
Health Service Research

Work climate in pandemic times: which burdens do German physicians in primary care report?

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Abstract

Background: In Germany, general practitioners (GPs) provide basic and primary care in the ambulatory sector and refer patients to other specialists when necessary. Often, GPs present the first point of contact for patients in the German healthcare system. During the COVID-19 pandemic, GPs and other medical specialists in the ambulatory setting suddenly were confronted with unprecedented challenges.

Objective: To answer the following research questions: How did COVID-19-related challenges affect the work climate? Do physicians with deteriorated work climate simultaneously report a worsened provision of patient care? Which challenges were the most burdening?

Methods: In the course of the project COVID-GAMS more than 18 000 physicians of various specialties had been invited to a quantitative cross-sectional online survey (in Summer 2020). Analyses were conducted separately for the groups of GPs and other medical specialists. Group differences were analysed statistically and burdening factors were identified.

Results: 1703 participants were included in the analysis. 22.2% of GPs (other medical specialists: 19.9%) stated, their work climate had deteriorated. Physicians with a deteriorated work climate showed a tendency towards poorer personal provision of patient care ($M = 3.75$, $SD = 0.98$ versus $M = 3.93$, $SD = 0.99$) compared to unchanged or improved work climate. The lack of protective material in March/April 2020, changes in practice management and possible economic impacts on the practice were the most burdening factors reported by GPs.

Conclusion: GPs who reported a negative impact on the work climate in the course of the first pandemic lockdown also tend to see own deficits in the provision of patient care.

Key words: COVID-19, cross-sectional studies, general practitioners, pandemics, patient care team, primary healthcare

Background

In Germany, primary care almost entirely takes place in the ambulatory sector. During the increasing expansion of SARS-CoV-2, governmental measures had been introduced that led to a massive restriction of public life, first in March and April 2020. General

practitioners (GPs) and other medical specialists had been confronted with the sudden standstill twofold: on the one hand it led to a strong decline in patient numbers, (1–3) on the other hand the outpatient sector was responsible for the main quantitative burden in the care of COVID-19 patients (4). Studies showed that during

Key Messages

- 22.2% of GPs report that their work climate has deteriorated.
- GPs with deteriorated work climate report poorer patient care.
- GPs state inadequate protective equipment as the highest burdening factor.

the COVID-19 pandemic and the past SARS outbreak healthcare workers in hospitals providing treatment and care for infected patients are under an increased risk of psychosocial burdens such as depression, anxiety, distress and burnout (5–7). As physicians working in primary care are the first point of contact for patients of various diseases including a suspected COVID-19 infection in Germany, these professionals were confronted with comparable challenges. Everyday work in practice was dominated by worries about the virus and insecurities due to lacking protective equipment such as medical face masks (8). An increasing number of studies show the various consequences of the pandemic for patient care in all medical specialities: emergency treatments as well as routine care and medical check-ups are affected (9–12). Research on the impact of the crisis regarding physicians in the ambulatory sector is still rather rare (8,13,14). The study COVID-GAMS ('The COVID-19 Crisis and its impact on the German ambulatory sector—the physicians' view') investigates the pandemic effects on physicians' work in the ambulatory setting.

Besides other aspects, the study COVID-GAMS focused on the influence of SARS-CoV-2 on work climate. For the purpose of this study, we defined work climate as the interaction of different healthcare professionals such as GPs and practice assistants, constituting one healthcare team and striving for the same goal: The provision of high-quality patient care. Prior research has shown that good work climate in healthcare teams can serve as a protective factor against stressors at work and increases resilience, (15) and positively influences job satisfaction and intention to stay, (16) whereas a low satisfaction with work climate is associated with increased risk of mental health disorders (17) and burnout (18). However, findings differ concerning the influence of work climate on the quality of patient care. While Hann et al. cannot determine work climate as a predictor for quality of patient care, (19) a more recent study from Shaheen et al. significantly associates occupational stress, work climate and employee development with quality of care (20).

Results of the first of three COVID-GAMS survey waves, which investigated physicians' experiences during the first lockdown period in March and April shall be reported here with a focus on changes of the work climate. Since several medical specialist groups had been integrated into the survey, we focus on the GPs' perspective and contrast them with all others.

We addressed the following questions: How did the various challenges during this time affect the work climate? Do physicians with deteriorated work climate simultaneously report a deteriorated provision of patient care? Which challenges were the most burdening?

