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Poor well-being and low job satisfaction in general practitioners and patients' change of general practitioner as an indicator of dissatisfaction with care: a cohort study combining register data and survey data

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ABSTRACT

Objectives: Low job satisfaction and poor well-being (e.g. stress and burnout) among physicians may have negative consequences for patient experienced healthcare quality. In primary care, this could manifest in patients choosing another general practitioner (GP). The objective of this study was to examine change of GP (unrelated to change of address) among patients in relation to their GPs' job satisfaction, well-being, and self-assessed work-ability.

Design and setting: Data from a nationwide questionnaire survey among Danish GPs in May 2016 was combined with register data on their listed patients. Associations between patients' change of GP (COGP) in the 6-month study period (from May 2016) and the job satisfaction/well-being of their GP were estimated as risk ratios (RRs) at the individual patient level using binomial regression analysis. Potential confounders were included for adjustment.

Participants: The study cohort included 569,766 patients aged ≥ 18 years listed with 409 GPs in single-handed practices.

Results: COGP was significantly associated with occupational distress (burnout and low job satisfaction) in the GP. This association was seen in a dose-response like pattern. For burnout, associations were found for depersonalisation and reduced sense of personal accomplishment (but not for emotional exhaustion). The adjusted risk ratio was 1.40 (1.10-1.72) for patients listed with a GP with the lowest level of job satisfaction and 1.24 (1.01-1.52) and 1.40 (1.14-1.72) for patients listed with a GP in the most unfavourable categories of depersonalisation and sense of personal accomplishment (the most favourable categories used as reference). COGP was not associated with self-assessed work-ability or domains of well-being related to life in general.

Conclusions: The findings strongly suggest that low job satisfaction, depersonalisation ('cynicism') and sense of low personal accomplishment among GPs affect patients' decision to change GP. Hence, the study indicate a negative impact of these factors on medical quality.

Keywords: Quality in Health Care, General Practitioners, Burnout, Job Satisfaction, Patient Satisfaction, Denmark

Strengths and limitations of this study

- Mental well-being and job satisfaction in general practitioners (GPs) were examined in relation to a register based (rather than a self-reported) measure of healthcare quality.
- Mental well-being and job satisfaction were assessed by validated rating scales.
- Precise linkage of each patient with a specific GP.
- Prospective study design.
- Adjustment for several potential confounders, but observed associations could still be mediated by unmeasured factors.

BACKGROUND

Among general practitioners (GPs) stress, burnout and job dissatisfaction is prevalent[1] and may have important implications for quality in healthcare.[2–7] Yet, existing research examining the possible consequences of physician mental well-being/satisfaction for healthcare quality predominantly rely on physician self-report.

Patient satisfaction is by itself an essential component of healthcare quality and may furthermore reflect underlying dimensions of healthcare quality important for health outcomes. Such dimension include access to care and effectiveness of clinical and interpersonal care.[8] The possible negative implications of GP distress for patients' experience and satisfaction with primary healthcare is understudied.

A change of GP that is unrelated to change of address (because of moving) may indicate dissatisfaction with the GP.[9–11] The continuous relationship with a GP is highly valued by many patients[12], and a patient's change of GP is often preceded by careful consideration.[13] Satisfaction and decision-making regarding change of GP is strongly influenced by the patient's perception of interpersonal aspects of care.[9,13–15] GPs who face stress, burnout, and low job satisfaction may compromise with the quality of provided care and exhibit reduced empathic concern for the patients.[7,16,17] Moreover, GPs with high levels of occupational distress may have longer waiting times for consultations due to excessive workloads, which could add to the

listed patients' propensity to change GP.[9,10] Consequently, the patient-GP relationship and the patient-assessed quality may suffer, and some patients may decide to change GP.

This study aimed to examine whether distress levels and self-assessed work-ability in GPs were associated with change of GP among listed patients (voluntary disenrollment) as proxy for dissatisfaction with care.

METHODS

Setting

Almost all citizens in Denmark (98%) are listed with a specific general practice. GPs in Denmark provide comprehensive family medicine to their listed patients and act as gatekeepers and coordinators to the rest of the tax-funded healthcare system.[18] Patients are charged a fee (approx. €26) if they change general practice unrelated to change of address. Approximately, 27% of Danish GPs are organised in single-handed practices.

Study population

In May 2016, we invited all GPs in Denmark to participate in a questionnaire survey on their working conditions and mental well-being (response rate: 50.2%). The survey has been described in detail elsewhere.[1] For the purpose of this study, only GPs in single-handed practices were included as this allowed for accurate linkage of each patient to a specific GP. Furthermore, we did not include GPs who had locum(s) employed for > 20 hours per week, GPs with < 500 listed patients, and GPs who were newcomers in their current practice (i.e. arrived in 2016).

GPs were excluded if more than 90% of the listed patients changed GP in the study period, or if more than 10% of the listed patients changed GP on the same date as this indicated restructuring of the practice (N = 7).

Study cases were patients aged ≥ 18 years who were registered in the Danish Patient List Register (PLR) with an eligible general practice at the beginning of the study period. The PLR holds information on start and end dates of all registrations of patients with all general practices in Denmark. The 6-month study period started

on 1 May 2016. A total of 569,776 patients listed with 402 GPs in single-handed practices were included in the analyses.

Change of GP

A p*atient's change of GP (COGP)* was defined as being listed in the PLR with a start date with a general practice in the study period and no new postal address or immigration within two months on both sides of the start date. Information on change of address and immigration among patients was collected from the Danish Civil Registration System.

GP mental well-being and job satisfaction

The indicators of mental well-being (general and occupational) and job satisfaction were selected a priori from the GP questionnaire. The indicators were measured by validated and reliable rating scales, which have previously shown adequate consistency among Danish GPs.[1] *Job satisfaction* was assessed by the Warr-Cook-Wall Job Satisfaction Scale (WCW-JSS), p*erceived stress in general life* by Cohen's 10-item Perceived Stress Scale (PSS-10), *general well-being* by the 5-item World Health Organisation Well-Being Index (WHO-5), and *burnout* by the Maslach Burnout Inventory Human-Services-Survey (MBI-HSS). The MBI-HSS consists of three subscales that measure three burnout dimensions: *emotional exhaustion, depersonalisation,* and *sense of personal accomplishment. Self-rated work-ability* was measured by a single-item of the Work Ability Index (WAI); the respondents scored their current work-ability against their lifetime best on a Likert scale. This single item has shown high consistency with the full scale.[19]

We categorised *job satisfaction, perceived stress, self-rated workability,* and each burnout dimension according to quartiles of the scale scores. No well-established cut-off values exist that define significant positive or negative levels of these measures. Burnout is often categorised according to the cut-off value based on normative frequency distributions; this approach allows for comparison of burnout symptoms over time and across populations, but it does not signify clinical significance.[20] As in previous research, we categorised scales according to quartiles to allow for exploration of non-linear and dose-response like associations with COGP.[21,22] To evaluate burnout as a multidimensional construct[20], we additionally

categorised burnout based on a *composite burnout score.*[22] This score was calculated by adding up points corresponding to the quartile of each subscale (reversed score for personal accomplishment); 1 point was assigned for subscale scores in the first quartile, and 2, 3 and 4 points were assigned for scores in the second, third and fourth quartiles, respectively. The composite score was categorised into five groups: 3-4 points (corresponding to low burnout levels on all subscales), 5-6 points, 7-8 points, 9-10 points, and 11-12 points (corresponding to high burnout levels on all subscales). Finally, g*eneral well-being* was categorised as 'poor' for a scale score of ≤ 50 (the recommended cut-off value when using the WHO-5 for screening for depression), 'good' for a score of >70, and 'moderate' for a score in between.[1]

Covariates

Potential confounders were selected a priori for adjustment. At GP level, information on gender and seniority (years since qualification as a GP: ≤ 5, 6-15, 16-25, or ≥ 25) was obtained from the questionnaire survey. At patient level, information on each patient's demographic and socioeconomic characteristics was obtained from Statistics Denmark.[23] This information included gender, age group at the beginning of the study period (18-29, 30-39, 40-49, 50-59, 60-69, 70-79, or ≥ 80 years), marital status (married/cohabiting or living alone), ethnic origin (Dane or immigrant/descendent), degree of urbanisation (rural area: < 1,000 inhabitants, small city: 1,000-19,999 inhabitants, medium city: 20,000-99,999 inhabitants, or large city: > 1,000,000 inhabitants), OECD-modified household income (categorised in pentiles), highest attained educational level (low: ≤ 10 years, medium: 11-15 years, or high: > 15 years), work affiliation (*in the labour force*: employed and students, *outside the labour force*: unemployed, early retirement pensioner, personal or sick leave, or *retired*).

Multimorbidity in patients was assessed by Charlson's Comorbidity Index (CCI) score (0, 1, 2, or ≥ 3), which was calculated on the basis of the diagnoses registered in the Danish National Patient Register in 2006-2015.[24]. Finally, the percentage of general practices closed for intake of new patients in the patients' municipality in 2016 (< 60%, 60-80%, or > 80%) was included as a covariate obtained from the Organisation of General Practitioners in Denmark[25] because the patient's option to change general practice depends on

the availability of alternative practices.[9] GPs are generally allowed to close for intake of new patients when their list size exceeds 1,600 patients per GP.

Information on socioeconomic characteristics was obtained for 2015. Missing information on educational level (5.9%) was categorised as unknown. Patients with missing information on any other covariates were excluded (N = 5.213 (0.9%)). Each patient was linked to the GP-related data through the GP's provider number.[1] At patient level, the data were linked through the CRN; a unique personal identification number assigned to all citizens in Denmark.[26] All personal identifiers were encrypted prior to analysis.[1]

Analyses

We calculated the share of patients with COGP and the corresponding 95% confidence interval (CI). Associations between each of the included GP well-being indicators and COGP among patients were calculated at the individual patient level by use of binomial regression analyses. The most favourable category of the indicator examined was used as reference. Unadjusted and adjusted analyses were carried out using robust variance estimation to account for clusters of patients at practice level. Adjusted models included share of practices closed for new patient uptake in the municipality, GP factors (gender and seniority) and patient factors (gender, age, marital status, ethnicity, city size, income, length of education, work affiliation, comorbidity) in the categories described above.

Prior to these analyses, we tested that the mean time at risk of COGP per listed patient did not vary across the GP well-being/satisfaction categories. Patients were considered to be at risk until death, immigration, or change of general practice for any reason.

A p-value of ≤ 0.05 was considered statistically significant. Analyses were performed using Stata, version 15.

Patient and public involvement

This research was done without patient or public involvement.

RESULTS

During the 6-month study period, we identified 6,648 (1.17%) cases of COGP among the included patients (i.e. change of GP without change of address). The characteristics of the study cohort (N = 569,776) and the share of patients with COGP are shown in Table 1.

Table 1. Patient characteristics according to COGP in the 6-month study period.

