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ABSTRACT

Objectives Mental health and well-being of healthcare staff were majorly impacted by the COVID-19 pandemic. Little attention has been devoted to the role employers could choose to play in mitigating long-term negative consequences and how effective organisational measures taken were perceived by the individual healthcare workers. This study aims to investigate (1) whether and how healthcare professionals' mental health has changed from the second to the third pandemic year, (2) whether differences between professional groups (physicians, nurses, paramedics) identified in previous studies persisted and (3) how job demands and resources, for example, work culture and employers' measures, impacted this situation.

Design The study employs an observational, cross-sectional design, using an online survey.

Setting and participants The study was conducted online from mid-June to mid-August 2022 among healthcare staff in state-run and private healthcare facilities, such as doctor's practices, hospitals and paramedic organisations, in Germany and Austria (n=421).

Outcome measures We measured psychological strain using an ICD-10-based symptom checklist, as well as subjective strain and importance of stressors using self-report questions. The ICD-10 was the 10th version of the International Statistical Classification of Diseases and Related Health Problems, a widely used standardized diagnostic manual.

Results Psychological strain stayed relatively consistent, with nursing staff suffering the most. While the job demands participants felt most affected by were structural issues (eg, staff shortages), employers were far more likely to be perceived as taking action against pandemic-specific job demands (eg, lack of protective gear). Psychological strain was lowest when staff perceived employers' actions as effective. Only 60% of those with severe enough symptoms to require psychological help had intentions of seeking such help, which is in line with past studies. This help-seeking hesitancy was also dependent on different facets of perceived work culture.

Conclusions Healthcare staff and nursing staff in particular continue to suffer in the aftermath of the COVID-19 pandemic. However, while employers were perceived as taking action against pandemic-specific job

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The study contrasts and compares different professional groups within the healthcare sector.
- ⇒ The study compares data from multiple waves throughout the COVID-19 pandemic.
- ⇒ The study is limited regarding any assumptions of causality by its cross-sectional design.
- ⇒ The study is further limited by self-selection biases typical for online studies.

demands, pre-existing job demands causing stress and psychological strain for staff have remained uncombated.

INTRODUCTION

In 2022, the COVID-19 pandemic hit its third year. As our team and others have shown, the mental health and well-being of healthcare staff were majorly impacted by the COVID-19 pandemic in its first year.¹⁻³ Symptoms of distress, anxiety, depression, insomnia and post-traumatic stress disorder were significantly elevated compared with prepandemic times for these professionals.³⁻⁵

However, so far, few studies have investigated the long-term consequences of the pandemic on the mental health of healthcare professionals. Furthermore, little is known about the differences in mental health across professional groups within the health sector.² The findings that do exist on the long-term mental health consequences for healthcare professionals of the pandemic have been inconsistent: while some have found increasing levels of mental health symptoms,⁶ others report declines in symptoms.^{7,8}

These discrepancies might partly be explained by the variability of healthcare systems across countries. Healthcare systems can differ significantly in terms of their organisation, financing and quantity and quality

Table 1 Distribution of participants' professions by gender

Profession	Sample		Gender				Country	
	n	Proportion (%)	f	m	d	Unknown	DE	AT
Inpatient nursing care	158	37.5	127	24	1	6	46	112
Inpatient elder care	32	7.6	25	7	0	0	28	4
Home care	53	12.6	40	10	1	2	14	39
Inpatient physician	54	12.8	30	24	0	0	28	26
Independent physician	44	10.5	16	26	2	0	20	24
Paramedic	4	1.0	2	2	0	0	2	2
Other	76	18.1	64	11	0	1	37	39
Total	421	100	304	104	4	9	175	246

n=9 participants did not indicate their gender.
AT, Austria; DE, Germany.

of delivered healthcare services, among other aspects. These differences can lead to variations in work-related stressors and resources for healthcare providers, which can in turn affect the quality of care and health outcomes. For example, a healthcare provider in a resource-limited setting may face challenges such as inadequate staffing, or limited medical supplies, which can contribute to higher rates of medical errors and adverse outcomes.⁹ Therefore, it is crucial to take into account the varying health system contexts in which these outcomes are produced. In the present study, data are collected from Germany and Austria, two culturally similar countries with similarly structured and financed healthcare systems¹⁰; both healthcare systems are known to consistently provide high-quality healthcare services which are extensively covered by public insurance, and both systems have been affected by staff shortages for several years due to the countries' demographic developments.

In our previous study, looking at mental health symptoms in healthcare professionals in Germany and Austria in 2021 and comparing these rates to our findings from 2020, we saw that symptoms, especially for depression and anxiety, persisted in the second pandemic year.² The findings regarding higher symptom prevalence rates among nursing staff compared with physicians and paramedics, as well as the association between mental health outcomes and team climate, underscore the importance of understanding the impact of working conditions on employee well-being. These findings can be examined through the lens of organisational psychology theories, which provide insights into the measures employers can take to create a positive work climate and improve work outcomes for employees. By applying these theories, employers can identify effective strategies to support their employees' mental health and well-being, ultimately improving overall organisational performance. While the healthcare system in a given country provides the framework within which healthcare services and by extension all healthcare workers operate, these systems are also complex and slow to change. Thus, the workers' immediate superiors and

employers, although not free from the constraints of said framework, are primarily responsible for adapting to changes and taking measures to improve their employees' situation as new challenges arise.

