stress and sociodemographic factors. The hypotheses being that job stress was more prevalent among females, physicians of younger ages, those practising in urban areas, and in solo practices (secondary objective).

Statistical analysis

The Commonwealth Fund provided country-specific sampling weights that accounted for the potential over-representation of GPs in relation to certain factors and can thus explain differential non–response according to known geographic and demographic parameters.[30] Descriptive statistics characterising the prevalence of occupational stress and the organisational features seen in the different countries were first produced. Next, two-step, multilevel (country/practice), weighted, mixed-effects, ordered logistic regression, using the country as the random factor, was carried out. Continuous dependent variables were transformed into categorical ones based on their distribution; categorical dependent variables were sometimes regrouped depending on their distribution (Table 1).

In step one, associations between the dependent variable (job stress) and practice characteristics were considered sequentially. Variables associated with a *P*-value of ≤0.2 were retained. Following this, a manual, backward, stepwise selection of variables (removing the least significant variable [*P*>0.05] at each step) was performed to obtain a final model.

In addition, analyses by country, using the final overall model, in order to check the consistency of the results across countries were conducted. Detailed results of the additional analysis are presented in Supplementary Table S1 and are not discussed further in this article. All statistical analyses were performed using Stata software (version 15).

RESULTS

Response rates ranged from 8.1% in France to 46.5% in Sweden, and a total of 12 049

Table 1 continued. Selected questions from the Commonwealth Fund International Health Policy Survey questionnaire, included as independent variables in present study

Questions	Answer's items	Grouping item in the multivariate analysis
Quality-of-care indicators		
Does the place where you practice routinely receive and review data on the following aspects of your patients' care?	Yes/no	
• Clinical outcomes		
• Surveys of patient satisfaction and experiences with care		
• Patients' hospital admissions or emergency department use		
• Percentage of patients who have received recommended preventive care		
Are any areas of your own clinical performances reviewed against targets at least annually?	Yes/no	
Do you receive information on how the clinical performance of your practice compares with other practices?	Yes, routinely Yes, occasionally No	Yes/no
Use of electronic tools		
Do you use electronic patient medical records in your practice	Yes/no	
Do you use any of the following technologies in your practice? Electronic alerts or prompts about a potential problem with drug dose or drug interaction	Yes, routinely Yes, occasionally No	Yes, routinely Yes, occasionally No

in Switzerland compared with nearly 45% in Norway and in the UK.

The majority of GPs practised in an urban area with the exception of Dutch and Norwegian GPs. The organisational and functioning features sometimes varied considerably between countries too, particularly regarding the composition of group practices, consultation duration, working with case managers, and the use of quality indicators, such as patient satisfaction, performance comparisons, and prevention targets (Table 3).

GPs' job stress by country
The prevalence of job stress ('extremely stressful' and 'very stressful') varied from 18% and 21% in the Netherlands and Australia to 56% and 59% in Sweden and the UK. Note that 20% of GPs in the UK reported their job to be 'extremely stressful'. Switzerland and France were in the middle of the range, with 31% and 38%, respectively (Figure 1).

GPs' job stress and associated factors, overall model
Job stress was higher among female GPs (odds ratio [OR] 1.41, 95% confidence interval [CI] = 1.15 to 1.71) than among males when using multiple variable analysis. It was also higher among GPs who were middle-aged (OR 1.21, 95% CI = 1.03 to 1.43, for those aged 35–44 years; OR 1.35, 95% CI = 1.08 to 1.70 for those aged 45–54 years) than those aged <35 years, and among those practising in urban areas (OR 1.23, 95% CI = 1.15 to 1.31 versus rural areas). In contrast, it was also lower among the sample's oldest GPs (OR 0.67,

GPs filled in the survey questionnaire. Table 2 presents the main characteristics of each country's GP sample. The proportion of female GPs varied from 32.9% in Switzerland to 51.5% in Sweden; variations in age distributions were also observed, for example, 18.9% of GPs were aged <45 years