		All patients N (%)	Patients with COGP n per 1000 (95%CI)
Total		569,776 (100)	11.7 (11.4-11.9)
Gender	Female	287,097 (50.4)	13.1 (12.7-13.6)
	Male	282,679 (49.6)	10.2 (9.8-10.5)
Age group, years	18 – 29	116,342 (20.4)	15.5 (14.8-16.2)
	30 – 39	85,453 (15.0)	13.7 (12.9-14.4)
	40 – 49	96,114 (16.8)	11.1 (10.4-11.7)
	50 – 59	94,716 (16.6)	9.5 (8.9-10.1)
	60 – 69	83,667 (14.7)	9.1 (8.5-9.8)
	70 – 79	61,533 (10.8)	10.1 (9.3-10.9)
	≥ 80	31,951 (5.6)	10.3 (9.3-10.9)
Marital status	Married / cohabiting	343,049 (60.2)	11.5 (11.1-11.9)
	Living alone	226,727 (39.8)	11.9 (11.5-12.4)
Ethnicity	Danish	491,661 (86.3)	11.4 (11.1-11.8)
	Immigrant/descendant	78,115 (13.7)	13.1 (12.3-13.8)
Education, years	≤ 10	142,070 (24.9)	12.5 (11.9-13.1)
	11-15	227,689 (40.0)	10.8 (10.4-11.3)
	> 15	166,644 (29.2)	11.8 (11.3-12.4)
	Unknown	33,373 (5.9)	12.9 (11.8-14.2)
Work affiliation	In the labour force	356,016 (62.5)	11.4 (11.0-11.8)
	Outside the labour force	85,620 (15.3)	15.3 (14.5-16.2)
	Retired	128,140 (22.5)	9.9 (9.4-10.5)
OECD-modified household income, pentiles	1st (low)	113,956 (20.0)	13.3 (12.7-14.0)
	2nd	113,955 (20.0)	12.8 (12.2-13.5)
	3rd	113,957 (20.0)	11.5 (10.9-12.1)
	4th	113,953 (20.0)	10.5 (9.9-11.0)
	5th (high)	113,955 (20.0)	10.2 (9.7-10.8)
Multimorbidity index score	0	460,769 (80.9)	11.7 (11.4-12.1)
	1	52,485 (9.2)	11.6 (10.8-12.6)
	2	31.899 (5.6)	11.0 (9.8-12.1)
	≥ 3	24,633 (4.3)	11.2 (10.0-12.6)
Practices closed for patient intake in the municipality	< 60%	264,254 (46.4)	12.1 (11.7-12.6)
	60-80%	200,187 (35.1)	12.1 (11.6-12.6)
	> 80%	105,335 (18.5)	9.7 (9.1-10.3)
City size	Rural area	89,014 (15.6)	10.8 (10.1-11.5)
	Small city	137,286 (24.1)	11.7 (11.1-12.3)
	Medium city	88,920 (15.6)	11.4 (10.7-12.1)
	Large city	254,556 (44.7)	12.1 (44.7-12.5)
Duration of GP-patient relationship	< 2 years	139,880 (24.6)	17.4 (16.7-18.1)
	2 - 8 years	203,640 (35.7)	12.1 (11.7-12.6)
	> 8 years	226,256 (39.7)	7.7 (7.4-8.1)

COGP: change of general practitioner without change of address.

Table 2 displays GP characteristics and well-being.

Table 2. Description of the GPs included in the study (N = 402)

GP and practice characteristics	
Gender, n (%)	
Female	178 (44.3)
Male	224 (55.7)
Age, years; mean (SD)	56.4 (8.4)
Years since qualification as a GP, mean (SD)	18.9 (9.4)
List size, median (IQI)	1693 (1544-1935)
COGP per 1000 listed patients, median (IQI); range	9.4 (5.9-14.7)
Well-being and satisfaction	
Job satisfaction score (WCW-JSS), median (IQI)	50 (40-58)
Emotional exhaustion score (MBI-HSS), median (IQI)	20 (13-28)
Depersonalisation score (MBI-HSS), median (IQI)	5 (3-8)
Personal accomplishment score (MBI-HSS), median (IQI)	35 (31-38)
Composite burnout score, n (%)	
3-4 (low)	75 (18.7)
5-6	80 (19.9)
7-8	93 (23.1)
9-10	93 (23.1)
11-12 (high)	61 (15.2)
Perceived general stress score (PSS-10), median (IQI)	12 (8-17)
General well-being (WHO-5)	
Good (score >70)	121 (30.6)
Moderate	197 (49.7)
Poor (score ≤ 50)	78 (19.7)
Self-assessed work-ability, n (%)	
Score 10 (best)	81 (20.4)
Score 9	122 (30.8)
Score 8	111 (28.0)
Score 7	82 (20.7)

IQI: interquartile range. COGP: Change of general practitioner without change of address. WCW-JSS: Warr-Cook-Wall Job Satisfaction Scale. MBI-HSS: Maslach Burnout Inventory Human-Services-Survey. PPS-10: Cohens Perceived Stress Scale. WHO-5: World Health Organisation Well-Being Index.
Note: Number of GPs varies due to partial response to the questionnaire for six GPs.

Table 3 shows the results of the regression analyses.

Table 3. Patients' COGP in relation to GP's job satisfaction, well-being, and self-assessed work-ability

	RR (95% CI)	adj. RR* (95% CI)

Job satisfaction (quartiles)		
4th (high)	1.00	1.00
3rd	1.08 (0.87-1.33)	1.08 (0.88-1.32)
2nd	1.21 (0.98-1.49)	**1.21 (1.01-1.48)**
1st (low)	**1.36 (1.08-1.71)**	**1.40 (1.10-1.72)**
Emotional exhaustion (quartiles)		
1st (low)	1.00	1.00
2nd	1.00 (0.80-1.25)	1.05 (0.85-1.31)
3rd	0.88 (0.72-1.09)	0.92 (0.76-1.13)
4th (high)	1.03 (0.31-1.28)	1.04 (0.86-1.27)
Depersonalisation (quartiles)		
1st (low)	1.00	1.00
2nd	1.15 (0.94-1.42)	1.18 (0.98-1.44)
3rd	1.15 (0.93-1.43)	1.22 (0.99-1.50)
4th (high)	1.21 (0.98-1.50)	**1.24 (1.01-1.52)**
Personal accomplishment (quartiles)		
1st (high)	1.00	1.00
2nd	1.10 (0.88-1.37)	1.13 (0.91-1.39)
3rd	**1.27 (1.06-1.52)**	**1.34 (1.12-1.59)**
4th (low)	**1.36 (1.09-1.69)**	**1.40 (1.14-1.72)**
Composite burnout score		
3-4 (low)	1.00	1.00
5-6	1.16 (0.92-1.47)	1.15 (0.92-1.44)
7-8	**1.24 (1.00-1.53)**	**1.30 (1.06-1.58)**
9-10	**1.30 (1.05-1.61)**	**1.38 (1.12-1.71)**
11-12 (high)	1.22 (0.96-1.56)	1.21 (0.96-1.52)
Perceived stress (quartiles)		
1st (low)	1.00	1.00
2nd	1.01 (0.82-1.24)	1.04 (0.86-1.25)
3rd	1.13 (0.90-1.42)	1.17 (0.93-1.46)
4th (high)	0.99 (0.82-1.20)	0.96 (0.80-1.15)
General well-being		
Good	1.00	1.00
Moderate	1.06 (0.89-1.27)	1.07 (0.89-1.27)
Poor	1.02 (0.83-1.25)	1.01 (0.82-1.24)
Self-assessed work-ability		
4th (high)	1.00	1.00
3rd	0.94 (0.75-1.17)	0.98 (0.79-1.22)
2nd	1.09 (0.86-1.38)	1.13 (0.91-1.42)
1st (low)	0.92 (0.73-1.15)	0.92 (0.74-1.15)

COGP: change of general practitioner without change of address. RR: risk ratio.
*adjusted for patient age, gender, socioeconomic factors, multimorbidity, city size, duration of GP-patient relationship and percentage of practices closed for patient intake in the municipality (categorised as presented in Table 1) and for GP seniority and gender.
Bold indicates significant results ($p \leq 0.05$).

The likelihood of COGP increased with depersonalisation, diminishing sense of personal accomplishment, and decreasing job satisfaction in the GP with whom the patient was listed. The adjusted RR was 1.40 (1.10-1.72)

for patients listed with a GP with the lowest level of job satisfaction and 1.24 (1.01-1.52) and 1.40 (1.14-1.72) for patients listed with a GP in the most unfavourable categories of the burnout dimensions depersonalisation and sense of low personal accomplishment.

Likewise, COGP tended to increase with a higher composite burnout score, although a small decline was seen at the highest level of burnout. Yet, the emotional exhaustion dimension of burnout was not associated with COPG. Likewise, no associations were found for perceived stress, general well-being, or self-assessed work-ability.

DISCUSSION

Main findings

Patients' likelihood of changing GP increased with decreasing job satisfaction in the GP with whom they were listed. Likewise, patients listed with a GP with high levels of depersonalisation, feelings of low personal accomplishment, or a high composite burnout score were more likely to change GP compared to patients listed with a GP with low burnout scores. Notably, these relationships had a dose-response pattern, although a small decrease was seen for the highest composite burnout level. In contrast, COGP was unrelated to emotional exhaustion, perceived stress, general well-being, and self-assessed work-ability in the GP.

Strengths and limitations

Major strengths of this study include the large sample size and the precise linkage of each patient to an individual GP by the combining of register-based data and survey data. The Danish national registers provide highly valid data.[26] The survey data covered multiple distinct and yet interrelated aspects of GP well-being, which was measured by validated and reliable assessment scales. The categorisation of all variables were performed according to predetermined procedures. The restriction of the study period to 6 months reduced the risk of fluctuations in the mental state of the GP during the study period.

We used COGP as a proxy for dissatisfaction with the GP. However, patients change GP after careful consideration; some may even stay with their GP even if they are dissatisfied and have a poor relationship

with their GP.[9,13,14] Hence, COGP may capture only major dissatisfaction and leave minor dissatisfaction undetected. In addition, not all patients consult their GP on a regular basis, which could leave some of the study cases 'unexposed' to their GP. These factors could have led us to underestimate the effect of GP factors on patient experience and satisfaction.

We assessed GP well-being indicators prior to COGP and the GPs were unaware of the collection of data on COGP. Still, we cannot rule out that caring for a patient population with a high propensity to change GP could affect GP well-being.

Furthermore, factors beyond the control of the GP may affect patients' COGP and could thus confound the results if inadequately controlled for. This may include characteristics of the patients themselves. For instance, complex healthcare needs in patients may relate to GP distress[27] as well as to patients' propensity to change GP. As seen from Table 1, patients inclined to change GP may include both patients with and without complex healthcare needs and the role of case-mix is complex and may confound the results in both directions.

Next, the likelihood of COGP in response to poor care may decrease with the availability of alternative practices locally. A high number of practices closed for patient intake may reflect workforce shortage, which may be associated with increased levels of GP workload and occupational distress.[28] Therefore, we adjusted for a lack of alternative practices. The adjustment for several potential confounders minimised the risk of residual confounding and we believe that unmeasured confounders are unlikely to explain study findings.

The study population was restricted to patients listed with GPs in single-handed practices who responded to the survey. Yet, we have no reason to assume that the associations examined depended on the GPs' approach to participation or on the type of practice. Thus, the study findings mhhay be generalised to partnership practices and to other countries with similar general practice settings.