One such theory is the Job Demands-Resources (JD-R) model,^{11 12} which posits that job demands (eg, workload, time pressure) and job resources (eg, team climate, social support, autonomy) interact to influence employee well-being (including burnout and work engagement) and work outcomes. Job demands refer to the psychosocial aspects of work that require cognitive and emotional efforts and are typically associated with social or psychological costs. In contrast, job resources are physical, psychosocial and organisational aspects of work that enable employees to achieve work objectives, experience professional growth and engage in personal development. Furthermore, job resources serve to reduce job demands and the associated psychological or physiological costs. The theory also suggests that employees may engage in proactive or reactive work behaviours to influence job demands and resources. Using the JD-R, Kaiser *et al*¹³ showed that job demands were positively correlated with burnout in Norwegian healthcare workers while job resources were positively associated with engagement and negatively with burnout. During COVID-19, Barello *et al*¹⁴ found that exposure to job demands in healthcare professionals led to feelings of emotional exhaustion, while workplace resources, such as engagement in decision-making regarding their own workload and personal resources, served as protective factors. The authors recommend that intervention programmes targeting a reduction of feelings of exhaustion should focus on constant supervisors' support, reduction of caseload and optimisation of shift-work systems to meet the rest needs of professionals.

Various factors have been identified as influential job demands and resources. For instance, team climate, that is, how employees perceive the collaboration within their work group, forms a less frequently studied job resource.¹³ It has shown negative associations with turnover intention

Table 2 Sample sizes by profession and year and analysis of variance results for time and profession

	2020	2021	2022
	n	n	n
Nursing staff	160	250	243
Physicians	19	71	98
Paramedics	5	212	4
Main effects time	Depression: $F(2, 835)=0.49, p=0.615$; anxiety: $F(2, 835)=0.35, p=0.705$; total scale: $F(2, 835)=0.12, p=0.887$		
Main effects profession	Depression: $F(1, 835)=40.47, p<0.001, \eta^2_{\text{G}}=0.046$; anxiety: $F(1, 835)=10.20, p=0.001, \eta^2_{\text{G}}=0.012$; total scale: $F(1, 835)=34.16, p<0.001, \eta^2_{\text{G}}=0.039$		
Time \times profession	Depression: $F(2, 835)=0.90, p=0.408$; anxiety: $F(2, 835)=0.81, p=0.444$; total scale: $F(2, 835)=2.07, p=0.127$		
Note: paramedics are excluded from analysis by profession due to the low number of paramedics in the 2020 and 2022 samples.			

and exhaustion in nursing staff¹⁵ and positive relations to job satisfaction in the medical field.¹⁶

Job demands specific to the pandemic

It has been recognised that preserving mental health and well-being of healthcare professionals poses a challenge that is influenced by job resources and demands on various levels including structural, institutional, individual and team characteristics.¹⁷ During the COVID-19 pandemic, healthcare professionals were confronted with new and additional job demands and stressors relevant to healthcare workers' work performance and mental health, including the experience of depression and anxiety, inadequate support, occupational stress, decreased productivity, lack of workplace preparedness, financial concerns with income/daily living, fear of transmission and burnout/fatigue.¹⁸ Additionally and in relation to lack of workplace preparedness, a scoping review of qualitative studies during the pandemic found that healthcare professionals reported lack of personal protective equipment or perceived the use of it as a burden.¹⁹ On the institutional level, healthcare professionals reported a lack of clear communication and coordination from management,¹⁹ along with a general need for appreciation and professional validation within the work environment.¹⁷ Furthermore, the COVID-19 pandemic impacted the workplace culture in multiple ways; for instance, due to restrictions of personal contact that were necessary to stop the spread of the virus, informal meetings were reduced or cancelled altogether.²⁰ On the other hand, studies identified job resources for healthcare professionals during the pandemic. For instance, on the organisational level, perceived organisational support was negatively related to reported depression symptoms, anxiety and burnout. Organisational support

even mitigated the adverse effects of pandemic-related job stressors on depression.²¹

Measures to combat increased job demands

Consequently, measures to better the situation for employees and their mental health during the pandemic have tended to address these various levels of burden. For instance, many different professional sectors introduced employment benefits such as flexible hours/schedules, flexible work location and additional paid time off for parents or people with care duties during the pandemic which were perceived as very helpful for working mothers' mental health.²² While not all of these measures are applicable to the healthcare sector (eg, healthcare jobs are typically not feasible for working from home), there was room for both isolated (eg, purchasing sufficient protective gear as needed) and structural measures (eg, increasing staff numbers to reduce individual workload and overtime) to target job demands specific to the healthcare sector.

Help-seeking hesitancy among healthcare staff

While the general availability of resources to employees is important, in some cases attention must also be paid to the employees' willingness to use them. Widespread hesitancy among healthcare staff to make use of psychological support services is one such particular case. Past studies have demonstrated this hesitancy^{23 24} and linked it to multiple external (eg, lack of time, energy) and psychological (eg, self-image of strength, helping rather than being helped) as well as social and work-related factors (eg, work culture, team climate, stigma surrounding mental health services).^{23 25 26} The healthcare sector along with other helping professions (eg, police) is particularly prone to help-seeking hesitancy due to this configuration of factors^{27 28}; hence, we include it in this study as an addition to the variables operationalised within the JD-R model (online supplemental figure 1).

Objectives, research questions and hypotheses

All research questions, hypotheses and analyses were preregistered on the data sharing repository "OSF" (Open Science Framework). Any deviations from the preregistration are described in the text.

In sum, until the present study, we were aware of German and Austrian healthcare staff's mental health suffering during the first two pandemic years, as well as of differences between different professional groups, with nurses bearing the brunt of the suffering. Moreover, previous studies informed us regarding the different stressors and job demands contributing to this situation and which among those healthcare staff deemed most important. Hence, the current study aims to contribute to this knowledge by investigating, first, how mental health symptoms in healthcare professionals changed from the second to the third pandemic year; second, whether differences between professional groups and a general help-seeking hesitancy persisted and third, how job demands

and resources, such as work culture and measures taken by employers to combat specific demands, might have impacted the situation. In order to answer these three separate research questions, the following hypotheses were formulated.