Methods

Study design and recruitment

COVID-GAMS comprises a trend analysis with three written online survey waves carried out within 18 months. The first survey, which is reported here, took place from July to September 2020. In collaboration with the National Association of Statutory Health Insurance Physicians a random sample of 18 000 physicians was invited to participate in the study: GPs ($n = 6500$) and six other medical specialist

groups (pediatrics $n = 2000$, cardiologists $n = 1000$, gastroenterologists $n = 500$, gynaecologists $n = 2000$, ENT-specialists $n = 2000$ and dentists $n = 4000$). For the first survey wave a quantitative cross-sectional online survey with qualitative components had been conducted. Physicians were invited via fax and e-mail, followed by three reminders. Due to an expected low response rate, the acquisition target for participants was $n = 1800$ (10%). Since the response remained below this target, additionally, the respective professional associations had been encouraged to distribute the survey invitation among their members until the target was reached.

Ethical approval was obtained from the Ethics Committee of the University of Cologne (approval no. 20-1169_1).

Measurement and statistical analyses

The data was collected as part of a comprehensive written online survey, which collected the interpersonal, economic and organizational challenges and their impact on patient care during the outbreak of COVID-19. To answer the research question, items on possible stress factors, on the work climate and on the physicians' subjective assessment of their patient care were developed and pre-tested. The survey items were translated from German into English for this paper.

As these burdening factors are specific, pandemic-related challenges, it was not possible to use validated scales. In order to explore possible challenges from the physicians' practical view, preliminary interviews were conducted with physicians from the medical fields concerned. On the basis of these qualitative results as well as publications of the physician-related institutions, possible challenges were collected and transformed into closed items for the questionnaire. Since we pursued an exploratory approach, the goal was to include a broad range of different issues. The wording of the questions concerning the burdening factors is stated in Table 5. The participants were asked to indicate to what extent these factors had a burdening effect on the practice team on a response format from *not at all burdensome* (1) to *very burdensome* (4). If a factor queried did not exist in the practice, participants could opt for *not applicable*.

The work climate and the provision of care were surveyed by self-developed items as well. This was necessary in order to enquire about the explicit influence of COVID-19 on the work climate. The use of validated scales on work climate would have required data of the work climate before the pandemic in order to assess the impact of pandemic-related challenges on the work climate in a follow-up survey at pandemic time. Due to the in-house development, the impact of the pandemic could be explicitly included in the framing of the question, so that more suitable information can be obtained for our research question. The item for recording the impact of the pandemic on the work climate was phrased as follows: "What is the overall impact of the challenges posed by the crisis so far on the work climate in your practice team?". Participants were asked to give their assessment using one of the following response options: 'The challenges have (a) worsened/(b) not changed/(c) improved the work climate in the practice'. The subjective impact on patient care was measured using the question 'Do you feel that you personally were able to provide adequate care to your patients during the

period of March and April?’ and a 5-point response format (1 = not at all, 2 = rather no, 3 = indecisive, 4 = rather yes, 5 = yes, absolutely).

Analyses were conducted separately for the groups of GPs and other medical specialists using descriptive measures. Mean values in this paper are calculated by transforming Likert responding formats into metric variables (21). Missing values were excluded for statistical analyses. In addition, Mann–Whitney U tests were performed to detect possible group differences between GPs and other medical specialists concerning the specific burdens and the provision of adequate care. Mann–Whitney U test was chosen as non-parametric alternative to *t*-test due to lacking normal distribution of the variable *adequate provision of care*. To investigate the relationship between the variables *adequate provision of care* and *work climate*, a one-way ANOVA was performed. In case of significance, a further post hoc pairwise *t*-test was conducted.

Results

With both recruitment ways, 1904 physicians participated in the survey. The response rate of the random sample was 7.6%. The number of study participants could be increased by the professional associations’ distribution of the study invitation (response rate cannot be reported due to the open recruitment format). After removing participants who did not state their medical specialty ($n = 201$), 1703 participants could be included in the analysis, among them 535 GPs. The majority of GPs were between 51 and 60 years old (40.6%; other medical specialties 45.0%), 48.1% of GPs were female, compared to 51.9% in other medical specialties,

and most of GPs were self-employed (89.8%; other medical specialties 88.6%). The area of medical practice was evenly distributed for GPs with 21.1% of GPs working in rural communities (other medical specialties 5.1%), 24.7% in small towns (other medical specialties 24.5%), 25.5% in cities (other medical specialties 30.3%) and 28.7% in big cities (other medical specialties 40.0%). Table 1 shows characteristics of all participants.