Comparison with the literature

To our knowledge, only one previous study has explored the possible impact of physician well-being/satisfaction on healthcare quality by using change of GP among patients as a quality indicator.[29] Lower levels of job satisfaction were associated with a higher propensity to change GP in patients with pain, whereas no such relationship was seen in patients with depression. For both patient groups, however, patients of physicians with greater job satisfaction reported greater levels of trust and confidence in their physician.[29] In line with our findings, the existing body of research suggests that higher levels of job satisfaction in physicians induce higher levels of patient satisfaction[30] and better patient-physician relationships.[7]

For burnout, the results of a recent review and meta-analysis examining the potential implications of physician burnout on patient-assessed quality were in accordance with our findings; depersonalisation and low sense of personal accomplishment were both significantly associated with reduced patient-reported satisfaction, whereas emotionally exhaustion was not.[6] Several reviews support that physician burnout may reduce the patient-assessed quality of care, but they also point to the need for further research.[2–4,6]

There is consistent evidence that the patient's perception of the GP-patient relationship is an important determinant of patient satisfaction[31–33] and that interpersonal aspects of care strongly influence the decision-making regarding COGP. Not feeling recognised by the GP, poor communication, and lack of confidence and trust in the GP have been identified as important drivers in patients' decision to change GP.[9,13–15].

Empirical research examining the potential impact of GP burnout and job satisfaction on interpersonal aspects of care is sparse, but theoretically, it is plausible that interpersonal aspects of care mediate the observed associations between occupational distress and COGP. Burnout has been described as an erosion of engagement initiated by loss of internal resources as a response to chronic job-related stress.[20] A suggested consequence of burnout is a hesitation to invest resources in the job as an attempt to protect against further resource depletion.[16] Hence, burned out GPs may be inclined to invest less in the relationship with their patients. Depersonalisation refers to the development of an emotional detachment to people related to work and involves lack of compassion and a cynical attitude towards patients.

Albeit reverse causality cannot be excluded, one study found that GPs with higher levels of job satisfaction asked more psychosocial questions and showed more affective communication.[34] Other studies found that GPs with lower sense of personal accomplishment used less affective communication and were less patient-centred[35] and that patients listed with more depersonalised and emotionally exhausted GPs were less satisfied with the consultations with their GP.[36] However, other studies found no indications that burnout or job dissatisfaction impaired the quality of interpersonal care.[37–39] Some of these differences may be attributable to different burnout definitions.

Job satisfaction and burnout are distinct aspects of occupational well-being, but these two aspects are also interrelated. Thus, it may seem contradictory that emotional exhaustion was not associated with COGP, while clear associations were found for the remaining two burnout components and for job satisfaction. Different explanations may account for this. Firstly, the influence of burnout on job performance may depend on the stage of burnout.[3,40] In the initial stage, emotional exhaustion may be the only symptom and by overstretching themselves GPs may compensate for the potential negative effects of adverse work conditions on patient care.[41,42] Moreover, high conscientiousness could be a risk factor for burnout. Thus, emotionally exhausted GPs may exhibit high levels of thoroughness and attentiveness to patients' needs in clinical encounters, and hence their patients may experience excellent care.[3,38,42] In later stages of burnout, carelessness and disengagement may become more dominant. This possible mix of excellent care provision and compromised care provision in emotionally exhausted GPs may counterbalance each other in the analysis. The finding that the frequency of COGP tended to increase with the composite burnout score could supports this, as higher composite scores are likely to reflect later stages of burnout. Secondly, as for the traditional cut-off levels of burnout, our categorisation of emotional exhaustion might not be suitable for identifying the level of exhaustion that causes functional impairment. A too low cut-off value could attenuate measured relationships.[3] Lastly, personal and professional values and attitudes that predispose to depersonalisation, low sense of personal accomplishment, and dissatisfaction could influence clinical practice.[43] Hence, the observed associations might reflect underlying attributes of the GP.

While COGP was found to be associated with work-specific aspects of well-being, no associations were found for well-being measures related to life in general. This suggests that job-related factors are most essential in the relationship between provider well-being and patient-assessed quality of care. Yet, the actual work conditions (and not only the GPs' affective response to them) may play a causal role in this relationship. For instance, GPs with higher workloads may have longer waiting times and shorter consultations, which could cause some patients to change GP.[9,10]

COGP among patients was not associated with the self-reported work-ability among GPs. Objective versus self-reported measurement of quality is controversial in research on the potential consequences of provider well-being for healthcare quality; the association with self-reported quality of care is well-documented, yet the reliability in terms of actual quality of care remains uncertain.[3] Quality of care is multifaceted and the absence of association in our study should not be considered a proof that self-assessed work-ability is an unreliable measure of care quality. Previously, we found lower self-reported work-ability as well as poor well-being in GPs to be associated with a higher rate of potentially preventable hospitalisations in listed patients, which could indicate suboptimal primary healthcare provision.[22] In the assessment of work-ability, GPs may attach much importance to more bio-medical aspects of care, such as the ability to diagnose and provide treatment according to the best medical standards. Most patients may not be qualified to judge such aspects and tend to focus more on the interpersonal aspects of care in their overall assessment of quality.[44]

Implications

The study findings imply that GPs' occupational well-being and job satisfaction influence patient satisfaction measured as COGP. Hence, improving job satisfaction and engagement and combating burnout seems important to improve patient-assessed quality of care.

The possible implications are highly important: GP distress is prevalent, and COGP among patients may reflect serious aspects of care quality. This lend support for the conception that attention should be paid to the work conditions and the well-being of healthcare providers in the pursuit of optimal healthcare.

However, more research is needed to establish the connection between GP well-being and healthcare provision.

Conclusion

We found that patients' likelihood of changing practice increased with decreasing GP engagement and job satisfaction. We found no association between COGP among patients and emotional exhaustion in the GP, whereas depersonalisation and reduced sense of personal accomplishment both increased the likelihood of COGP. Overall, the findings suggest that the degree to which the GP thrives in the job influences the quality of care provided.

DECLARATIONS

Authors' contributions

All authors contributed substantially to the design of the study. KBN performed the statistical analyses in consultation with AHC. KBN wrote the first draft of the article. AFP, FB, PV, and AHC assisted in writing and revising the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Ethics approval

The project was approved by the Danish Data Protection Agency (J.no. 2016–41-4648). According to Danish law, approval by the Danish National Committee on Health Research Ethics was not required as no biomedical intervention was performed. Respondents gave their content to participate by responding to the questionnaire. Personally identifiable information on GPs and patients were re-coded and anonymised at Statistics Denmark prior to data analysis.

Availability of data and materials

Danish data protection regulations prohibit disclosure of data to any third party without prior permission from the Danish Data Protection Agency. Thus, the data from this study cannot be made publicly available.

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cohort studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2-3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	5-6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	5, 7
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	-
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5-8
Bias	9	Describe any efforts to address potential sources of bias	5-8
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6-7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	7
		(*d*) If applicable, explain how loss to follow-up was addressed	-
		(*e*) Describe any sensitivity analyses	-
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	5-8
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-9
		(b) Indicate number of participants with missing data for each variable of interest	7-8
		(c) Summarise follow-up time (eg, average and total amount)	8
Outcome data	15*	Report numbers of outcome events or summary measures over time	8
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10-11 (table 3)
		(*b*) Report category boundaries when continuous variables were categorized	10 (table 2)
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	considered
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	-
Discussion			
Key results	18	Summarise key results with reference to study objectives	12
Limitations			
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-16
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	17

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Poor well-being and low job satisfaction in general practitioners and patients' change of general practitioner as an indicator of dissatisfaction with care: a Danish cohort study combining register data and survey data

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Poor well-being and low job satisfaction in general practitioners and patients' change of general practitioner as an indicator of dissatisfaction with care: a Danish cohort study combining register data and survey data

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ABSTRACT

Objectives: Low job satisfaction and poor well-being (e.g. stress and burnout) among physicians may have negative consequences for patient experienced healthcare quality. In primary care, this could manifest in patients choosing another general practitioner (GP). The objective of this study was to examine change of GP (unrelated to change of address) among patients in relation to their GPs' job satisfaction, well-being, and self-assessed work-ability.

Design and setting: Data from a nationwide questionnaire survey among Danish GPs in May 2016 was combined with register data on their listed patients. Associations between patients' change of GP (COGP) in the 6-month study period (from May 2016) and the job satisfaction/well-being of their GP were estimated as risk ratios (RRs) at the individual patient level using binomial regression analysis. Potential confounders were included for adjustment.

Participants: The study cohort included 569,766 patients aged ≥ 18 years listed with 409 GPs in single-handed practices.

Results: COGP was significantly associated with occupational distress (burnout and low job satisfaction) in the GP. This association was seen in a dose-response like pattern. For burnout, associations were found for depersonalisation and reduced sense of personal accomplishment (but not for emotional exhaustion). The adjusted risk ratio was 1.40 (1.10-1.72) for patients listed with a GP with the lowest level of job satisfaction and 1.24 (1.01-1.52) and 1.40 (1.14-1.72) for patients listed with a GP in the most unfavourable categories of depersonalisation and sense of personal accomplishment (the most favourable categories used as reference). COGP was not associated with self-assessed work-ability or domains of well-being related to life in general.

Conclusions: Patients' likelihood of changing GP increased with GP burnout and decreasing job satisfaction. These findings indicate a negative impact of GPs' work conditions and occupational well-being on patient-assessed quality of care.

Keywords: Quality in Health Care, General Practitioners, Burnout, Job Satisfaction, Patient Satisfaction, Denmark

Strengths and limitations of this study

- Mental well-being and job satisfaction in general practitioners (GPs) were examined in relation to a register based (rather than a self-reported) measure of healthcare quality.
- Mental well-being and job satisfaction were assessed by validated rating scales.
- Precise linkage of each patient with a specific GP.
- Prospective study design.
- Adjustment for several potential confounders, but observed associations could still be mediated by unmeasured factors.

BACKGROUND

Among general practitioners (GPs) stress, burnout and job dissatisfaction is prevalent[1] and may have important implications for quality in healthcare.[2–7] Yet, existing research examining the possible consequences of physician mental well-being/satisfaction for healthcare quality predominantly rely on physician self-report.

Patient satisfaction is by itself an essential component of healthcare quality and may furthermore reflect underlying dimensions of healthcare quality important for health outcomes. Such dimension include access to care and effectiveness of clinical and interpersonal care.[8] The possible negative implications of GP distress for patients' experience and satisfaction with primary healthcare is understudied.

A change of GP that is unrelated to change of address (because of moving) may indicate dissatisfaction with the GP.[9–11] The continuous relationship with a GP is highly valued by many patients[12], and a patient's change of GP is often preceded by careful consideration.[13] Satisfaction and decision-making regarding change of GP is strongly influenced by the patient's perception of interpersonal aspects of care.[9,13–15] GPs who face stress, burnout, and low job satisfaction may compromise with the quality of provided care and exhibit reduced empathic concern for the patients.[7,16,17] Moreover, GPs with high levels of occupational distress may have longer waiting times for consultations due to excessive workloads, which could add to the

listed patients' propensity to change GP.[9,10] Consequently, the patient-GP relationship and the patient-assessed quality may suffer, and some patients may decide to change GP.

This study aimed to examine whether distress levels and self-assessed work-ability in GPs were associated with change of GP among listed patients (voluntary disenrollment) as proxy for dissatisfaction with care.

METHODS

Setting

Almost all citizens in Denmark (98%) are listed with a specific general practice, which they must consult for medical advice. GPs in Denmark provide comprehensive family medicine to their listed patients and act as gatekeepers and coordinators to the rest of the tax-funded healthcare system.[18] Patients are charged a fee (approx. €26) if they change general practice unrelated to change of address. Approximately, 27% of Danish GPs are organised in single-handed practices.