Separate sets of hypotheses were preregistered for longitudinal and cross-sectional data, as participants were recruited through multiple channels and the survey was open to both new participants and those who had previously participated. However, the resulting longitudinal sample was too small to conduct any of the planned analyses; the longitudinal hypotheses are therefore omitted here.

For the cross-sectional data sets from 2020, 2021 and 2022, we formulated the following research questions and hypotheses:

Question 1

How does healthcare staff's mental health compare in the 2021 and 2022 sample? How does it compare within countries and professional groups? In line with findings from previous years, we expected:

H1: Nursing staff will have significantly worse mental health than other professional groups.

Question 2 (exploratory)

Which job demands, that is, workplace-related stressors, are most strongly related to psychological strain at the same measurement point? Have employers been perceived to take measures against any of these demands and stressors and if so, which ones and how effectively?

Subquestion 2.1: What is the relationship between psychological strain and employers being perceived as taking measures against stressors?

Subquestion 2.2: What is the relationship between psychological strain and employers' measures being perceived as effective? Does it matter more that the employer at least tried, or is it necessary that they succeeded?

Question 3 (exploratory)

Is help-seeking behaviour related to the intensity of psychological strain? Is this relationship different from 2021?

Question 4

Is there a relation between psychological strain and perceived work culture?

H2: A more open and supportive work culture is related to lower psychological strain.

Question 5

Is help-seeking behaviour related to perceived work culture?

H3: A more open and supportive work culture is related to a higher likelihood of seeking help.

METHOD

To investigate these questions, we conducted a preregistered cross-sectional online survey among healthcare staff.

Setting and participants

Data collection was conducted online from mid-June 2022 to mid-August 2022, in a single, cross-sectional measurement wave. Instead of aiming for a predetermined sample size, the goal was to collect the maximum number of participants possible within this 2-month time frame. Anyone who worked in a medical profession within the healthcare sector (in particular, doctors, nurses and paramedics) in Germany or Austria and was over 18 was eligible to participate in the study. These groups were targeted during the recruitment process accordingly. To this end, the survey was systematically distributed via private and public healthcare providers and unions in Germany and Austria. Participants gave their informed consent for participation in the study and for electronic storage of their responses. Recruitment and data collection took place in parallel, since the study consisted of an online survey. No intervention was conducted. No personally identifiable information was collected along with their responses, including IP addresses or GPS data. Participants were not financially or otherwise incentivised to participate in the study.

Variables and measures

The survey began with a section on demographics (age, gender, occupation within the medical sector, country of residence, number of children, income, health status, etc). To assess psychological strain and mental health, participants were then presented with the self-report questionnaire ICD-10 Symptom Rating (ISR).²⁹ This instrument assesses symptoms of psychological disorders in German based on the ICD-10³⁰ and includes 29 items forming subscales for depression, anxiety, eating disorders, obsessive-compulsive disorder and somatoform disorder symptoms as well as an *extra*-subscale with various additional symptoms. Items are rated on a 5-point Likert scale (from 0—*does not apply* to 4—*extremely*) and are averaged to compute subscale scores (3–4 items for each disorder and 12 items for the extra subscale) as well as a total score. The internal consistency of the ISR total scores has been demonstrated to be good (coefficient $\alpha=0.92$), as has the internal consistency of the subscales (coefficient $\alpha=0.78 - 0.86$).³¹ The individual scales have been shown to be highly retest reliable, with α s ranging from 0.70 to 0.94 in different clinical and non-clinical samples.³² The ISR differentiates well between clinical groups ($n=12\,265$, $M=1.22$, $SD=0.65$) and non-clinical control groups ($n=25\,12$, $M=0.40$, $SD=0.45$), with 71%–75% specificity and 84%–88% sensitivity.³³

Help-seeking behaviour was operationalised with a single-matrix item from the previous two study waves.^{2,3} The item assessed whether or not participants had sought help for the psychological strain they had experienced

and why or, if they had not, whether they would like to do so in the future, which kind of help they might like (eg, psychotherapy or something more informal), as well as their reasoning for their help-seeking willingness or hesitancy (eg, because they felt they were not suffering enough to warrant this, because they felt others had it worse, because they preferred dealing with things by themselves).

Perceived work culture was assessed with a set of 17 items from,² encompassing how participants perceived the communication among colleagues (eg, 'My colleagues talk to me about their worries and issues') and social comparisons among colleagues concerning strength and resilience in the face of difficulties (eg, 'My colleagues can deal with issues better than I do').

Job demands, that is, workplace-related stressors and employers' actions taken against them were assessed with a list of 17 self-constructed items modified and expanded from the previous study wave.² The items were presented as a matrix: for each demand (eg, staff shortages, lack of safety equipment to guard against infection), participants were asked to rate how strongly they felt affected by the job demand, whether they believed it was within their employer's power to do anything to mitigate the job demand and, if so, whether they believed the employer had taken any action to do so, and the extent to which they felt the employer's actions had improved the issue.

Patient and public involvement

No patient involved.

Analyses

All analyses were conducted using R V.4.2.3³⁴ and various helper packages including *afex*³⁵ for calculating analysis of variances (ANOVAs). Missing values were handled using listwise deletion. The analyses were conducted as preregistered, specifically per research question.

Question 1

t-Tests and ANOVAs were calculated to compare group means between the years,^{36 37} as well as between countries and professional groups. Additionally, post hoc contrasts were specified to compare the psychological strain among nursing staff to that of other professional groups.

Question 2

For each job demand, participants were grouped into three categories: (1) those who believed their employer could not have taken any action to mitigate the demand, (2) those who believed the employer could have, but failed to take effective action (ie, action was taken but caused no or even adverse effects in the participants' view) and (3) those who believed effective action was taken. An ANOVA with Dunnett's post hoc contrasts was computed to compare the extent of psychological strain in the three groups. Additionally, a linear regression was computed using perceived improvement (ie, the extent of improvement within the group of participants who

thought their employer had taken effective measures) to predict psychological strain.