Table 2. Responder general characteristics, weighted data

Characteristics													Repartition in each country, %[a]
Sample size, N	n (% missing data)	AU 747	CA 2284	DE 559	FR 502	NL 618	NZ 503	NO 864	SE 2905	CH 1065	UK 1001	US 1001	Total 12 049
Sex, female	5324 (0.27)[b]	37.0	43.8	44.3	35.0	45.3	45.0	40.0	51.5	32.9	49.1	39.9	**44.2**
Age, years	12 029 (0.17)[b]												
<35	1162	11.3	9.5	1.0	7.8	4.5	9.0	13.1	9.1	0.8	13.8	5.5	**9.7**
35–44	2921	28.8	22.1	35.7	15.8	28.1	29.0	31.7	26.6	18.1	30.9	20.3	**24.3**
45–54	3155	32.1	27.5	27.6	28.1	31.3	40.0	22.0	24.3	31.3	30.0	30.1	**26.2**
55–64	3561	17.3	26.3	28.6	39.0	33.3	18.0	27.0	28.1	36.4	19.2	28.8	**29.6**
≥65	1230	10.5	14.5	7.1	9.3	2.7	4.0	6.2	11.8	13.5	6.2	16.1	**10.2**
Urban area[c]	5898 (0.71)[b]	71.8	66.7	52.9	70.4	46.6	69.7	37.7	52.4	51.5	68.0	72.1	**57.7**
FTE GPs in the practice, median (IQR)	11 963 (3.4)	5 (3–7)	4 (2–7)	1 (1–2)	1 (1–2)	1.6 (1.2–2.7)	4 (2.5–6)	4 (3–5.4)	5 (3–7)	1.4 (1–2)	5 (3–6)	3 (1–7)	**3 (1.8–6)**

[a]Unless otherwise stated. [b]Percentage of missing data. [c]Urban location was self-reported. AU = Australia. CA = Canada. CH = Switzerland. DE = Germany. FR = France. FTE = full-time equivalent. IQR = interquartile range. NL = Netherlands. NO = Norway. NZ = New Zealand. SE = Sweden.

Table 3. Main practice characteristics in 11 high-income countries, weighted data

| Characteristics | n (% missing data)[b] | Repartition in each country, %[a] | | | | | | | | | | | |
		AU 747	CA 2284	DE 559	FR 502	NL 618	NZ 503	NO 864	SE 2905	CH 1065	UK 1001	US 1001	Total 12 049
Sample size, N													
Consultation duration, minutes, median (IQR)	11 930 (0.99)	15 (12–20)	15 (12–20)	10 (8–10)	20 (15–20)	10 (10–12)	15 (15–15)	20 (15–20)	20 (20–30)	20 (15–20)	10 (10–10)	17 (15–20)	15 (12–20)
Workload, hours/week, median (IQR)	12 049 (0)	40 (30–45)	40 (32–50)	50 (40–55)	50 (40–60)	45 (33–52)	36 (30–45)	40 (35–48)	40 (32–45)	48 (35–55)	44 (35–50)	45 (40–56)	40 (34–50)
Part dedicated to administration tasks (% total workload), median (IQR)	11 840 (1.7)	10 (5–15)	15 (8–20)	20 (13–30)	15 (10–20)	20 (15–30)	20 (10–25)	20 (10–25)	25 (16–30)	20 (10–25)	20 (10–25)	10 (15–25)	20 (10–25)
Make home visits	11 904 (1.2)												
Frequently		25.1	19.5	57.1	56.1	88.3	20.6	20.3	24.7	42.8	84.0	6.0	34.3
Occasionally		59.6	49.4	30.0	34.2	11.7	74.8	77.8	70.1	45.4	15.1	28.6	49.7
Work with case manager	11 934 (0.9)												
In-practice		75.4	42.9	20.6	12.9	83.0	83.0	31.8	75.8	8.4	87.4	43.9	52.5
External		6.2	21.5	6.8	83.3	14.9	7.4	33.9	9.8	52.2	8.3	22.8	21.6
Use of EHR	11 985 (0.5)	92.4	72.9	85.5	75.6	99.3	99.8	99.5	99.3	54.3	98.4	84.5	86.5
Use of E-alert drug prescription	11 878 (1.4)												
Yes, routinely		89.5	41.7	31.5	46.8	96.4	94.8	82.3	81.6	29.8	86.5	77.3	67.8
Yes, occasionally		4.9	14.3	16.6	20.0	2.8	4.0	10.6	11.4	15.2	11.8	6.6	11.3
Target-related performance	11 840 (1.7)	47.5	41.8	40.5	65.5	48.2	83.8	22.7	53.0	33.5	83.4	74.9	51.5
Information about patient satisfaction surveys	11 894 (1.3)	46.3	17.1	25.1	3.7	62.8	60.5	9.3	89.2	15.7	87.9	64.1	49.2
Delay in receiving discharge information	11 748 (2.5)												
<2 days		32.4	22.5	70.4	14.9	43.3	62.3	22.5	19.7	40.0	33.7	53.1	32.0
2 days–2 weeks		56.6	55.4	23.0	50.8	50.2	35.3	73.2	67.6	50.1	57.7	38.3	55.1
3–4 weeks		7.8	12.7	4.5	25.1	5.8	2.4	4.1	7.7	6.9	7.1	2.8	8.2
>1 month/never		3.2	9.4	2.1	9.2	0.7	0.0	0.2	5.1	3.0	1.5	5.8	4.7