Study population

In May 2016, we invited all GPs in Denmark to participate in a questionnaire survey on their working conditions and mental well-being (response rate: 50.2%). The survey has been described in detail elsewhere.[1] For the purpose of this study, only GPs in single-handed practices were included as this allowed for accurate linkage of each patient to a specific GP. Furthermore, we did not include GPs who had locum(s) employed for > 20 hours per week, GPs with < 500 listed patients, and GPs who were newcomers in their current practice (i.e. arrived in 2016).

GPs were excluded if more than 90% of the listed patients changed GP in the study period, or if more than 10% of the listed patients changed GP on the same date as this indicated restructuring of the practice (N = 7).

Study cases were patients aged ≥ 18 years who were registered in the Danish Patient List Register (PLR) with an eligible general practice at the beginning of the study period. The PLR holds information on start and end dates of all registrations of patients with all general practices in Denmark. The 6-month study period started

on 1 May 2016. A total of 569,776 patients listed with 402 GPs in single-handed practices were included in the analyses.

Change of GP

A p*atient's change of GP (COGP)* was defined as being listed in the PLR with a start date with a general practice in the study period and no new postal address or immigration within two months on both sides of the start date. Information on change of address and immigration among patients was collected from the Danish Civil Registration System.

GP mental well-being and job satisfaction

The indicators of mental well-being (general and occupational) and job satisfaction were selected a priori from the GP questionnaire. The indicators were measured by validated and reliable rating scales, which have previously shown adequate consistency among Danish GPs.[1] *Job satisfaction* was assessed by the Warr-Cook-Wall Job Satisfaction Scale (WCW-JSS), p*erceived stress in general life* by Cohen's 10-item Perceived Stress Scale (PSS-10), *general well-being* by the 5-item World Health Organisation Well-Being Index (WHO-5), and *burnout* by the Maslach Burnout Inventory Human-Services-Survey (MBI-HSS). The MBI-HSS consists of three subscales that measure three burnout dimensions: *emotional exhaustion, depersonalisation,* and *sense of personal accomplishment. Self-rated work-ability* was measured by a single-item of the Work Ability Index (WAI); the respondents scored their current work-ability against their lifetime best on a Likert scale. This single item has shown high consistency with the full scale.[19]

We categorised *job satisfaction, perceived stress, self-rated workability,* and each burnout dimension according to quartiles of the scale scores. No well-established cut-off values exist that define significant positive or negative levels of these measures. Burnout is often categorised according to the cut-off value based on normative frequency distributions; this approach allows for comparison of burnout symptoms over time and across populations, but it does not signify clinical significance.[20] As in previous research, we categorised scales according to quartiles of the sum-scores to allow for exploration of non-linear and dose-response like associations with COGP.[21,22] To evaluate burnout as a multidimensional construct[20], we

additionally categorised burnout based on a *composite burnout score.*[22] This score was calculated by adding up points corresponding to the quartile of each subscale (reversed score for personal accomplishment); 1 point was assigned for subscale scores in the first quartile, and 2, 3 and 4 points were assigned for scores in the second, third and fourth quartiles, respectively. The composite score was categorised into five groups: 3-4 points (corresponding to low burnout levels on all subscales), 5-6 points, 7-8 points, 9-10 points, and 11-12 points (corresponding to high burnout levels on all subscales). Finally, g*eneral well-being* was categorised as 'poor' for a scale score of ≤ 50 (the recommended cut-off value when using the WHO-5 for screening for depression), 'good' for a score of >70, and 'moderate' for a score in between.[1]

Covariates

Potential confounders were selected a priori for adjustment. At GP level, information on gender and seniority (years since qualification as a GP: ≤ 5, 6-15, 16-25, or ≥ 25) was obtained from the questionnaire survey. At patient level, information on each patient's demographic and socioeconomic characteristics was obtained from Statistics Denmark.[23] This information included gender, age group at the beginning of the study period (18-29, 30-39, 40-49, 50-59, 60-69, 70-79, or ≥ 80 years), marital status (married/cohabiting or living alone), ethnic origin (Dane or immigrant/descendent), degree of urbanisation (rural area: < 1,000 inhabitants, small city: 1,000-19,999 inhabitants, medium city: 20,000-99,999 inhabitants, or large city: > 1,000,000 inhabitants), OECD-modified household income (categorised in pentiles), highest attained educational level (low: ≤ 10 years, medium: 11-15 years, or high: > 15 years), work affiliation (*in the labour force*: employed and students, *outside the labour force*: unemployed, early retirement pensioner, personal or sick leave, or *retired*).

Multimorbidity in patients was assessed by Charlson's Comorbidity Index (CCI) score (0, 1, 2, or ≥ 3), which was calculated on the basis of the diagnoses registered in the Danish National Patient Register in 2006-2015.[24]. Finally, the percentage of general practices closed for intake of new patients in the patients' municipality in 2016 (< 60%, 60-80%, or > 80%) was included as a covariate obtained from the Organisation of General Practitioners in Denmark[25] because the patient's option to change general practice depends on

the availability of alternative practices.[9] GPs are generally allowed to close for intake of new patients when their list size exceeds 1,600 patients per GP.

Information on socioeconomic characteristics was obtained for 2015. Missing information on educational level (5.9%) was categorised as unknown. Patients with missing information on any other covariates were excluded (N = 5.213 (0.9%)). Each patient was linked to the GP-related data through the GP's provider number.[1] At patient level, the data were linked through the CRN; a unique personal identification number assigned to all citizens in Denmark.[26] All personal identifiers were encrypted prior to analysis.[1]

Analyses

We calculated the share of patients with COGP and the corresponding 95% confidence interval (CI). Associations between each of the included GP well-being indicators and COGP among patients were calculated at the individual patient level by use of binomial regression analyses. The most favourable category of the indicator examined was used as reference. Unadjusted and adjusted analyses were carried out using robust variance estimation to account for clusters of patients at practice level. Adjusted models included share of practices closed for new patient uptake in the municipality, GP factors (gender and seniority) and patient factors (gender, age, marital status, ethnicity, city size, income, length of education, work affiliation, comorbidity) in the categories described above.

Prior to these analyses, we tested that the mean time at risk of COGP per listed patient did not vary across the GP well-being/satisfaction categories. Patients were considered to be at risk until death, immigration, or change of general practice for any reason.

A p-value of ≤ 0.05 was considered statistically significant. Analyses were performed using Stata, version 15.

Patient and public involvement

This research was done without patient or public involvement.

RESULTS

During the 6-month study period, we identified 6,648 (1.17%) cases of COGP among the included patients (i.e. change of GP without change of address). The characteristics of the study cohort (N = 569,776) and the share of patients with COGP are shown in Table 1.

Table 1. Patient characteristics according to COGP in the 6-month study period.

		All patients N (%)	Patients with COGP n per 1000 (95%CI)
Total		569,776 (100)	11.7 (11.4-11.9)
Gender	Female	287,097 (50.4)	13.1 (12.7-13.6)
	Male	282,679 (49.6)	10.2 (9.8-10.5)
Age group, years	18 – 29	116,342 (20.4)	15.5 (14.8-16.2)
	30 – 39	85,453 (15.0)	13.7 (12.9-14.4)
	40 – 49	96,114 (16.8)	11.1 (10.4-11.7)
	50 – 59	94,716 (16.6)	9.5 (8.9-10.1)
	60 – 69	83,667 (14.7)	9.1 (8.5-9.8)
	70 – 79	61,533 (10.8)	10.1 (9.3-10.9)
	≥ 80	31,951 (5.6)	10.3 (9.3-10.9)
Marital status	Married / cohabiting	343,049 (60.2)	11.5 (11.1-11.9)
	Living alone	226,727 (39.8)	11.9 (11.5-12.4)
Ethnicity	Danish	491,661 (86.3)	11.4 (11.1-11.8)
	Immigrant/descendant	78,115 (13.7)	13.1 (12.3-13.8)
Education, years	≤ 10	142,070 (24.9)	12.5 (11.9-13.1)
	11-15	227,689 (40.0)	10.8 (10.4-11.3)
	> 15	166,644 (29.2)	11.8 (11.3-12.4)
	Unknown	33,373 (5.9)	12.9 (11.8-14.2)
Work affiliation	In the labour force	356,016 (62.5)	11.4 (11.0-11.8)
	Outside the labour force	85,620 (15.3)	15.3 (14.5-16.2)
	Retired	128,140 (22.5)	9.9 (9.4-10.5)
OECD-modified household income, pentiles	1st (low)	113,956 (20.0)	13.3 (12.7-14.0)
	2nd	113,955 (20.0)	12.8 (12.2-13.5)
	3rd	113,957 (20.0)	11.5 (10.9-12.1)
	4th	113,953 (20.0)	10.5 (9.9-11.0)
	5th (high)	113,955 (20.0)	10.2 (9.7-10.8)
Multimorbidity index score	0	460,769 (80.9)	11.7 (11.4-12.1)
	1	52,485 (9.2)	11.6 (10.8-12.6)
	2	31.899 (5.6)	11.0 (9.8-12.1)
	≥ 3	24,633 (4.3)	11.2 (10.0-12.6)
Practices closed for patient intake in the municipality	< 60%	264,254 (46.4)	12.1 (11.7-12.6)
	60-80%	200,187 (35.1)	12.1 (11.6-12.6)
	> 80%	105,335 (18.5)	9.7 (9.1-10.3)
City size	Rural area	89,014 (15.6)	10.8 (10.1-11.5)
	Small city	137,286 (24.1)	11.7 (11.1-12.3)
	Medium city	88,920 (15.6)	11.4 (10.7-12.1)
	Large city	254,556 (44.7)	12.1 (44.7-12.5)
Duration of GP-patient relationship	< 2 years	139,880 (24.6)	17.4 (16.7-18.1)
	2 - 8 years	203,640 (35.7)	12.1 (11.7-12.6)
	> 8 years	226,256 (39.7)	7.7 (7.4-8.1)

COGP: change of general practitioner without change of address.

Table 2 displays GP characteristics and well-being.

Table 2. Description of the GPs included in the study (N = 402)

GP and practice characteristics	
Gender, n (%)	
Female	178 (44.3)
Male	224 (55.7)
Age, years; mean (SD)	56.4 (8.4)
Years since qualification as a GP, mean (SD)	18.9 (9.4)
List size, median (IQI)	1693 (1544-1935)
COGP per 1000 listed patients, median (IQI); range	9.4 (5.9-14.7)
Well-being and satisfaction	
Job satisfaction score (WCW-JSS), median (IQI)	50 (40-58)
Emotional exhaustion score (MBI-HSS), median (IQI)	20 (13-28)
Depersonalisation score (MBI-HSS), median (IQI)	5 (3-8)
Personal accomplishment score (MBI-HSS), median (IQI)	35 (31-38)
Composite burnout score, n (%)	
3-4 (low)	75 (18.7)
5-6	80 (19.9)
7-8	93 (23.1)
9-10	93 (23.1)
11-12 (high)	61 (15.2)
Perceived general stress score (PSS-10), median (IQI)	12 (8-17)
General well-being (WHO-5)	
Good (score >70)	121 (30.6)
Moderate	197 (49.7)
Poor (score ≤ 50)	78 (19.7)
Self-assessed work-ability, n (%)	
Score 10 (best)	81 (20.4)
Score 9	122 (30.8)
Score 8	111 (28.0)
Score 7	82 (20.7)

IQI: interquartileinterval. COGP: Change of general practitioner without change of address. WCW-JSS: Warr-Cook-Wall Job Satisfaction Scale. MBI-HSS: Maslach Burnout Inventory Human-Services-Survey. PPS-10: Cohens Perceived Stress Scale. WHO-5: World Health Organisation Well-Being Index.
Note: Number of GPs varies due to partial response to the questionnaire for six GPs.