Question 3

A logistic regression of psychological strain, that is, ISR symptom severity, was calculated on help-seeking behaviour. An interaction with time was included to compare how the relationship between these two variables changed over time.

Question 4

A linear regression was calculated with perceived work culture predicting psychological strain, that is, ISR symptom severity.

Question 5

A logistic regression was calculated predicting the ORs of help-seeking given the need (ie, given the presence of sufficiently severe psychological symptoms) with perceived work culture, to test whether a more open and supportive work culture would lead to a higher likelihood of seeking help when in need.

Due to the non-normal, right-skewed distribution of the psychological strain variables and their low variance homogeneity, a log transformation was conducted on these variables prior to all analyses; reports of descriptive statistics refer to non-transformed measures, however.

RESULTS

Out of 630 respondents who started the questionnaire, n=421 provided complete answers (completion rate 66%). All questionnaire items that referred to data relevant for the research questions were labelled as mandatory questions; accordingly, there are no missing data to be reported. Table 1 displays the sample characteristics. Concerning health status, 175 (42%) of the participants reported that they were at heightened risk in case of a COVID-19 infection because they had a relevant pre-condition. 350 (83%) indicated that they had had contact with patients infected by COVID-19. In terms of socio-economic status, the sample was fairly homogenous: the majority (51%) earned a gross salary between €2000 and €3500, with only 14% earning more than €4500€.

Preliminary analyses

First, the reliabilities of all scales used were tested. All ISR subscales had good reliability ($\alpha_{depression}$ depression=0.86, $\alpha_{anxiety}$ anxiety=0.89, α_{eating} eating=0.80, α_{OCD} OCD=0.87, $\alpha_{somatoform}$ somatoform=0.81). The internal consistency of the work culture scale and its subscales was also good (α_{WC} WC=0.81, α_{WC1} WC1=0.80, α_{WC2} WC2=0.80).

RQ 1: how does healthcare staff's mental health compare across the years? How does it compare within countries and professional groups?

Mental health stayed relatively consistent across the years, with nursing staff continuously reporting the strongest psychological strain. There were no significant main

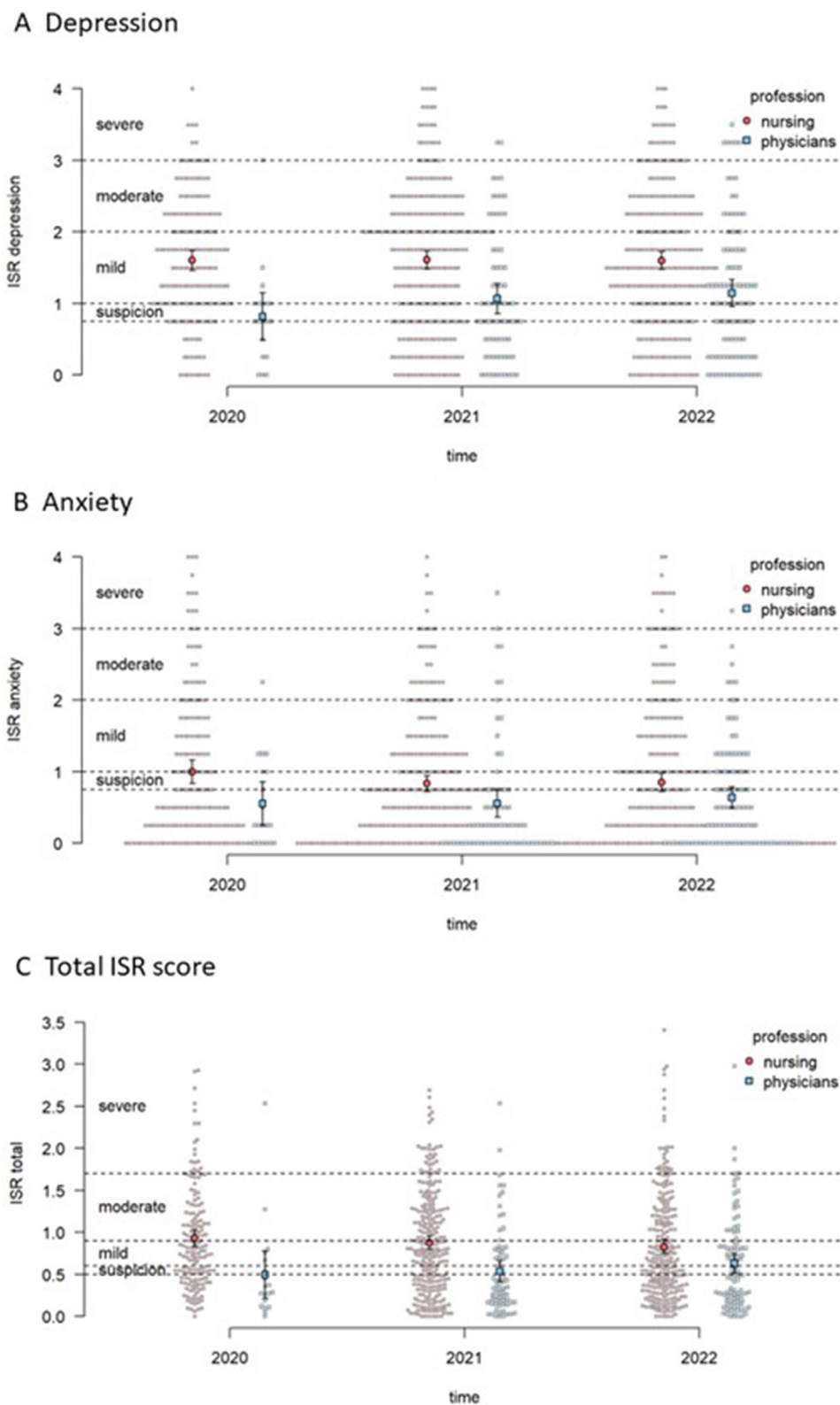


Figure 1 Analysis of variance (ANOVA) results of ICD-10 Symptom Rating (ISR) results by professional group over time.