[a]Unless otherwise stated. [b]The percentages in brackets are calculated using interquartile 1 to interquartile 3 range. AU = Australia. CA = Canada. CH = Switzerland. DE = Germany. EHR = electronic health record. FR = France. IQR = interquartile range. NL = Netherlands. NO = Norway. NZ = New Zealand. SE = Sweden.
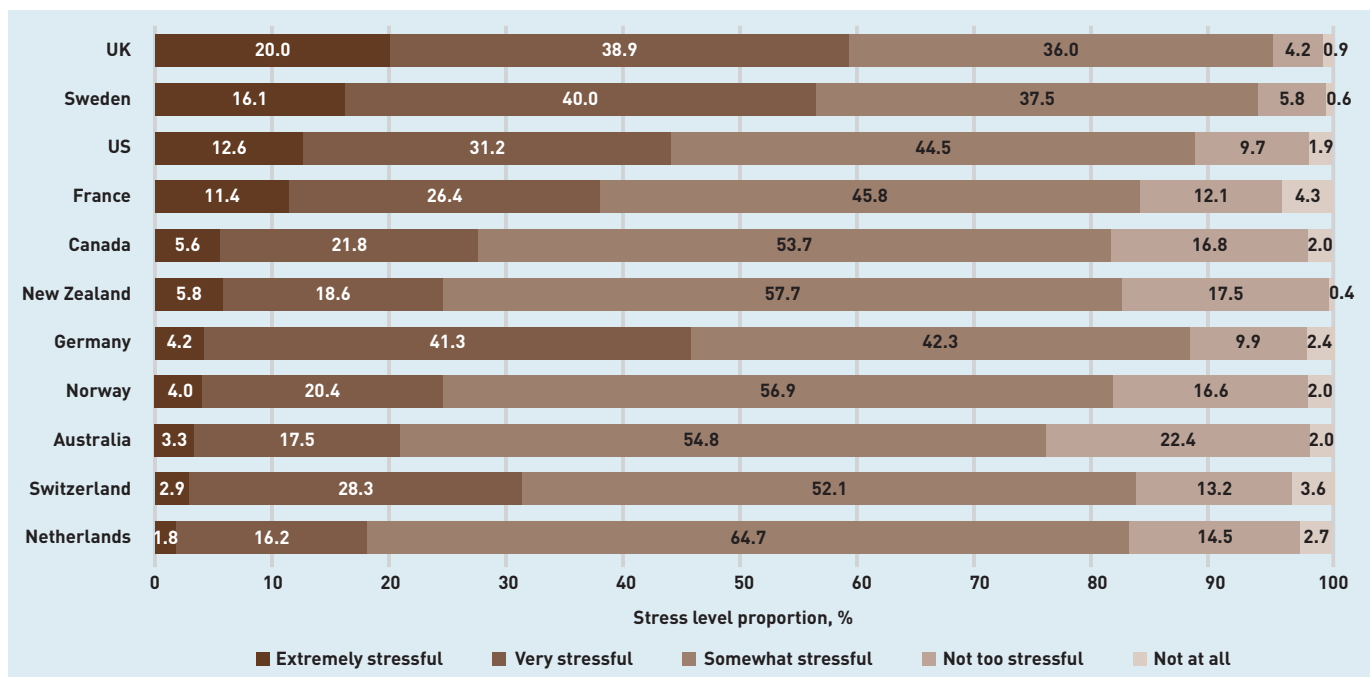
Figure 1. GP job stress levels in 11 high-income countries, weighted data.

95% CI = 0.49 to 0.92), probably reflecting a selection effect (stressed GPs retired earlier or changed jobs).