Table 3 shows the results of the regression analyses.

Table 3. Patients' COGP in relation to GP's job satisfaction, well-being, and self-assessed work-ability

	RR (95% CI)	adj. RR* (95% CI)

Job satisfaction (quartiles)		
4th (high)	1.00	1.00
3rd	1.08 (0.87-1.33)	1.08 (0.88-1.32)
2nd	1.21 (0.98-1.49)	**1.21 (1.01-1.48)**
1st (low)	**1.36 (1.08-1.71)**	**1.40 (1.10-1.72)**
Emotional exhaustion (quartiles)		
1st (low)	1.00	1.00
2nd	1.00 (0.80-1.25)	1.05 (0.85-1.31)
3rd	0.88 (0.72-1.09)	0.92 (0.76-1.13)
4th (high)	1.03 (0.31-1.28)	1.04 (0.86-1.27)
Depersonalisation (quartiles)		
1st (low)	1.00	1.00
2nd	1.15 (0.94-1.42)	1.18 (0.98-1.44)
3rd	1.15 (0.93-1.43)	1.22 (0.99-1.50)
4th (high)	1.21 (0.98-1.50)	**1.24 (1.01-1.52)**
Personal accomplishment (quartiles)		
1st (high)	1.00	1.00
2nd	1.10 (0.88-1.37)	1.13 (0.91-1.39)
3rd	**1.27 (1.06-1.52)**	**1.34 (1.12-1.59)**
4th (low)	**1.36 (1.09-1.69)**	**1.40 (1.14-1.72)**
Composite burnout score		
3-4 (low)	1.00	1.00
5-6	1.16 (0.92-1.47)	1.15 (0.92-1.44)
7-8	**1.24 (1.00-1.53)**	**1.30 (1.06-1.58)**
9-10	**1.30 (1.05-1.61)**	**1.38 (1.12-1.71)**
11-12 (high)	1.22 (0.96-1.56)	1.21 (0.96-1.52)
Perceived stress (quartiles)		
1st (low)	1.00	1.00
2nd	1.01 (0.82-1.24)	1.04 (0.86-1.25)
3rd	1.13 (0.90-1.42)	1.17 (0.93-1.46)
4th (high)	0.99 (0.82-1.20)	0.96 (0.80-1.15)
General well-being		
Good	1.00	1.00
Moderate	1.06 (0.89-1.27)	1.07 (0.89-1.27)
Poor	1.02 (0.83-1.25)	1.01 (0.82-1.24)
Self-assessed work-ability		
4th (high)	1.00	1.00
3rd	0.94 (0.75-1.17)	0.98 (0.79-1.22)
2nd	1.09 (0.86-1.38)	1.13 (0.91-1.42)
1st (low)	0.92 (0.73-1.15)	0.92 (0.74-1.15)

COGP: change of general practitioner without change of address. RR: risk ratio.
*adjusted for patient age, gender, socioeconomic factors, multimorbidity, city size, duration of GP-patient relationship and percentage of practices closed for patient intake in the municipality (categorised as presented in Table 1) and for GP seniority and gender.
Bold indicates significant results ($p \leq 0.05$).

The likelihood of COGP increased with depersonalisation, diminishing sense of personal accomplishment, and decreasing job satisfaction in the GP with whom the patient was listed. The adjusted RR was 1.40 (1.10-1.72)

for patients listed with a GP with the lowest level of job satisfaction and 1.24 (1.01-1.52) and 1.40 (1.14-1.72) for patients listed with a GP in the most unfavourable categories of the burnout dimensions depersonalisation and sense of low personal accomplishment.

Likewise, COGP tended to increase with a higher composite burnout score, although a small decline was seen at the highest level of burnout. Yet, the emotional exhaustion dimension of burnout was not associated with COPG. Likewise, no associations were found for perceived stress, general well-being, or self-assessed work-ability.

DISCUSSION

Main findings

Patients' likelihood of changing GP increased with decreasing job satisfaction in the GP with whom they were listed. Likewise, patients listed with a GP with high levels of depersonalisation, feelings of low personal accomplishment, or a high composite burnout score were more likely to change GP compared to patients listed with a GP with low burnout scores. Notably, these relationships had a dose-response pattern, although a small decrease was seen for the highest composite burnout level. In contrast, COGP was unrelated to emotional exhaustion, perceived stress, general well-being, and self-assessed work-ability in the GP.

Strengths and limitations

Major strengths of this study include the large sample size and the precise linkage of each patient to an individual GP by the combining of register-based data and survey data. The Danish national registers provide highly valid data.[26] The survey data covered multiple distinct and yet interrelated aspects of GP well-being, which was measured by validated and reliable assessment scales. The categorisation of all variables were performed according to predetermined procedures. The sample size allowed us to rank GP well-being indicators using multiple categories, which enabled exploration of non-linear and dose-response like associations. Still, the categorisation might not distinguish the level of poor well-being that may affect the

patient-experienced quality of care. The restriction of the study period to 6 months reduced the risk of fluctuations in the mental state of the GP during the study period.

We assessed GP well-being prior to COGP and the GPs were unaware of the collection of data on COGP. Still, we cannot rule out that caring for a patient population with a high propensity to change GP could affect GP well-being.

We used COGP as a proxy for dissatisfaction with the GP. The literature support COGP as a valid indicator of patient-assessed quality.[9–11] Still, other explanation than dissatisfaction with GP care may account for some patients' COGP. Moreover, patients change GP after careful consideration; some may even stay with their GP even if they are dissatisfied and have a poor relationship with their GP.[9,13,14] COGP is a rare event (1.17% of patients in the study) and may capture only major dissatisfaction while leaving minor dissatisfaction undetected. These matters impair the use of COGP as a proxy for patient satisfaction and could result in an underestimation of the influence of GP-related factors on patient satisfaction. In addition, not all patients consult their GP on a regular basis, which could leave some of the study cases 'unexposed' to their GP, which may also increase the risk of an underestimation.

Factors beyond the control of the GP may affect patients' COGP and could thus confound the results if inadequately controlled for. First, patient factors are important determinants of COGP, and bias related to patient characteristics may occur. For instance, complex healthcare needs in patients may relate to GP distress[27] as well as to patients' propensity to change GP. As seen from Table 1, patients inclined to COGP seem to include patients who were more likely to consult with complex healthcare needs (e.g. patients outside the labour force) and patients who were less inclined to consult with complex needs (e.g. younger people). Overall, the role of case-mix of patients is complex and may confound the results in both directions. Next, the likelihood of COGP in response to poor care may decrease with the availability of alternative practices locally. A high number of practices closed for patient intake may reflect workforce shortage, which may be associated with increased levels of GP workload and occupational distress.[28] Therefore, we adjusted for a lack of alternative practices. If inadequately adjusted for, this would most likely result in an underestimation of the observed relationship between GP distress and COGP in patients. Additionally,

unmeasured characteristics of the GPs and their clinics (e.g. personality, clinical skills, and work conditions) could confound the results. Overall, we adjusted for several potential confounders and we believe that unmeasured confounding is unlikely to fully account for the observed associations.

The study population was restricted to patients listed with GPs in single-handed practices who responded to the survey, which could impair generalisability of findings. Yet, we have no reason to assume that the associations examined depended on the GPs' approach to participation or on the type of practice. The prevalence of burnout and low job satisfaction was the same for GPs in single-handed practices and GPs in partnership practices.[1]

Comparison with the literature

To our knowledge, only one previous study has explored the possible impact of physician well-being/satisfaction on healthcare quality by using change of GP among patients as a quality indicator.[29] Lower levels of job satisfaction were associated with a higher propensity to change GP in patients with pain, whereas no such relationship was seen in patients with depression. For both patient groups, however, patients of physicians with greater job satisfaction reported greater levels of trust and confidence in their physician.[29] In line with our findings, the existing body of research suggests that higher levels of job satisfaction in physicians induce higher levels of patient satisfaction[30] and better patient-physician relationships.[7]

For burnout, the results of a recent review and meta-analysis examining the potential implications of physician burnout on patient-assessed quality were in accordance with our findings; depersonalisation and low sense of personal accomplishment were both significantly associated with reduced patient-reported satisfaction, whereas emotionally exhaustion was not.[6] Several reviews support that physician burnout may reduce the patient-assessed quality of care, but they also point to the need for further research.[2–4,6]

There is consistent evidence that the patient's perception of the GP-patient relationship is an important determinant of patient satisfaction[31–33] and that interpersonal aspects of care strongly influence the decision-making regarding COGP. Not feeling recognised by the GP, poor communication, and lack of

confidence and trust in the GP have been identified as important drivers in patients' decision to change GP.[9,13–15].

Empirical research examining the potential impact of GP burnout and job satisfaction on interpersonal aspects of care is sparse, but theoretically, it is plausible that interpersonal aspects of care mediate the observed associations between occupational distress and COGP. Burnout has been described as an erosion of engagement initiated by loss of internal resources as a response to chronic job-related stress.[20] A suggested consequence of burnout is a hesitation to invest resources in the job as an attempt to protect against further resource depletion.[16] Hence, burned out GPs may be inclined to invest less in the relationship with their patients. Depersonalisation refers to the development of an emotional detachment to people related to work and involves lack of compassion and a cynical attitude towards patients.

Albeit reverse causality cannot be excluded, one study found that GPs with higher levels of job satisfaction asked more psychosocial questions and showed more affective communication.[34] Other studies found that GPs with lower sense of personal accomplishment used less affective communication and were less patient-centred[35] and that patients listed with more depersonalised and emotionally exhausted GPs were less satisfied with the consultations with their GP.[36] However, other studies found no indications that burnout or job dissatisfaction impaired the quality of interpersonal care.[37–39] Some of these differences may be attributable to different burnout definitions.

It may seem contradictory that emotional exhaustion was not associated with COGP, while clear associations were found for the remaining two burnout components and for job satisfaction. Different explanations may account for this. Firstly, the influence of burnout on job performance may depend on the stage of burnout.[3,40] In the initial stage, emotional exhaustion may be the only symptom and by overstretching themselves GPs may compensate for the potential negative effects of adverse work conditions on patient care.[41,42] Moreover, high conscientiousness could be a risk factor for burnout. Thus, emotionally exhausted GPs may exhibit high levels of thoroughness and attentiveness to patients' needs in clinical encounters, and hence their patients may experience excellent care.[3,38,42] In later stages of burnout, carelessness and disengagement may become more dominant. This possible mix of excellent care provision

and compromised care provision in emotionally exhausted GPs may counterbalance each other in the analysis. The finding that the frequency of COGP tended to increase with the composite burnout score could supports this, as higher composite scores are likely to reflect later stages of burnout. Secondly, as for the traditional cut-off levels of burnout, our categorisation of emotional exhaustion might not be suitable for identifying the level of exhaustion that causes functional impairment. A too low cut-off value could attenuate measured relationships.[3] Lastly, personal and professional values and attitudes that predispose to depersonalisation, low sense of personal accomplishment, and dissatisfaction could influence clinical practice.[43] Hence, the observed associations might reflect underlying attributes of the GP.