effects for time, nor any significant interactions between time and profession, for either depression, anxiety or the ISR total score (see [table 2](#)). However, there were significant main effects for profession in all three models, meaning that nursing staff are significantly more depressed, more anxious and have overall poorer mental

health than physicians (see [table 2](#), [figure 1](#)). This discrepancy between professions persisted across all 3 years. In addition, we controlled for country (data available for 2021 and 2022 only), but the effects remained the same.

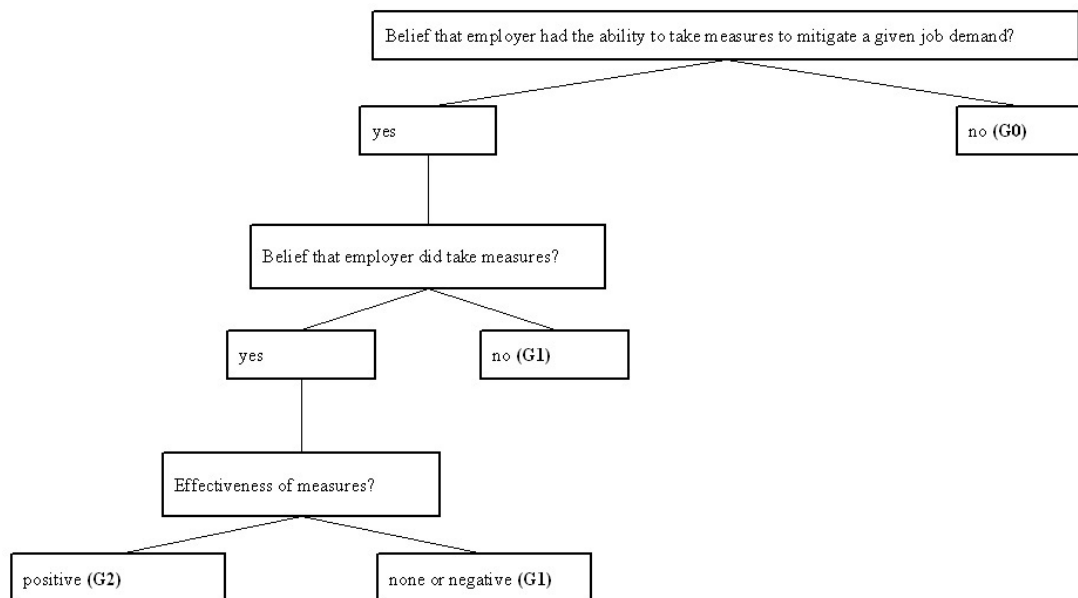


Figure 2 Flow chart illustrating the subgroups G0–G2 analysed to answer research question 2.

RQ 2: which job demands are most strongly related to psychological strain at the same measurement point? Have employers been perceived to take measures to mitigate these demands and if so, which ones and how effectively?

The job demands participants subjectively felt most affected by were structural issues independent of the pandemic situation, with staff shortages and insufficient appreciation of their work ranking highest. Another structural issue which ranked somewhat lower ($M=2.41$), but still on the high end of the scale, was long working hours. This issue is to some extent a permanent feature of medical jobs, but it is also exacerbated by staff shortages resulting in having to take on more shifts and having to take on more tasks during those shifts. By contrast, the final structural issue included in the survey was at the very end of the list, being of no concern at all ($M=0.97$): job insecurity. Currently, the healthcare sector is experiencing staff shortages on a large scale, resulting in job security and in fact a surplus of available jobs.

Staff shortages and insufficient appreciation were followed by a plethora of pandemic-specific job demands. Among these pandemic-specific factors, participants felt the most stressed by the uncertainty about the duration of the pandemic and related changes, insufficient time for recovery after one's own illness and changes in work procedures related to protective measures and restrictions on patient contact (see online supplemental table 1). Moreover, the fear of family members and loved ones getting infected was a salient concern. Limited contact to colleagues due to the safety measures and bad top-down communication of said measures and changes were workplace-specific factors causing stress to healthcare staff. To a lesser extent, participants felt stressed by a need for childcare in their household arising from them working more hours, as well as by fears about the correct usage and availability of protective gear, anxiety

about self-infection and bearing witness to an increasing number of serious illnesses and deaths. The importance of these factors has naturally decreased in comparison to previous survey waves; as by 2022, protective gear was readily available, it was clear how to use said gear and case numbers were low at the time of the survey as was typical for the summer months throughout the pandemic.

Conversely, the structural issues were the ones against which the lowest percentage of employers was taking measures in our participants' perception, with only 50%–60% being perceived as working to improve staff shortages, long working hours, lack of time to properly recover from illness and lack of appreciation (online supplemental table 2). By contrast, the vast majority of employers were seen to be taking action about material needs such as insufficient protective gear (online supplemental table 2).

Is it more relevant for psychological strain that the employer made an effort to take action, or that the action taken was actually effective?

When it comes to employers' measures, it is not the thought that counts—only measures that were perceived as effectively mitigating the job demands in question also reduced psychological strain.

Psychological strain caused by a given job demand was consistently highest when an employer was perceived to have taken action that either seemed ineffective or even entailing negative effects (G1), compared with both situations in which the employer was perceived as unable to take action (G0) and situations in which the employer was perceived to have taken effective action (G2, see figure 2 and online supplemental tables 3,4).