We asked for challenges around the pandemic up to this point in Summer 2020 and what impact on the work climate these challenges have had so far. Most of the participants reported no change in the work climate (GPs: 62.6%, others: 64.9%), some indicated an improvement (GPs: 15.1%, others: 15.2%) and 22.2% of GPs (others: 19.9%) stated the work climate had deteriorated.

The majority of physicians, 71.9% of GPs and 80.5% of other medical specialists, reported adequate care (*yes, absolutely and rather yes*). The mean values were lower for the group of general practitioners ($M = 3.91$, $SD = 1.0$) compared to the other medical specialists ($M = 4.15$, $SD = 0.9$). The Mann–Whitney U test confirmed this group difference ($P < 0.001$). Physicians with a deteriorated work climate report that they supplied poorer patient care (GPs: $n = 116$, $M = 3.75$, $SD = 0.98$ versus others: $n = 223$, $M = 3.93$, $SD = 0.99$) compared to physicians who stated an improved or unchanged work climate. However, when performing ANOVA analysis (Tables 2 and 3), there was no significant effect of the variable *work climate* on *provision of adequate care* at the $P < 0.05$ level in the group of GPs [$F(2, 452) = 2.02$, $P = 0.134$] but in the group of all other medical specialists [$F(2, 945) = 6.7$, $P = 0.001$]. A pairwise post hoc *t*-test (Table 4) in the population of other medical specialists

Table 1. Characteristics of 1703 study participants (March/April 2020)

Variable	N	General practitioners, $n = 535$	Other medical specialists, $n = 1168$
Age (in years), % (n)	1692		
Younger than 30		0.0 (0)	0.6 (7)
31 to 40		11.0 (59)	7.2 (83)
41 to 50		25.8 (138)	25.9 (300)
51 to 60		40.6 (217)	45.0 (521)
Older than 60		22.5 (120)	21.3 (247)
Missing		(1)	(10)
Gender, % (n)	1690		
Male		51.7 (276)	47.9 (554)
Female		48.1 (257)	51.9 (600)
Divers		0.2 (1)	0.2 (2)
Missing		(1)	(12)
Work experience (in years), Mean (SD)	1678	16.6 (10.04)	18.0 (9.74)
Missing, (n)		(6)	(19)
Mode of employment, % (n)	1695		
Self-employed		89.8 (478)	88.6 (1030)
Employed		10.2 (54)	11.4 (133)
Missing		(3)	(5)
Type of medical practice, % (n)	1693		
Single practice		49.7 (265)	55.4 (643)
Joint practice		50.3 (268)	44.6 (517)
Missing		(2)	(8)
Number of physicians in medical practice, Mean (SD)	1658	2.4 (1.63)	2.4 (1.82)
Missing, (n)		(10)	(35)
Area of medical practice, % (n)	1687		
Rural community (< 5000 inhabitants)		21.1 (112)	5.1 (59)
Small town (> 5000–20 000 inhabitants)		24.7 (131)	24.5 (284)
City (> 20 000–100 000 inhabitants)		25.5 (135)	30.3 (351)
Big city (> 100 000 inhabitants)		28.7 (152)	40.0 (463)
Missing		(5)	(11)

stated significance between the characteristics of the variable *work climate unchanged* and *worsened* ($P = 0.001$) as well as *improved* and *worsened* ($P = 0.046$).

Table 5 provides a deeper look at specific challenges for the practice team, e.g. inadequate protective equipment or fears experienced by the practice staff. Aspects and values are grouped by changes in the work climate. Seven potential burdens associated to the pandemic had been queried with a 4-point Likert responding format. GPs and other medical specialists with deteriorated work climate showed the highest mean values in the queried burdens (GPs: 6 out of 7 burdening factors, other medical specialists: 7 out of 7 burdening factors) in contrast to physicians with improved or unchanged work climate. The lack of protective material in March and April 2020 was seen as most burdensome for all groups. Together with changes in practice management due to the pandemic and possible economic impacts on the practice, these aspects build the top 3 of burdening effects reported by GPs. On the GPs' side the two groups with deteriorated and improved work climate respectively show the largest difference in values at changes in practice management ($MD = 0.62$) and the communication of the guidelines and changes to the employees ($MD = 0.65$). The most burdening factors for the group of other medical specialists were inadequate protective equipment, a change in patient volume and a possible economic impact on the practice.

Discussion

This study aimed at examining the association between COVID-19 related deterioration of work climate on the self-reported quality of patient care and at highlighting the most burdening challenges. More than 20% of general physicians in our sample feel that the challenges emerging from the COVID-19 pandemic had a deteriorating effect on the work climate. Furthermore, a deteriorated work climate tends to affect the provision of care as perceived by the GPs. However, this effect does not reach statistical significance.