While COGP was associated with work-specific aspects of well-being, no associations were found for well-being measures related to life in general. This suggests that job-related factors are most essential in the relationship between provider well-being and patient-assessed quality of care. Yet, the actual work conditions (and not only the GPs' affective response to them) may play a causal role in this relationship. For instance, GPs with higher workloads may have longer waiting times and shorter consultations, which could cause some patients to change GP.[9,10]

COGP among patients was not associated with the self-reported work-ability among GPs. Objective versus self-reported measurement of quality is controversial in research on the potential consequences of provider well-being for healthcare quality; the association with self-reported quality of care is well-documented, yet the reliability in terms of actual quality of care remains uncertain.[3] Quality of care is multifaceted and the absence of association in our study should not be considered a proof that self-assessed work-ability is an unreliable measure of care quality. Previously, we found lower self-reported work-ability as well as poor well-being in GPs to be associated with a higher rate of potentially preventable hospitalisations in listed patients, which could indicate suboptimal primary healthcare provision.[22] In the assessment of work-ability, GPs may attach much importance to more bio-medical aspects of care, such as the ability to diagnose and provide treatment according to the best medical standards. Most patients may not be qualified to judge such aspects and tend to focus more on the interpersonal aspects of care in their overall assessment of quality.[44]

Implications

The study findings imply that GPs' occupational well-being and job satisfaction influence patient satisfaction measured as COGP. Hence, improving job satisfaction and engagement and combating burnout seems important to improve patient-assessed quality of care.

The possible implications are highly important: GP distress is prevalent, and COGP among patients may reflect serious aspects of care quality. This lend support for the conception that attention should be paid to the work conditions and the well-being of healthcare providers in the pursuit of optimal healthcare. However, more research is needed to establish the connection between GP well-being and healthcare provision.

Conclusion

We found that patients' likelihood of changing GP increased with decreasing GP job satisfaction and increasing GP burnout. We found no association between COGP among patients and emotional exhaustion in the GP, whereas depersonalisation and reduced sense of personal accomplishment both increased the likelihood of COGP. Overall, the findings suggest that the degree to which the GP thrives in the job influences the patient assessed quality of care provided.

DECLARATIONS

Authors' contributions

All authors contributed substantially to the design of the study. KBN performed the statistical analyses in consultation with AHC. KBN wrote the first draft of the article. AFP, FB, PV, and AHC assisted in writing and revising the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Ethics approval

The project was approved by the Danish Data Protection Agency (J.no. 2016–41-4648). According to Danish law, approval by the Danish National Committee on Health Research Ethics was not required as no biomedical intervention was performed. Respondents gave their content to participate by responding to the questionnaire. Personally identifiable information on GPs and patients were re-coded and anonymised at Statistics Denmark prior to data analysis.

Availability of data and materials

Danish data protection regulations prohibit disclosure of data to any third party without prior permission from the Danish Data Protection Agency. Thus, the data from this study cannot be made publicly available.

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cohort studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2-3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	5-6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	5, 7
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	-
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5-8
Bias	9	Describe any efforts to address potential sources of bias	5-8
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6-7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	7
		(*d*) If applicable, explain how loss to follow-up was addressed	-
		(*e*) Describe any sensitivity analyses	-
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	5-8
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-9
		(b) Indicate number of participants with missing data for each variable of interest	7-8
		(c) Summarise follow-up time (eg, average and total amount)	8
Outcome data	15*	Report numbers of outcome events or summary measures over time	8
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10-11 (table 3)
		(*b*) Report category boundaries when continuous variables were categorized	10 (table 2)
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	considered
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	-
Discussion			
Key results	18	Summarise key results with reference to study objectives	12
Limitations			
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-16
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	17

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Mental well-being and job satisfaction in general practitioners in Denmark and their patients' change of general practitioner: a cohort study combining survey data and register data

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Mental well-being and job satisfaction in general practitioners in Denmark and their patients' change of general practitioner: a cohort study combining survey data and register data

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ABSTRACT

Objectives: Low job satisfaction and poor well-being (e.g. stress and burnout) among physicians may have negative consequences for patient experienced healthcare quality. In primary care, this could manifest in patients choosing another general practitioner (GP). The objective of this study was to examine change of GP (unrelated to change of address) among patients in relation to their GPs' job satisfaction, well-being, and self-assessed work-ability.

Design and setting: Data from a nationwide questionnaire survey among Danish GPs in May 2016 was combined with register data on their listed patients. Associations between patients' change of GP (COGP) in the 6-month study period (from May 2016) and the job satisfaction/well-being of their GP were estimated as risk ratios (RRs) at the individual patient level using binomial regression analysis. Potential confounders were included for adjustment.

Participants: The study cohort included 569,766 patients aged ≥ 18 years listed with 409 GPs in single-handed practices.

Results: COGP was significantly associated with occupational distress (burnout and low job satisfaction) in the GP. This association was seen in a dose-response like pattern. For burnout, associations were found for depersonalisation and reduced sense of personal accomplishment (but not for emotional exhaustion). The adjusted risk ratio was 1.40 (1.10-1.72) for patients listed with a GP with the lowest level of job satisfaction and 1.24 (1.01-1.52) and 1.40 (1.14-1.72) for patients listed with a GP in the most unfavourable categories of depersonalisation and sense of personal accomplishment (the most favourable categories used as reference). COGP was not associated with self-assessed work-ability or domains of well-being related to life in general.

Conclusions: Patients' likelihood of changing GP increased with GP burnout and decreasing job satisfaction. These findings indicate that patients' evaluation of care as measured by change of GP may be influenced by their GPs' work conditions and occupational well-being.

Keywords: General Practitioners, Burnout, Job Satisfaction, Patient Satisfaction, Denmark

Strengths and limitations of this study

- Mental well-being and job satisfaction in general practitioners (GPs) were examined in relation to a register based (rather than a self-reported) indicator of suboptimal healthcare quality.
- Mental well-being and job satisfaction were assessed by validated rating scales.
- Precise linkage of each patient with a specific GP.
- Prospective study design.
- Adjustment for several potential confounders, but observed associations could still be mediated by unmeasured factors.

BACKGROUND

Among general practitioners (GPs) stress, burnout and job dissatisfaction is prevalent[1] and may have important implications for quality in healthcare.[2–7] Yet, existing research examining the possible consequences of physician mental well-being/satisfaction for healthcare quality predominantly rely on physician self-report.

Patient satisfaction is by itself an essential component of healthcare quality and may furthermore reflect underlying dimensions of healthcare quality important for health outcomes. Such dimension include access to care and effectiveness of clinical and interpersonal care.[8] The possible negative implications of GP distress for patients' experience and satisfaction with primary healthcare is understudied.

A change of GP that is unrelated to change of address (because of moving) may indicate dissatisfaction with the GP.[9–11] The continuous relationship with a GP is highly valued by many patients[12], and a patient's change of GP is often preceded by careful consideration.[13] Satisfaction and decision-making regarding change of GP is strongly influenced by the patient's perception of interpersonal aspects of care.[9,13–15] GPs who face stress, burnout, and low job satisfaction may compromise with the quality of provided care and exhibit reduced empathic concern for the patients.[7,16,17] Moreover, GPs with high levels of occupational distress may have longer waiting times for consultations due to excessive workloads, which could add to the

listed patients' propensity to change GP.[9,10] Consequently, the patient-GP relationship and the patient-assessed quality may suffer, and some patients may decide to change GP.

This study aimed to examine whether distress levels and self-assessed work-ability in GPs were associated with change of GP among listed patients (voluntary disenrollment) as proxy for dissatisfaction with care.

METHODS

Setting

Almost all citizens in Denmark (98%) are listed with a specific general practice, which they must consult for medical advice. GPs in Denmark provide comprehensive family medicine to their listed patients and act as gatekeepers and coordinators to the rest of the tax-funded healthcare system.[18] Patients are charged a fee (approx. €26) if they change general practice unrelated to change of address. Approximately, 27% of Danish GPs are organised in single-handed practices.

Study population

In May 2016, we invited all GPs in Denmark to participate in a questionnaire survey on their working conditions and mental well-being (response rate: 50.2%). The survey has been described in detail elsewhere.[1] For the purpose of this study, only GPs in single-handed practices were included as this allowed for accurate linkage of each patient to a specific GP. Furthermore, we did not include GPs who had locum(s) employed for > 20 hours per week, GPs with < 500 listed patients, and GPs who were newcomers in their current practice (i.e. arrived in 2016).

GPs were excluded if more than 90% of the listed patients changed GP in the study period, or if more than 10% of the listed patients changed GP on the same date as this indicated restructuring of the practice (N = 7).

Study cases were patients aged ≥ 18 years who were registered in the Danish Patient List Register (PLR) with an eligible general practice at the beginning of the study period. The PLR holds information on start and end dates of all registrations of patients with all general practices in Denmark. The 6-month study period started

on 1 May 2016. A total of 569,776 patients listed with 402 GPs in single-handed practices were included in the analyses.

Change of GP

A p*atient's change of GP (COGP)* was defined as being listed in the PLR with a start date with a general practice in the study period and no new postal address or immigration within two months on both sides of the start date. Information on change of address and immigration among patients was collected from the Danish Civil Registration System.

GP mental well-being and job satisfaction

The indicators of mental well-being (general and occupational) and job satisfaction were selected a priori from the GP questionnaire. The indicators were measured by validated and reliable rating scales, which have previously shown adequate consistency among Danish GPs.[1] *Job satisfaction* was assessed by the Warr-Cook-Wall Job Satisfaction Scale (WCW-JSS), p*erceived stress in general life* by Cohen's 10-item Perceived Stress Scale (PSS-10), *general well-being* by the 5-item World Health Organisation Well-Being Index (WHO-5), and *burnout* by the Maslach Burnout Inventory Human-Services-Survey (MBI-HSS). The MBI-HSS consists of three subscales that measure three burnout dimensions: *emotional exhaustion, depersonalisation,* and *sense of personal accomplishment. Self-rated work-ability* was measured by a single-item of the Work Ability Index (WAI); the respondents scored their current work-ability against their lifetime best on a Likert scale. This single item has shown high consistency with the full scale.[19]

We categorised *job satisfaction, perceived stress, self-rated workability,* and each burnout dimension according to quartiles of the scale scores. No well-established cut-off values exist that define significant positive or negative levels of these measures. Burnout is often categorised according to the cut-off value based on normative frequency distributions; this approach allows for comparison of burnout symptoms over time and across populations, but it does not signify clinical significance.[20] As in previous research, we categorised scales according to quartiles of the sum-scores to allow for exploration of non-linear and dose-response like associations with COGP.[21,22] To evaluate burnout as a multidimensional construct[20], we

additionally categorised burnout based on a *composite burnout score.*[22] This score was calculated by adding up points corresponding to the quartile of each subscale (reversed score for personal accomplishment); 1 point was assigned for subscale scores in the first quartile, and 2, 3 and 4 points were assigned for scores in the second, third and fourth quartiles, respectively. The composite score was categorised into five groups: 3-4 points (corresponding to low burnout levels on all subscales), 5-6 points, 7-8 points, 9-10 points, and 11-12 points (corresponding to high burnout levels on all subscales). Finally, g*eneral well-being* was categorised as 'poor' for a scale score of ≤ 50 (the recommended cut-off value when using the WHO-5 for screening for depression), 'good' for a score of >70, and 'moderate' for a score in between.[1]

Covariates

Potential confounders were selected a priori for adjustment. At GP level, information on gender and seniority (years since qualification as a GP: ≤ 5, 6-15, 16-25, or ≥ 25) was obtained from the questionnaire survey. At patient level, information on each patient's demographic and socioeconomic characteristics was obtained from Statistics Denmark.[23] This information included gender, age group at the beginning of the study period (18-29, 30-39, 40-49, 50-59, 60-69, 70-79, or ≥ 80 years), marital status (married/cohabiting or living alone), ethnic origin (Dane or immigrant/descendent), degree of urbanisation (rural area: < 1,000 inhabitants, small city: 1,000-19,999 inhabitants, medium city: 20,000-99,999 inhabitants, or large city: > 1,000,000 inhabitants), OECD-modified household income (categorised in pentiles), highest attained educational level (low: ≤ 10 years, medium: 11-15 years, or high: > 15 years), work affiliation (*in the labour force*: employed and students, *outside the labour force*: unemployed, early retirement pensioner, personal or sick leave, or *retired*).