GPs' stress increased with weekly workloads (OR 2.88, 95% CI = 2.38 to 3.51, if >50 hours/week versus ≤40 hours/week), the time percentage dedicated to administrative tasks (OR 1.65, 95% CI = 1.44 to 1.89 if >20% of total workload versus ≤10% of total workload), and a low possibility of offering same-day appointments (OR 1.74, 95% CI = 1.18 to 2.56 when <20% possibility versus >50% possibility). In addition, a higher prevalence of job stress was reported among GPs for whom performance was compared with targets (OR 1.14, 95% CI = 1.05 to 1.24), among those who did not have case managers (OR 1.22, 95% CI = 1.04 to 1.44) and among those who used E-alerts for routine drug prescriptions (OR 1.29, 95% CI = 1.08 to 1.53 versus no use).

Finally, long delays in receiving discharge information were associated with higher job stress, and this displayed a gradient effect. In contrast, longer consultations were associated with lower job stress (OR 0.64, 95% CI = 0.53 to 0.76 if >20 minutes versus <10 minutes) (Table 4).

The vast majority of results were consistent across the countries. This was particularly the case for weekly workloads and the time spent on administrative tasks, both of which were systematically associated with job stress. However, the results involving age were somewhat

unclear: in Australia, France, and Germany the youngest GPs (aged <35 years) were the most exposed to job stress (Supplementary Table S1). Finally, some country-specific exceptions were observed, including consultation duration (France), use of a case manager (Germany), and the use of electronic tools (Canada) (Supplementary Table S1).

Data sharing
No additional data are available. The dataset generated and analysed during the current study is not publicly available, as a part of an international study under agreement. However, data could be available from the corresponding author on reasonable request.

DISCUSSION
Summary
This study showed that exposure to occupational stress among GPs varied considerably across high-income countries. The situation seems to be particularly deleterious in the UK, but also in Sweden, where more than one in two GPs reported exposure to occupational stress. In contrast, fewer than one in five Dutch GPs felt exposed to occupational stress. Overall, self-reported prevalence of job stress varied by up to a factor of three. In addition to this, multiple regression analyses showed that certain features of practice organisation and function were associated with stress at work. The main factors were a heavy

Table 4. Associations between GP job stress, practice organisation, and characteristics, ordered logistic regression

Characteristics	n^a	Single independent variables		Multiple variable analysis final model (*N* = 10 627)	
		OR	(95% CI)	OR	(95% CI)
Physician characteristics					
GP sex (ref: male)	6695				
Female	5290	1.28	(0.98 to 1.66)	1.41	(1.15 to 1.71)
GP age, years (ref: <35)	1156				
35–44	2908	1.23	(1.05 to 1.43)	1.22	(1.03 to 1.43)
45–54	3138	1.43	(1.14 to 1.79)	1.35	(1.07 to 1.70)
55–64	3542	1.23	(0.98 to 1.55)	1.20	(0.92 to 1.56)
≥65	1223	0.57	(0.45 to 0.71)	0.67	(0.49 to 0.92)
Rural/urban area (ref: rural)	5045				
Urban	6868	1.16	(1.07 to 1.26)	1.23	(1.15 to 1.31)
Practice organisational and functioning features					
General organisation and workload					
FTE GPs (ref: <3)	4501			—	
3–5	4009	1.04	(0.89 to 1.21)		
>5	3125	0.96	(0.76 to 1.21)		
Workload, hours/week (ref: ≤40)	6123				
41–50	3437	1.62	(1.42 to 1.85)	1.66	(1.41 to 1.96)
>50	2304	2.75	(2.30 to 3.29)	2.88	(2.38 to 3.50)
Administrative task (% total workload) (ref: ≤10%)	4031				
11–20	3945	1.26	(1.07 to 1.47)	1.19	(1.04 to 1.36)
>20	3820	1.94	(1.64 to 2.28)	1.65	(1.44 to 1.89])
Consultation length, minutes (ref: <10 minutes)	2423				
10–20	6928	0.89	(0.80 to 0.98)	0.88	(0.77 to 1.00)
>20	2532	0.63	(0.55 to 0.73)	0.64	(0.53 to 0.76)
Same-day appointment, % (ref: >50%)	7650				
About 50	1602	1.22	(1.04 to 1.42)	1.25	(1.05 to 1.50)
20–40	1271	1.41	(1.25 to 1.60)	1.49	(1.29 to 1.70)
<20	1041	1.82	(1.22 to 2.69)	1.74	(1.18 to 2.56)
Home visit (ref: Yes, frequently)	4080			—	
Yes occasionally	5917	0.92	(0.82 to 1.04)		
No	1907	0.83	(0.66 to 1.05)		
Coordination					
Contact with home care providers (ref: No and occasionally)	6062			—	
Routinely	5243	1.08	(0.92 to 1.26)		
Involved in coordinated care with hospital (ref: No)	1744			—	
Yes	10 139	1.04	(0.93 to 1.17)		
Inter-visit contacts with patients (ref: No)	1493			—	
Yes	10 427	0.98	(0.84 to 1.14)		
Case manager (ref: Yes, inside)	6407				
Yes, outside	2562	1.11	(0.97 to 1.28)	1.13	(0.99 to 1.30)
No	2895	1.14	(0.92 to 1.40)	1.22	(1.04 to 1.44)
Delay in receiving discharge information (ref: ≤2 days)	3737				
2 days–2 weeks	6438	1.20	(1.10 to 1.32)	1.19	(1.09 to 1.28)
3–4 weeks	956	1.65	(1.41 to 1.92)	1.58	(1.41 to 1.78)
>1 month or never	554	1.26	(0.90 to 1.76)	1.26	(1.03 to 1.55)