The comparison between ineffective or adverse and effective action taken was statistically significant for all job demands except two (need for childcare and protective

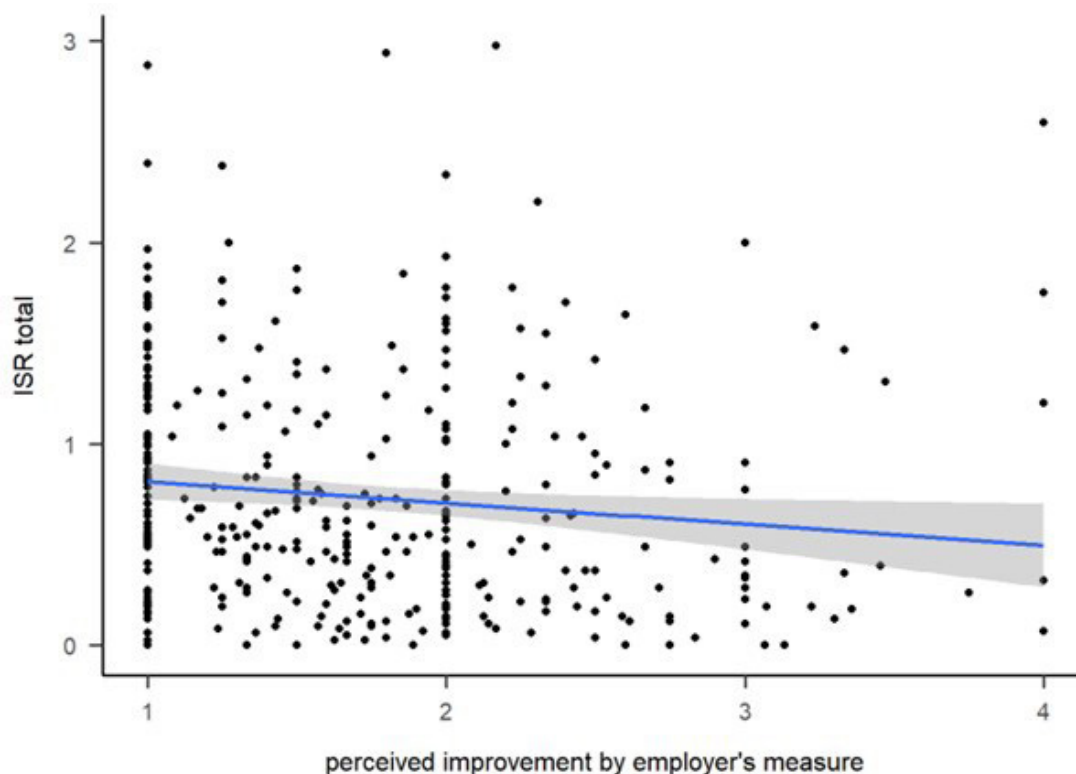


Figure 3 Subjective improvement of situation due to measures of employer predicts psychological strain. ISR, ICD-10 Symptom Rating.

measures hindering patient contact), with psychological strain consistently being lower when the action taken was perceived as effective (online supplemental table 4). That said, the relation between subjectively perceived measure efficacy and experienced psychological strain is statistically significant, but rather weak (see [figure 3](#); $b=-0.03$, 95% CI -0.05 to -0.02 , $t(1864.45)=-4.67$, $p<0.001$, $R^2_{\text{corr}}=1.5\%$).

RQ 3: is help-seeking behaviour related to the intensity of psychological strain? Is this relationship different from 2021?

People with more severe symptoms were more likely to seek out psychological help ($b=1.21$, 95% CI 0.78 to 1.66, $OR=3.35$, $z=5.41$, $p<0.001$), though the association of strain with help-seeking did not change from 2021 to 2022 ($b=-0.64$, 95% CI -1.20 to -0.09 , $z=-2.27$, $p=0.023$). The likelihood of help-seeking was also higher in 2022 as compared with 2021 ($b=1.29$, 95% CI 0.71 to 1.88, $OR=3.62$, $z=4.32$, $p<0.001$); yet overall, 42.5% of those with severe enough psychological strain to require psychological support (ie, with a general ISR score >0.5) had no intention of seeking help (online supplemental table 5).

RQ 4: is there a relation between psychological strain and perceived work culture?

Yes. The more positive the perception of work culture, the lower the mental strain ([figure 4](#)); this is true for both subscales of the work culture measure, the 'not being ashamed of struggling with the high workload' subscale ($b=-0.03$, 95% CI -0.04 to -0.03 , $t(368)=-10.78$, $p<0.001$)

and the 'open communication among colleagues' subscale ($b=-0.01$, 95% CI -0.01 to 0.00 , $t(368)=-2.85$, $p=0.005$). The model explains $R^2=0.28$, 90% CI 0.22 to 0.35.

RQ 5: is help-seeking behaviour related to perceived work culture?

Yes. While a work culture of open communication among colleagues increases the likelihood of seeking help ($b=0.07$, 95% CI 0.03 to 0.12, $OR=0.93$, $z=3.29$, $p=0.001$), not being ashamed of struggling with a high workload is a barrier to help-seeking ($b=-0.08$, 95% CI -0.12 to -0.03 , $OR=1.08$, $z=-3.18$, $p=0.001$). The model explains $Pseudo-R^2=0.07$.