Patient numbers had substantially dropped during the first lockdown across all groups of medical specialists in primary care in Germany, (2) which could lead to the assumption of a lower workload. The result that 22.2% percent of GPs reported a deteriorated work climate suggests an impact of specific burdens associated with the crisis and independent from patient numbers and the associated work load.

On the other side, 15.1% of GPs reported an improved work climate during the first months of work in the pandemic. This result is in line with other studies and reports, which highlight increasing solidarity and team cohesion in times of crisis (22,23).

Table 2. One-way ANOVA with dependent variable provision of adequate care and independent variable work climate for the 535 participants classified as general practitioners (2020)

Variable	General practitioners, $n = 535$				
	Sum of square	df	Mean square	F-value	Sig.
Working climate					
Between	3.7	2	1.183	2.022	0.134
Groups					
Within Groups	408.8	452	0.906		
Total	412.5	454			
Missing		80			

In our sample, GPs with an improved work climate show a tendency towards higher ability to provide patient care compared to lower provision of adequate care when work climate had deteriorated. However, these differences do not reach statistical significance. Analyses of other medical specialists in our sample show significant differences between improved and deteriorated work climate, which may be induced by higher numbers of participants.

The results show the largest difference regarding the severity of burden between the two groups with deteriorated and improved work climate for changes in practice management and for the communication of guidelines and changes to the employees. This can be seen as an indication that change and communication matters are more likely to lead to a sustainable deterioration of the work climate. This interpretation can be supported by previous research highlighting organizational change as negatively impacting psychological distress (24). From this point of view, aspects of internal communication seem to have a higher potential regarding the impact on work climate than external factors such as patients' fears or lack of protective materials.

Economic fears including worries about (lower) patient numbers also play an important role. This can be explained by large part with the situation of ambulatory physicians in Germany, who are mostly self-employed entrepreneurs (89.6% of GPs in the survey).

The practice staff's fears about the risk of contracting the virus was—compared to the other factors—assessed as less burdensome in our sample. However, these fears still exist and are relevant which is supported by Denning et al. who report work safety aspects to be inversely associated with the risk of burnout in medical staff during the COVID-19 pandemic (7).

Table 3. One-way ANOVA and pairwise post hoc t-test with dependent variable provision of adequate care and independent variable work climate for the 1168 participants classified as other medical specialists (2020)

Variable	Other medical specialists, $n = 1168$				
	Sum of square	df	Mean square	F-value	Sig.
Work climate					
Between	11.7	2	5.857	6.703	0.001
groups					
Within groups	825.8	945	0.874		
Total	837.5	947			
Missing		220			

P-values below 0.05 are provided in boldface.

Table 4. Pairwise post hoc t-test of characteristics of independent variable work climate for 1168 participants grouped as other medical specialists (2020)

Variable	Other medical specialists, $n = 1168$	
	Working climate	
Working climate		
Unchanged	<i>P</i> -value ^a	0.00086
Improved	<i>P</i> -value ^a	0.04603
		Unchanged
		–
		1.00000

P-values below 0.05 are provided in boldface.

^a *P*-value adjusted with Bonferroni.

Table 5. Burdens on the practice teams of general practitioners and other medical specialists due to COVID-19-related changes, separately by groups of physicians who indicated a deteriorated, unchanged or improved work climate respectively (March/April 2020)

To what extent have the following factors had a burdening effect on the practice team?