… continued

workload, particularly administrative tasks, the use of electronic aids, performance assessments against benchmarks, and a lack of communication and coordination among healthcare providers. In contrast, having case managers and longer consultations were both associated with less perceived stress among GPs.

Strengths and limitations
The present study had some limitations. Participation rates were sometimes low,

Table 4 continued. Associations between GP job stress, practice organisation, and characteristics, ordered logistic regression

Characteristics	n^a	Single independent variables		Multiple variable analysis final model (N = 10 627)	
		OR	(95% CI)	OR	(95% CI)
Quality of care indicator					
Clinical outcomes (ref: No)	5771			—	
Yes	6118	0.96	(0.84 to 1.10)		
Surveys of patient satisfaction (ref: No)	6046			—	
Yes	5848	1.00	(0.88 to 1.13)		
Information about hospital admissions and emergency visits (ref: No)	7441			—	
Yes	4375	1.00	(0.92 to 1.09)		
Preventive targets to reach (ref: No)	8056	1.02	(0.89 to 1.18)	—	
Yes	3732				
Performance reviewed against targets (ref: No)	5742				
Yes	6098	1.20	(1.07 to 1.35)	1.15	(1.05 to 1.24)
Information on clinical performance of your practice compared with other practices (ref: No)	3198			—	
Yes, occasionally	3533	1.10	(0.91 to 1.34)		
Yes, routinely	4495	1.07	(0.83 to 1.38)		
Use of electronic tools					
Use of EHR (ref: No)	1621			—	
Yes	10 364	1.18	(1.03 to 1.36)		
Use of E-alert drug prescription (ref: No)	2472				
Yes, occasionally	1338	1.31	(1.14 to 1.51)	1.18	(1.12 to 1.25)
Yes, routinely	7999	1.37	(1.18 to 1.60)	1.29	(1.09 to 1.53)
Country variance				0.32	

^{a}Missing data in each category. EHR = electronic health record. FTE = full-time equivalent. OR = odds ratio.

ranging from 19% to 47%. However, data were weighted to account for differential non–response rates according to known geographic and demographic parameters, thus limiting the potential selection bias.[29,31] Data were self-reported and therefore may include some declaration biases, for different reasons, such as memory, influences of other parameters, or cultural variation. However, most of the independent variables were factual, which limits these kinds of biases. Some variables were probably lacking, especially those characterising healthcare systems at the macro level, such as means of remuneration. Regarding the included variables it should be noted that their meaning may vary from one country to another, for example, in the role of case managers. In contrast, the inclusion of many independent variables has risked alpha inflation error. However, with respect to the main hypotheses, the authors do not think it reasonable to adjust the alpha level to the number of variables tested. Finally, as a cross-sectional study, the associations detected were not necessarily causal.