DISCUSSION

We set out to investigate how healthcare staff's mental health compared in different years of the COVID-19 pandemic and different subgroups, which job demands affected mental health the most and how effectively employers worked to reduce these demands, and how the job resource perceived work-culture affected mental health and help-seeking behaviour. To this end, we collected data from $n=421$ healthcare professionals in Germany and Austria in an online survey running from June to August 2022 and compared them to data we collected in 2021 ($n=639$)^{2 36} and in 2020 ($n=300$).^{3 37}

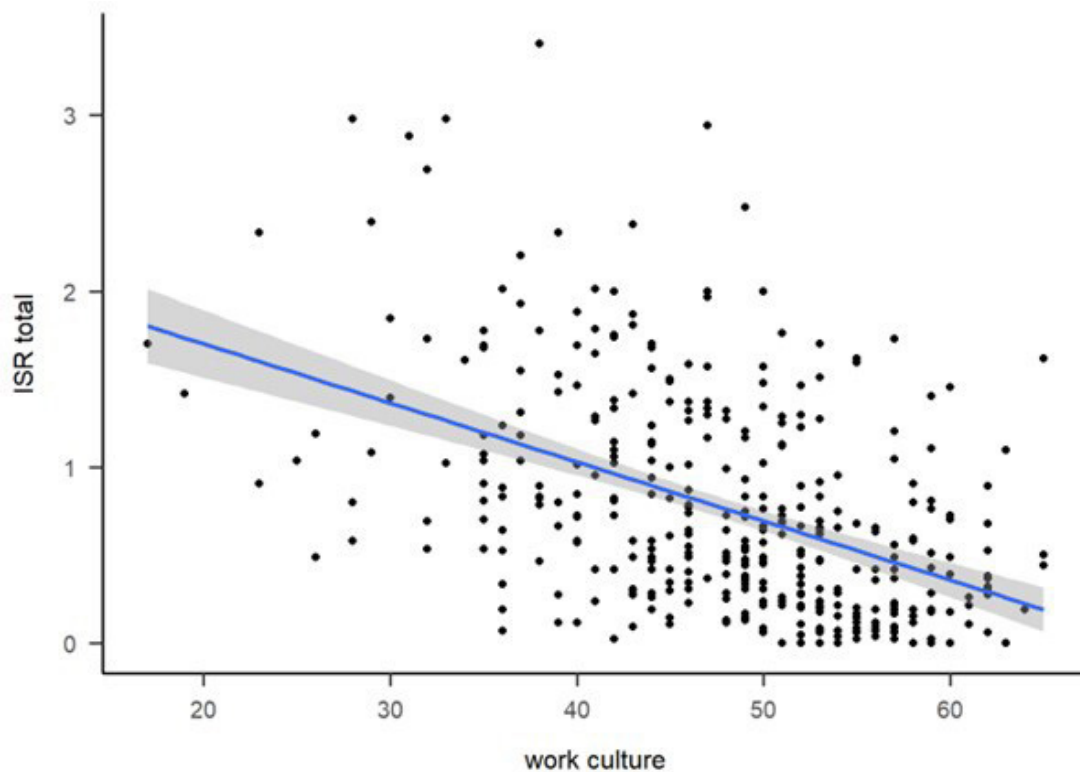


Figure 4 Relationship between psychological strain (ISR total score) and perceived work culture.

We found that across the years, psychological strain stayed relatively consistent, not resulting in strong evidence for either habituation or exhaustion over time. This is particularly concerning for nursing staff, the subgroup with the by far highest levels of psychological strain in our studies. Similar findings were recently reported from the Netherlands, where the prevalence of mental health symptoms remained high among intensive care unit nurses during the second surge of the pandemic.³⁸ This speaks to the ongoing structural problems that exist within the healthcare sector and which continue to affect nursing staff in particular. In the same vein, a meta-analysis of studies predating the pandemic³⁹ showed that mental health concerns, emotional exhaustion, increased work demands and poor work support are among the main causes of workplace disabilities, absenteeism and sickness among nursing staff, which is indicative of how long these problems have been known and remained largely unchanged.

Nursing staff in our study suffered from the strongest psychological strain at each time point, meaning that they were significantly more anxious, more depressed and experienced overall worse mental health (ie, highest ISR total scores) than physicians. Others have also found that nursing staff experience greater distress compared with other professional groups in the healthcare sector.⁴⁰ Potential explanations for this may lie in the fact that physicians might often receive higher levels of appreciation and be more valued, and their suffering is more acknowledged than that of nurses.⁴¹ Furthermore, occupational hierarchies shape the experience of work.¹⁹

Nurses usually find themselves in less-empowered positions, and workplace empowerment is associated with reduced feelings of occupational stress among nurses.⁴² Additionally, the percentage of women in the nursing profession is higher than that of men. Being woman has been associated with higher risk for depressive symptoms,⁴³ and during the pandemic women, in addition to the job demands, often assumed increased caregiving responsibilities in the home when schools and childcare supports were limited.⁴⁴ Finally, there are a number of COVID-19-specific factors known to have affected nurses in particular. COVID-19-related discrimination might play a role, such as being avoided by colleagues, which was experienced to a greater extent by front-line workers.⁴⁵ In fact, a number of studies have found that healthcare professionals were faced with the fact that others avoided them based on the perceptions that they were virus carriers and spreaders.^{19 45} Nurses were also taking on tasks that were covered by physicians prior to the pandemic, such as connecting patients to ventilators without prior training⁴⁶ and were consequently exposed to a health-threatening physical and psychological workload.⁴⁷ Moreover, the fear of being infected at work (and in turn infecting loved ones) was an intense stressor for nurses, linked to higher levels of depression and anxiety in this group.^{47–49}

While the job demands participants felt that they were subjectively most affected by structural issues independent of the pandemic situation (such as staff shortages and insufficient appreciation of their work), employers were far more likely to be perceived as taking action

against pandemic-specific job demands (such as lack of protective gear) than against these structural issues. Similarly, Daghero *et al*⁵⁰ found that in healthcare workers burnout symptoms were mainly predicted by satisfaction with organisational resources during COVID-19. While these results mirror prepandemic results, the relations were stronger during the pandemic.⁵⁰

Moreover, we found that it is not the thought that counts: while the relationship between subjective measure efficacy and psychological strain was weak ($b=-0.03$), it was clear across the different job demands that psychological strain was the lowest when employers were perceived to be taking effective action. Psychological strain related to each of the job demands was also lower when the participants thought the employer could not have done anything about the job demands than when they thought the employer could have done something but had done so poorly.