	n	General practitioners, <i>n</i> = 535	Other medical specialists, <i>n</i> = 1168	<i>P</i> -value (GPs versus others)
Inadequate protective equipment	1604			
Work climate deteriorated, Mean (SD)		3.53 (0.7)	3.58 (0.7)	0.456
Work climate unchanged, Mean (SD)		3.54 (0.8)	3.43 (0.8)	0.023
Work climate improved, Mean (SD)		3.62 (0.7)	3.45 (0.9)	0.239
Not applicable/missing	99			
Changes made in practice management	1626			
Work climate deteriorated, Mean (SD)		3.43 (0.7)	3.36 (0.7)	0.382
Work climate unchanged, Mean (SD)		2.99 (0.8)	2.93 (0.8)	0.299
Work climate improved, Mean (SD)		2.81 (0.8)	2.96 (0.8)	0.198
Not applicable/missing	77			
Possible economic impact on the practice	1619			
Work climate deteriorated, Mean (SD)		3.31 (0.7)	3.51 (0.7)	0.013
Work climate unchanged, Mean (SD)		3.01 (0.9)	3.26 (0.8)	<0.001
Work climate improved, Mean (SD)		2.87 (0.9)	3.14 (0.8)	0.031
Not applicable/missing	84			
Patients' fears about the risk of contracting the virus	1634			
Work climate deteriorated, Mean (SD)		3.25 (0.7)	3.08 (0.7)	0.037
Work climate unchanged, Mean (SD)		2.96 (0.8)	2.74 (0.8)	<0.001
Work climate improved, Mean (SD)		2.86 (0.8)	2.79 (0.8)	0.602
Not applicable/missing	69			
Change in patient volume	1619			
Work climate deteriorated, Mean (SD)		3.17 (0.9)	3.41 (0.7)	0.013
Work climate unchanged, Mean (SD)		2.87 (0.9)	3.04 (0.9)	0.003
Work climate improved, Mean (SD)		2.65 (0.8)	2.96 (0.9)	0.008
Not applicable/missing	84			
Practice staff's fears about the risk of contracting the virus	1635			
Work climate deteriorated, Mean (SD)		2.97 (0.7)	3.16 (0.8)	0.019
Work climate unchanged, Mean (SD)		2.63 (0.8)	2.69 (0.8)	0.326
Work climate improved, Mean (SD)		2.55 (0.8)	2.77 (0.9)	0.087
Not applicable/missing	68			
Communication of the guidelines and changes to the employees	1625			
Work climate deteriorated, Mean (SD)		2.89 (0.8)	2.95 (0.8)	0.589
Work climate unchanged, Mean (SD)		2.34 (0.9)	2.29 (0.8)	0.544
Work climate improved, Mean (SD)		2.24 (1.0)	2.25 (0.9)	0.721
Not applicable/missing	78			

P-values below 0.05 are provided in boldface.

Response format: 'not at all burdensome' (1), 'rather not burdensome' (2), 'rather burdensome' (3), 'very burdensome' (4), not applicable (not scored/missing).

Limitations

Due to the retrospective assessment, effects of memory distortion cannot be ruled out completely, especially in regard to the dynamic development of the pandemic and the associated changes in German healthcare policy.

Prior research shows that especially in GPs achievable response rates are rather low. Muehlensiepen et al. report a response rate of 18.9% in German ambulatory physicians (25). Also, in a study conducted by Meyer and Wehling only 9.4% of German GPs addressed responded (26). The survey took place anonymously and online, without financial incentive. A financial incentive was not possible in this case due to the public funding and would have entailed special data protection requirements due to the anonymity of the survey. The time required to complete the survey was assumed to be 30 minutes and was openly communicated to the physicians. This, as well as the increased workload due to the COVID-19 pandemic, may have

negatively influenced the response rate. Based on the experiences in the survey of physicians in the private practice sector, a response rate of only 10% was assumed in advance.

These limiting factors clearly restrain the representativity of our results and selection bias may have occurred. However, the sample of German physicians in the ambulatory sector is still the largest regarding COVID-19 studies with a focus on personal challenges and attitudes during the pandemic. In contrast with statistical data from the German Federal Registry of Physicians, our subsample of GPs is slightly younger than the average (27) and consists of a higher percentage of self-employed physicians (28). Nevertheless, it is comparable regarding gender distribution (29) and represents a balanced distribution concerning rural and urban areas.

Although a broad range of potential burdens for physicians have been addressed in the survey, it must be kept in mind that this list was not exhaustive and there might be other factors influencing the

work climate. As the self-reported statements towards adequate provision of care was queried with one item only, results must be interpreted with caution.

Conclusion

Physicians in the German ambulatory sector who reported a negative impact on the work climate in the course of the first pandemic lockdown also tend to see own deficits in the provision of patient care. Moreover, almost all analysed aspects of pandemic related changes are reported the most burdensome within the group with deteriorated work climate. Possible burdening factors can be external and internal.

In particular, internal factors such as communication of the guidelines and changes to the employees or changes made in practice management seem to negatively influence the work climate in the practice. Therefore, when considering changes in the practice, one needs to be aware of potential negative side effects on work climate. To counteract these effects and to prevent jeopardizing quality patient care, time spent on thorough communication within the practice team is worthwhile even in times of high workload (24).

Declarations

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Ethical approval: The project COVID-GAMS was approved by the Ethics Committee of the University of Cologne (20-1169_1).

Data availability: The data underlying this article will be shared on reasonable request to the corresponding author.

Conflict of interest: none.

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