Comparison with existing literature
The importance of workload and time pressure have often been reported as predictors of job stress (job dissatisfaction or consequential burnout) in GPs.[8,32–34] This was the only element systematically associated with job stress in every country in the present study. The problem of workload faced by GPs in the UK has been frequently raised in recent years, and solutions involving patients, GPs, practices, and the healthcare system as a whole have been proposed.[35,36]

Reducing bureaucracy is one solution suggested at the healthcare system level. The deleterious effects of performing administrative tasks have been described in the literature.[1,37–39] A national UK study found that 80% of the 3000 GPs surveyed felt that they were required to do unimportant administrative tasks that prevented them from completing more important ones.[40] As administrative responsibilities seem sure to increase in the coming years — with insurance restrictions and hyper-specialisation of medicine — this element needs to be tackled rapidly.[35] However, it

could also be of interest to determine the specific unimportant administrative tasks performed by physicians and qualitative studies would be more appropriate for this purpose.

Inability to offer same-day appointments is likely a reflection of a busy practice with overworked doctors, in other words, a proxy measure for general time pressures and lack of latitude to organise one's activities. It is therefore unsurprising to find an association with the perceived stress here because these two elements are key parts of Siegrist and Karasek's classic models of job stress. The first one, in particular, is based on the imbalance between a job's demands and a worker's control over their job.[6,41]

The association between GPs' stress levels and short consultation durations appears logical, too. However, longer consultations do not seem to be the norm that healthcare systems will adopt in the future: far from it.[42] Indeed, one way to increase the reach of GPs in the face of increasing patient numbers seems to be reducing consultation durations. However, to avoid harmful consequences to patient care, other ways of organising GPs' practices will have to be invented. Many countries have already thought about new organisational models for primary care, mainly through the introduction of interprofessional collaboration with nurses, medical assistants, and social workers. This evolution could also go some way to reducing levels of GP occupational stress. The present study showed the potential positive impact of working with in-practice case managers. Previous studies have reported this impact on the team climate but two significant concerns nuanced how GPs accepted delegation: first, the problems related to task delegation in terms of skills, and, second, fears that the patient–physician relationship might suffer.[43]

Other solutions could involve promoting alternative remuneration systems for GPs instead of fees for services. Capitation, that is, payment of a standard amount for each patient, could make up at least a part of that remuneration. Some studies have demonstrated the impact of blended capitation on the quantity and the quality of GPs' delivered services.[44] It could also reduce time pressure and job stress through longer consultation, for instance.[45]

No association between the use of electronic health records and GPs' job stress was found in the present study. However, the use of electronic drug prescription alerts was associated with a higher prevalence of job stress. The impact of using these electronic tools on the quality of care is recognised.[46] However, the literature shows that the impact on physicians' wellbeing remains unclear.[47–50] The present study found mixed results. The authors initially hypothesised that exposure to constraints relating to meeting quality assessment indicators could generate job stress among the study's GPs. Indeed, greater occupational stress was found among GPs who declared having targets. In contrast, the present study found no association between job stress and the existence of patient satisfaction surveys or comparisons between standard practices or good professional practices. The impact of these targets may be linked to the financial incentives that generally go along with such quality indicators. They understandably become a source of job stress for GPs.

Finally, job stress was higher among females than males (a fact quite systematically observed across the country analyses). The reason is probably plurifactorial; however, the cumulative role of females at home and at work is one of the explanations. This is a somewhat alarming result as more and more medical students are young females.

Implications for research and practice
Overall, across all the countries in this study, results confirmed the potential impact of certain factors of practice organisation on GPs' occupational stress. In particular, weekly workloads were one of the notable predictors of occupational stress among GPs, being found in every country in the study. As mentioned previously, qualitative studies would be appropriate for studying the specific time-consuming administrative tasks performed by physicians that are deemed unimportant.

Two other observations could be seen as alarming: being a female GP and working in an urban area, which are both predictors of occupational stress, may well be current trends for the profession. The study also provided some useful information on ways to positively transform practice organisation, for instance, via the introduction of case managers. It should be noted, however, that the definition of case managers is quite heterogeneous in terms of the role, their activities, and the professionals who play this role. Further qualitative research could indicate which types of case management (or practice structure that includes these professionals) contribute to reducing stress for GPs.

Furthermore, the considerable variations in the prevalence of stress between countries means that there is significant room for improvement.

Though the variables studied could not explain a significant part of these variations, policymakers and professional associations should nevertheless consider these elements as arguments for the development of new ways of working that may lead to a reduction in the occupational stress felt by many GPs.

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