While there was overall a positive relationship between symptom severity and likelihood of seeking out psychological help and the general likelihood of seeking out help had risen between 2021 and 2022, only around 60% of those with severe enough symptoms to require psychological help had intentions of seeking help in 2022. Seeking help for psychological problems has to be seen in the context of the pandemic, in which there was a general tendency for delays, decreases or deficits in help-seeking behaviour for mental health problems during the pandemic, as well as a limited availability for mental health support services.^{51 52} However, even when psychological support is in place, due to the higher workload employees often did not have time to access it.⁴¹

In our present study, both the intensity of psychological strain and the propensity for seeking psychological help were partly explained by the perceived work culture: perceiving a work culture where one does not need to be ashamed of struggling with the high workload and where one is able to openly communicate with colleagues were both related to lower psychological strain, explaining 28% of the variance present. This finding is in line with Corcoran *et al*⁴¹ who found in their qualitative study on the healthcare providers' experiences during the pandemic that employees wished to express how they were being impacted and wanted their experiences to be acknowledged. While the perception of a work culture encouraging open communication also fostered help-seeking, not feeling ashamed for struggling with the workload presented a barrier to help-seeking, although both effects were very small, and the model overall only explained 7% of the variance in help-seeking decisions.

Limitations

The interpretability and generalisability of our data are limited: first, by the mode of data collection; second by the study design and third by the specificity of countries in which data were collected. First, our data collection took place online and solely relied on self-report measures; moreover, the survey was only available in

German. These features of the study, while common, entail certain biases—self-report measures are dependent on the participant's level of introspection and willingness to be honest, and online surveys foster certain self-selection effects. These effects may have been further exacerbated by the survey's availability in German only; a certain level of German language skills is necessary to work in the healthcare sector and the survey was not overly complex, meaning that understanding of the survey should have been fully possible, but some people may find it strenuous to take a survey in a second or third language and therefore choose not to participate. Such a selection effect would have disproportionately affected the nursing staff subgroup. Second, the study design was only quasi-longitudinal. Due to practical restrictions and anonymisation needs, we could not directly contact the same participants repeatedly; instead, we provided the option to enter a pseudonymised study code and repeatedly advertised the survey via the same information channels at every data collection. Rather than the partly longitudinal data set we had hoped for, this resulted in comparable but disjunct cross-sectional data sets. Finally, we only collected data in two WEIRD countries (that is, Western, Educated, Industrialized, Rich, Democratic),⁵³ namely Germany and Austria. This naturally prohibits generalisation of our findings to non-WEIRD countries, but such generalisation was also not the aim of the study; job demands, resources and external factors influencing mental health are bound to vary widely depending on structural differences in the systems within which healthcare staff operate. As these systems and more general health-related contexts (such as age distributions, wealth, vaccination rates, availabilities of medications, to name a few) vary drastically between countries, we did not aim to produce findings that would generalise universally, but rather to choose countries with comparable healthcare systems and cultural and socioeconomic contexts and to produce findings that would describe healthcare staff's situation within them.

Sample justification

We asked for health status in relation to heightened risk associated with a COVID-19 infection rather than disability status or specific clinical diagnoses as this was the more relevant sample descriptor given the study topic, and we did not deem it ethical to ask for more private details than strictly necessary. We used a categorised estimate of monthly income as a proxy for socioeconomic status. While the concept itself is more complex and extends beyond income alone, the variance of other typical factors like educational background and social prestige of profession is limited within a sample selected based on profession. Thus, in combination with considerations for questionnaire length, we used income as a proxy. Finally, we did not collect data on racial identity or ethnicity. While we would have been likely to find differences on these variables or immigration background between nursing staff and physicians on a group level, we

had no hypotheses tied to these variables and they were not among the main interests of the study. Given that race discourses are very different in the German-speaking context versus the US-American context and it is very uncommon to be asked to identify one's racial identity or ethnicity in forms or questionnaires in Germany and Austria, we expected that asking such questions without a clear link to the study topic would feel invasive to the participants and cause reactance.

Implications and conclusion

In terms of practical implications, these findings point out very clearly that, first, nurses are the most affected subgroup of healthcare staff and are hence most in need of measures to alleviate their work-related psychological strain. Second, the job demands most in need of mitigating are the structural factors that preceded the pandemic and persist as more pandemic-specific job demands have come and gone: staff shortages and the related lack of free time to recover both physically and mentally, long working hours and lack of appreciation. The willingness to seek out psychological support when psychological strain becomes sufficiently severe has somewhat increased over time, and measures can be taken to further foster help-seeking behaviour, for example, by improving work culture and creating a safe space for expressing one's struggles with the workload without shame. However, help-seeking on an individual level is a band-aid that can mitigate, but not compensate for persisting structural problems which continue to cause psychological distress. Thus, besides investigating interventions to improve work culture and encourage help-seeking among individuals suffering from psychological symptoms, future research should be careful not to ignore the structural issues underlying mental health in the healthcare sector and should direct its attention towards identifying effective and efficient ways to alleviate these structural problems, for example, by making jobs in the healthcare sector more attractive.

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Data availability statement Data are available in a public, open access repository. All conducted analyses are reported fully in this article. All hypotheses that were preregistered are reported. Where analyses were not preregistered, they are clearly labelled as 'exploratory' in the paper. The complete data set was analysed and is

available in the corresponding OSF folder, <https://osf.io/s7ayk/>, along with study materials and analysis code.

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