Multimorbidity in patients was assessed by Charlson's Comorbidity Index (CCI) score (0, 1, 2, or ≥ 3), which was calculated on the basis of the diagnoses registered in the Danish National Patient Register in 2006-2015.[24]. Finally, the percentage of general practices closed for intake of new patients in the patients' municipality in 2016 (< 60%, 60-80%, or > 80%) was included as a covariate obtained from the Organisation of General Practitioners in Denmark[25] because the patient's option to change general practice depends on

the availability of alternative practices.[9] GPs are generally allowed to close for intake of new patients when their list size exceeds 1,600 patients per GP.

Information on socioeconomic characteristics was obtained for 2015. Missing information on educational level (5.9%) was categorised as unknown. Patients with missing information on any other covariates were excluded (N = 5.213 (0.9%)). Each patient was linked to the GP-related data through the GP's provider number.[1] At patient level, the data were linked through the CRN; a unique personal identification number assigned to all citizens in Denmark.[26] All personal identifiers were encrypted prior to analysis.[1]

Analyses

We calculated the share of patients with COGP and the corresponding 95% confidence interval (CI). Associations between each of the included GP well-being indicators and COGP among patients were calculated at the individual patient level by use of binomial regression analyses. The most favourable category of the indicator examined was used as reference. Unadjusted and adjusted analyses were carried out using robust variance estimation to account for clusters of patients at practice level. Adjusted models included share of practices closed for new patient uptake in the municipality, GP factors (gender and seniority) and patient factors (gender, age, marital status, ethnicity, city size, income, length of education, work affiliation, comorbidity) in the categories described above.

Prior to these analyses, we tested that the mean time at risk of COGP per listed patient did not vary across the GP well-being/satisfaction categories. Patients were considered to be at risk until death, immigration, or change of general practice for any reason.

A p-value of ≤ 0.05 was considered statistically significant. Analyses were performed using Stata, version 15.

Patient and public involvement

This research was done without patient or public involvement.

RESULTS

During the 6-month study period, we identified 6,648 (1.17%) cases of COGP among the included patients (i.e. change of GP without change of address). The characteristics of the study cohort (N = 569,776) and the share of patients with COGP are shown in Table 1.

Table 1. Patient characteristics according to COGP in the 6-month study period.

		All patients N (%)	Patients with COGP n per 1000 (95%CI)
Total		569,776 (100)	11.7 (11.4-11.9)
Gender	Female	287,097 (50.4)	13.1 (12.7-13.6)
	Male	282,679 (49.6)	10.2 (9.8-10.5)
Age group, years	18 – 29	116,342 (20.4)	15.5 (14.8-16.2)
	30 – 39	85,453 (15.0)	13.7 (12.9-14.4)
	40 – 49	96,114 (16.8)	11.1 (10.4-11.7)
	50 – 59	94,716 (16.6)	9.5 (8.9-10.1)
	60 – 69	83,667 (14.7)	9.1 (8.5-9.8)
	70 – 79	61,533 (10.8)	10.1 (9.3-10.9)
	≥ 80	31,951 (5.6)	10.3 (9.3-10.9)
Marital status	Married / cohabiting	343,049 (60.2)	11.5 (11.1-11.9)
	Living alone	226,727 (39.8)	11.9 (11.5-12.4)
Ethnicity	Danish	491,661 (86.3)	11.4 (11.1-11.8)
	Immigrant/descendant	78,115 (13.7)	13.1 (12.3-13.8)
Education, years	≤ 10	142,070 (24.9)	12.5 (11.9-13.1)
	11-15	227,689 (40.0)	10.8 (10.4-11.3)
	> 15	166,644 (29.2)	11.8 (11.3-12.4)
	Unknown	33,373 (5.9)	12.9 (11.8-14.2)
Work affiliation	In the labour force	356,016 (62.5)	11.4 (11.0-11.8)
	Outside the labour force	85,620 (15.3)	15.3 (14.5-16.2)
	Retired	128,140 (22.5)	9.9 (9.4-10.5)
OECD-modified household income, pentiles	1st (low)	113,956 (20.0)	13.3 (12.7-14.0)
	2nd	113,955 (20.0)	12.8 (12.2-13.5)
	3rd	113,957 (20.0)	11.5 (10.9-12.1)
	4th	113,953 (20.0)	10.5 (9.9-11.0)
	5th (high)	113,955 (20.0)	10.2 (9.7-10.8)
Multimorbidity index score	0	460,769 (80.9)	11.7 (11.4-12.1)
	1	52,485 (9.2)	11.6 (10.8-12.6)
	2	31.899 (5.6)	11.0 (9.8-12.1)
	≥ 3	24,633 (4.3)	11.2 (10.0-12.6)
Practices closed for patient intake in the municipality	< 60%	264,254 (46.4)	12.1 (11.7-12.6)
	60-80%	200,187 (35.1)	12.1 (11.6-12.6)
	> 80%	105,335 (18.5)	9.7 (9.1-10.3)
City size	Rural area	89,014 (15.6)	10.8 (10.1-11.5)
	Small city	137,286 (24.1)	11.7 (11.1-12.3)
	Medium city	88,920 (15.6)	11.4 (10.7-12.1)
	Large city	254,556 (44.7)	12.1 (44.7-12.5)
Duration of GP-patient relationship	< 2 years	139,880 (24.6)	17.4 (16.7-18.1)
	2 - 8 years	203,640 (35.7)	12.1 (11.7-12.6)
	> 8 years	226,256 (39.7)	7.7 (7.4-8.1)

COGP: change of general practitioner without change of address.

Table 2 displays GP characteristics and well-being.

Table 2. Description of the GPs included in the study (N = 402)

GP and practice characteristics	
Gender, n (%)	
Female	178 (44.3)
Male	224 (55.7)
Age, years; mean (SD)	56.4 (8.4)
Years since qualification as a GP, mean (SD)	18.9 (9.4)
List size, median (IQI)	1693 (1544-1935)
COGP per 1000 listed patients, median (IQI); range	9.4 (5.9-14.7)
Well-being and satisfaction	
Job satisfaction score (WCW-JSS), median (IQI)	50 (40-58)
Emotional exhaustion score (MBI-HSS), median (IQI)	20 (13-28)
Depersonalisation score (MBI-HSS), median (IQI)	5 (3-8)
Personal accomplishment score (MBI-HSS), median (IQI)	35 (31-38)
Composite burnout score, n (%)	
3-4 (low)	75 (18.7)
5-6	80 (19.9)
7-8	93 (23.1)
9-10	93 (23.1)
11-12 (high)	61 (15.2)
Perceived general stress score (PSS-10), median (IQI)	12 (8-17)
General well-being (WHO-5)	
Good (score >70)	121 (30.6)
Moderate	197 (49.7)
Poor (score ≤ 50)	78 (19.7)
Self-assessed work-ability, n (%)	
Score 10 (best)	81 (20.4)
Score 9	122 (30.8)
Score 8	111 (28.0)
Score 7	82 (20.7)

IQI: interquartileinterval. COGP: Change of general practitioner without change of address. WCW-JSS: Warr-Cook-Wall Job Satisfaction Scale. MBI-HSS: Maslach Burnout Inventory Human-Services-Survey. PPS-10: Cohens Perceived Stress Scale. WHO-5: World Health Organisation Well-Being Index.
Note: Number of GPs varies due to partial response to the questionnaire for six GPs.

Table 3 shows the results of the regression analyses.

Table 3. Patients' COGP in relation to GP's job satisfaction, well-being, and self-assessed work-ability

	RR (95% CI)	adj. RR* (95% CI)

Job satisfaction (quartiles)		
4th (high)	1.00	1.00
3rd	1.08 (0.87-1.33)	1.08 (0.88-1.32)
2nd	1.21 (0.98-1.49)	**1.21 (1.01-1.48)**
1st (low)	**1.36 (1.08-1.71)**	**1.40 (1.10-1.72)**
Emotional exhaustion (quartiles)		
1st (low)	1.00	1.00
2nd	1.00 (0.80-1.25)	1.05 (0.85-1.31)
3rd	0.88 (0.72-1.09)	0.92 (0.76-1.13)
4th (high)	1.03 (0.31-1.28)	1.04 (0.86-1.27)
Depersonalisation (quartiles)		
1st (low)	1.00	1.00
2nd	1.15 (0.94-1.42)	1.18 (0.98-1.44)
3rd	1.15 (0.93-1.43)	1.22 (0.99-1.50)
4th (high)	1.21 (0.98-1.50)	**1.24 (1.01-1.52)**
Personal accomplishment (quartiles)		
1st (high)	1.00	1.00
2nd	1.10 (0.88-1.37)	1.13 (0.91-1.39)
3rd	**1.27 (1.06-1.52)**	**1.34 (1.12-1.59)**
4th (low)	**1.36 (1.09-1.69)**	**1.40 (1.14-1.72)**
Composite burnout score		
3-4 (low)	1.00	1.00
5-6	1.16 (0.92-1.47)	1.15 (0.92-1.44)
7-8	**1.24 (1.00-1.53)**	**1.30 (1.06-1.58)**
9-10	**1.30 (1.05-1.61)**	**1.38 (1.12-1.71)**
11-12 (high)	1.22 (0.96-1.56)	1.21 (0.96-1.52)
Perceived stress (quartiles)		
1st (low)	1.00	1.00
2nd	1.01 (0.82-1.24)	1.04 (0.86-1.25)
3rd	1.13 (0.90-1.42)	1.17 (0.93-1.46)
4th (high)	0.99 (0.82-1.20)	0.96 (0.80-1.15)
General well-being		
Good	1.00	1.00
Moderate	1.06 (0.89-1.27)	1.07 (0.89-1.27)
Poor	1.02 (0.83-1.25)	1.01 (0.82-1.24)
Self-assessed work-ability		
4th (high)	1.00	1.00
3rd	0.94 (0.75-1.17)	0.98 (0.79-1.22)
2nd	1.09 (0.86-1.38)	1.13 (0.91-1.42)
1st (low)	0.92 (0.73-1.15)	0.92 (0.74-1.15)

COGP: change of general practitioner without change of address. RR: risk ratio.
*adjusted for patient age, gender, socioeconomic factors, multimorbidity, city size, duration of GP-patient relationship and percentage of practices closed for patient intake in the municipality (categorised as presented in Table 1) and for GP seniority and gender.
Bold indicates significant results ($p \leq 0.05$).

The likelihood of COGP increased with depersonalisation, diminishing sense of personal accomplishment, and decreasing job satisfaction in the GP with whom the patient was listed. The adjusted RR was 1.40 (1.10-1.72)

for patients listed with a GP with the lowest level of job satisfaction and 1.24 (1.01-1.52) and 1.40 (1.14-1.72) for patients listed with a GP in the most unfavourable categories of the burnout dimensions depersonalisation and sense of low personal accomplishment.

Likewise, COGP tended to increase with a higher composite burnout score, although a small decline was seen at the highest level of burnout. Yet, the emotional exhaustion dimension of burnout was not associated with COPG. Likewise, no associations were found for perceived stress, general well-being, or self-assessed work-ability.

DISCUSSION

Main findings

Patients' likelihood of changing GP increased with decreasing job satisfaction in the GP with whom they were listed. Likewise, patients listed with a GP with high levels of depersonalisation, feelings of low personal accomplishment, or a high composite burnout score were more likely to change GP compared to patients listed with a GP with low burnout scores. Notably, these relationships had a dose-response pattern, although a small decrease was seen for the highest composite burnout level. In contrast, COGP was unrelated to emotional exhaustion, perceived stress, general well-being, and self-assessed work-ability in the GP.

Strengths and limitations

Major strengths of this study include the large sample size and the precise linkage of each patient to an individual GP by the combining of register-based data and survey data. The Danish national registers provide highly valid data.[26] The survey data covered multiple distinct and yet interrelated aspects of GP well-being, which was measured by validated and reliable assessment scales. The categorisation of all variables were performed according to predetermined procedures. The sample size allowed us to rank GP well-being indicators using multiple categories, which enabled exploration of non-linear and dose-response like associations. Still, the categorisation might not distinguish the level of poor well-being that may affect the

patient-experienced quality of care. The restriction of the study period to 6 months reduced the risk of fluctuations in the mental state of the GP during the study period.

We assessed GP well-being prior to COGP and the GPs were unaware of the collection of data on COGP. Still, we cannot rule out that caring for a patient population with a high propensity to change GP could affect GP well-being.

We used COGP as a proxy for dissatisfaction with the GP. The literature support COGP as a valid indicator of patient-assessed quality.[9–11] Still, other explanation than dissatisfaction with GP care may account for some patients' COGP. Moreover, patients change GP after careful consideration; some may even stay with their GP even if they are dissatisfied and have a poor relationship with their GP.[9,13,14] COGP is a rare event (1.17% of patients in the study) and may capture only major dissatisfaction while leaving minor dissatisfaction undetected. These matters impair the use of COGP as a proxy for patient satisfaction and could result in an underestimation of the influence of GP-related factors on patient satisfaction. In addition, not all patients consult their GP on a regular basis, which could leave some of the study cases 'unexposed' to their GP, which may also increase the risk of an underestimation.

Factors beyond the control of the GP may affect patients' COGP and could thus confound the results if inadequately controlled for. First, patient factors are important determinants of COGP, and bias related to patient characteristics may occur. For instance, complex healthcare needs in patients may relate to GP distress[27] as well as to patients' propensity to change GP. As seen from Table 1, patients inclined to COGP seem to include patients who were more likely to consult with complex healthcare needs (e.g. patients outside the labour force) and patients who were less inclined to consult with complex needs (e.g. younger people). Overall, the role of case-mix of patients is complex and may confound the results in both directions. Next, the likelihood of COGP in response to poor care may decrease with the availability of alternative practices locally. A high number of practices closed for patient intake may reflect workforce shortage, which may be associated with increased levels of GP workload and occupational distress.[28] Therefore, we adjusted for a lack of alternative practices. If inadequately adjusted for, this would most likely result in an underestimation of the observed relationship between GP distress and COGP in patients. Additionally,

unmeasured characteristics of the GPs and their clinics (e.g. personality, clinical skills, and work conditions) could confound the results. Overall, we adjusted for several potential confounders and we believe that unmeasured confounding is unlikely to fully account for the observed associations.

The study population was restricted to patients listed with GPs in single-handed practices who responded to the survey, which could impair generalisability of findings. Yet, we have no reason to assume that the associations examined depended on the GPs' approach to participation or on the type of practice. The prevalence of burnout and low job satisfaction was the same for GPs in single-handed practices and GPs in partnership practices.[1]

Comparison with the literature

To our knowledge, only one previous study has explored the possible impact of physician well-being/satisfaction on patients' evaluation of healthcare by using change of GP among patients as an indicator of dissatisfaction with care.[29] Lower levels of job satisfaction were associated with a higher propensity to change GP in patients with pain, whereas no such relationship was seen in patients with depression. For both patient groups, however, patients of physicians with greater job satisfaction reported greater levels of trust and confidence in their physician.[29] In line with our findings, the existing body of research suggests that higher levels of job satisfaction in physicians induce higher levels of patient satisfaction[30] and better patient-physician relationships.[7]

For burnout, the results of a recent review and meta-analysis examining the potential implications of physician burnout on patient-assessed quality were in accordance with our findings; depersonalisation and low sense of personal accomplishment were both significantly associated with reduced patient-reported satisfaction, whereas emotionally exhaustion was not.[6] Several reviews support that physician burnout may reduce the patient-assessed quality of care, but they also point to the need for further research.[2–4,6]

There is consistent evidence that the patient's perception of the GP-patient relationship is an important determinant of patient satisfaction[31–33] and that interpersonal aspects of care strongly influence the decision-making regarding COGP. Not feeling recognised by the GP, poor communication, and lack of

confidence and trust in the GP have been identified as important drivers in patients' decision to change GP.[9,13–15].

Empirical research examining the potential impact of GP burnout and job satisfaction on interpersonal aspects of care is sparse, but theoretically, it is plausible that interpersonal aspects of care mediate the observed associations between occupational distress and COGP. Burnout has been described as an erosion of engagement initiated by loss of internal resources as a response to chronic job-related stress.[20] A suggested consequence of burnout is a hesitation to invest resources in the job as an attempt to protect against further resource depletion.[16] Hence, burned out GPs may be inclined to invest less in the relationship with their patients. Depersonalisation refers to the development of an emotional detachment to people related to work and involves lack of compassion and a cynical attitude towards patients.

Albeit reverse causality cannot be excluded, one study found that GPs with higher levels of job satisfaction asked more psychosocial questions and showed more affective communication.[34] Other studies found that GPs with lower sense of personal accomplishment used less affective communication and were less patient-centred[35] and that patients listed with more depersonalised and emotionally exhausted GPs were less satisfied with the consultations with their GP.[36] However, other studies found no indications that burnout or job dissatisfaction impaired the quality of interpersonal care.[37–39] Some of these differences may be attributable to different burnout definitions.

It may seem contradictory that emotional exhaustion was not associated with COGP, while clear associations were found for the remaining two burnout components and for job satisfaction. Different explanations may account for this. Firstly, the influence of burnout on job performance may depend on the stage of burnout.[3,40] In the initial stage, emotional exhaustion may be the only symptom and by overstretching themselves GPs may compensate for the potential negative effects of adverse work conditions on patient care.[41,42] Moreover, high conscientiousness could be a risk factor for burnout. Thus, emotionally exhausted GPs may exhibit high levels of thoroughness and attentiveness to patients' needs in clinical encounters, and hence their patients may experience excellent care.[3,38,42] In later stages of burnout, carelessness and disengagement may become more dominant. This possible mix of excellent care provision

and compromised care provision in emotionally exhausted GPs may counterbalance each other in the analysis. The finding that the frequency of COGP tended to increase with the composite burnout score could supports this, as higher composite scores are likely to reflect later stages of burnout. Secondly, as for the traditional cut-off levels of burnout, our categorisation of emotional exhaustion might not be suitable for identifying the level of exhaustion that causes functional impairment. A too low cut-off value could attenuate measured relationships.[3] Lastly, personal and professional values and attitudes that predispose to depersonalisation, low sense of personal accomplishment, and dissatisfaction could influence clinical practice.[43] Hence, the observed associations might reflect underlying attributes of the GP.

While COGP was associated with work-specific aspects of well-being, no associations were found for well-being measures related to life in general. This suggests that job-related factors are most essential in the relationship between provider well-being and patient-assessed quality of care. Yet, the actual work conditions (and not only the GPs' affective response to them) may play a causal role in this relationship. For instance, GPs with higher workloads may have longer waiting times and shorter consultations, which could cause some patients to change GP.[9,10]

COGP among patients was not associated with the self-reported work-ability among GPs. Previously, we found lower self-reported work-ability as well as poor well-being in GPs to be associated with a higher rate of potentially preventable hospitalisations in listed patients, which could indicate suboptimal primary healthcare provision.[22] In the assessment of work-ability, GPs may attach much importance to more bio-medical aspects of care, such as the ability to diagnose and provide treatment according to the best medical standards. Most patients may not be qualified to judge such aspects and tend to focus more on the interpersonal aspects of care in their overall evaluation of quality.[44]

Implications

The study findings imply that GPs' occupational well-being and job satisfaction influence patient satisfaction measured as COGP. Hence, improving job satisfaction and engagement and combating burnout may improve patient-assessed quality of care.

The possible implications are highly important: GP distress is prevalent, and COGP among patients may reflect serious aspects of care quality. This lend support for the conception that attention should be paid to the work conditions and the well-being of healthcare providers in the pursuit of optimal healthcare. However, more research is needed to establish the connection between GP well-being and healthcare provision.

Conclusion

We found that patients' likelihood of changing GP increased with decreasing GP job satisfaction and increasing GP burnout. We found no association between COGP among patients and emotional exhaustion in the GP, whereas depersonalisation and reduced sense of personal accomplishment both increased the likelihood of COGP. Overall, the findings suggest that the degree to which the GP thrives in the job influences the patient assessed quality of care provided.

DECLARATIONS

Authors' contributions

All authors contributed substantially to the design of the study. KBN performed the statistical analyses in consultation with AHC. KBN wrote the first draft of the article. AFP, FB, PV, and AHC assisted in writing and revising the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Ethics approval

The project was approved by the Danish Data Protection Agency (J.no. 2016–41-4648). According to Danish law, approval by the Danish National Committee on Health Research Ethics was not required as no biomedical intervention was performed. Respondents gave their content to participate by responding to the questionnaire. Personally identifiable information on GPs and patients were re-coded and anonymised at Statistics Denmark prior to data analysis.

Availability of data and materials

Danish data protection regulations prohibit disclosure of data to any third party without prior permission from the Danish Data Protection Agency. Thus, the data from this study cannot be made publicly available.

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cohort studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2-3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	5-6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	5, 7
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	-
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5-8
Bias	9	Describe any efforts to address potential sources of bias	5-8
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6-7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	7
		(*d*) If applicable, explain how loss to follow-up was addressed	-
		(*e*) Describe any sensitivity analyses	-
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	5-8
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-9
		(b) Indicate number of participants with missing data for each variable of interest	7-8
		(c) Summarise follow-up time (eg, average and total amount)	8
Outcome data	15*	Report numbers of outcome events or summary measures over time	8
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10-11 (table 3)
		(*b*) Report category boundaries when continuous variables were categorized	10 (table 2)
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	considered
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	-
Discussion			
Key results	18	Summarise key results with reference to study objectives	12
Limitations			
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-16
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	17

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.