
Health Service Research

The psychological impact of COVID-19 among primary care physicians in the province of Verona, Italy: a cross-sectional study during the first pandemic wave

Antonio Lasalvia^{1,2*}, Giulio Rigon³, Carlo Rugiu⁴, Claudia Negri³, Franco Del Zotti³, Francesco Amaddeo^{2,5}, Chiara Bonetto²

¹UOC Psichiatria, Azienda Ospedaliera Universitaria Integrata (AOUI) di Verona, Verona, Italy, ²Section of Psychiatry, Department of Neuroscience, Biomedicine and Movement Sciences, University of Verona, Verona, Italy, ³General Practitioner, Centro Studi FIMMG di Verona, Verona, Italy, ⁴UOC Nefrologia, Ospedale 'Mater Salutis', ULSS9 Scaligera, Legnago, Italy, ⁵UOC Psicosomatica e Psicologia Medica, Azienda Ospedaliera Universitaria Integrata (AOUI) di Verona, Verona, Italy

*Corresponding author: Antonio Lasalvia, Section of Psychiatry, Department of Neuroscience, Biomedicine and Movement Sciences, University of Verona, Policlinico 'G.B. Rossi', P.le Scuro, 10 - 37134, Verona, Italy. E-mail: antonio.lasalvia@univr.it

Abstract

Background: Among healthcare professionals working with COVID-19 patients, general practitioners (GPs) are under considerable pressure and may develop adverse mental health outcomes.

Objectives: To assess mental health outcomes on GPs working during the COVID-19 pandemic and to explore their associations with personal characteristics and features of GP practices.

Methods: Observational cross-sectional study conducted on a sample of GPs working in Verona province (Italy) during the first pandemic wave. Participants were invited to complete a web-based form addressing socio-demographic and work-related information, previous practice organization, practice re-organization during the COVID-19 pandemic, and a set of measures for post-traumatic stress (IES-R), anxiety (SAS), depression (PHQ-9), and burnout (MBI-GS).

Results: A total of 215 GPs (38.3% of the eligible population) participated. Overall, 44.7% reported COVID-19-related traumatic events; among these, 35.9% (95% CI, 26%–46%) developed symptoms of post-traumatic distress. Furthermore, 36% (95% CI, 29%–43%) reported symptoms of anxiety, 17.9% (95% CI, 12%–23%) symptoms of at least moderate depression, and 25.4% (95% CI, 19%–32%) symptoms of burnout. Multivariate regressions showed that being quarantined or admitted for COVID-19 was associated with all the mental health outcomes considered. Being female, working in rural settings, and having less professional experience were associated with higher anxiety and depression. The ability to diagnose COVID-19 increased self-perceived professional efficacy, thus contributing to burnout reduction.

Conclusion: The high prevalence of adverse mental health outcomes among GPs during the pandemic highlights the importance of timely interventions in this population and promoting targeted preventive actions in the event of future healthcare crises.

Keywords: anxiety, burnout, COVID-19, depression, general practitioners, post-traumatic stress symptoms

Key Messages

- General practitioners (GPs) are at risk of psychological distress for being on the frontline of COVID-19.
- A survey on the psychological impact of COVID-19 pandemic on GPs was conducted.
- Nearly one-quarter of GPs reported symptoms of anxiety, depression, and burnout.
- Being quarantined/admitted increased the risk of psychological distress.
- The ability to diagnose COVID-19 increased self-perceived professional efficacy.
- Lack of guidelines on COVID-19 management increased psychological distress.

Introduction

The COVID-19 outbreak was first detected in Wuhan, China, at the end of December 2019 and rapidly spread worldwide within a few months. Italy was the first western country to be affected by the pandemic. The first Italian cases were diagnosed in 2 small towns of Lombardy and Veneto on February 21. On February 24, the Italian government established 2 “red zones” in those towns. On March 8, the government decided to extend these extraordinary measures to all of Lombardy, Veneto, and some neighboring provinces of Emilia-Romagna; eventually, a nationwide lockdown was established on March 11. Italy, as most countries worldwide, was caught somewhat unprepared to tackle an emergency of such a huge impact. The rapid spread of COVID-19 throughout the national territory and the dangerousness of the disease required a great amount of resources not promptly available at the beginning. Within this context, healthcare staff in Lombardy, Veneto, and Emilia-Romagna were under heavy workload conditions and at high risk of infection.

General practitioners (GPs) were on the frontline of the COVID-19 response, playing a crucial role in the containment of the pandemic in the community. GPs have faced dramatic and rapid changes in their practice, receiving little assistance or clear guidance from health authorities.¹ GPs have also risked significant exposure to the SARS-CoV-2 infection, visiting an overwhelming number of patients, often directly in their homes, with minimal control over their work environment.² Due to inadequate protection on the frontline, particularly at the beginning of the emergency, GPs became spreading agents of COVID-19 within the community.^{3,4} Extensive involvement in end-of-life care, traumatic events (such as death and dying) combined with the task of making onerous decisions, feelings of futility, and being forced to practise outside their areas of clinical expertise, may have exposed GPs to an increased risk of adverse psychological outcomes. Unfortunately, the psychological impact of the COVID-19 pandemic on GPs has received relatively less attention compared to hospital staff.^{5,6} A study conducted on a convenience sample of GPs recruited in Genoa, Italy, reported nearly 23% of respondents having moderate to severe depressive symptoms that significantly impacted anxiety, insomnia, and quality of life.⁷ Another study exploring the relationships between burnout and coping strategies among Italian GPs during the COVID-19 pandemic found that activation of dysfunctional strategies was associated with a less functional response to the emergency.⁸ Finally, a recent study on a convenience sample of GPs in Piedmont, Italy, reported that one-third developed depressive and post-traumatic stress symptoms, and three-quarters clinically relevant anxiety.⁹

Beyond symptoms of anxiety and depression, limited information is available on the prevalence of burnout experienced by GPs during the current pandemic and the associations of the various mental health outcomes with both personal and occupational factors. The present study aimed to explore: (1) organizational changes that occurred in general practice; (2) mental health outcomes (in terms of

post-traumatic stress, anxiety, depressive symptoms, and burnout) of GPs; (3) factors—among personal, job-related, organizational, and COVID-19-related—associated with adverse mental health outcomes in GPs in a highly burdened area of north-east Italy during the “first wave” of the COVID-19 pandemic.

Methods

Study design

This study was conducted in the province of Verona (Veneto, north-east Italy) during the first wave of the COVID-19 pandemic (May 11–27, 2020) through the online platform *LimeSurvey*. The invitation to participate together with the link to the online questionnaire was sent by e-mail to each GP working in the province of Verona ($n = 561$) by the Primary Care Unit of the Local Health Authority; this office had the full list (with respective e-mail addresses) of all GPs working in the study area. As the survey was anonymous, a specific reminder could not be sent to each individual GP, but reminders were sent around to potential participants as a group. Specifically, as all GPs in Italy are affiliated to trade unions, a reminder for completing the questionnaire was sent around after 1 week by the local offices of the most representative GPs' trade unions (FIMMG-Italian Federation of General Practitioners; SNAMI-Italian National Syndicate of Independent Doctors; SMI-Syndicate of Italian Doctors). One week later, a further reminder was sent around by e-mail to the GPs group by the research team and 1 further reminder was sent around again by the GPs' trade unions.

Context of care and participants

GPs in Italy work as independent contractors under the National Health Service and provide services across a number of organizational settings: (a) single practice (GPs manage their practice on their own); (b) “advanced group practice” (single practice open 7 h a day where GPs work together); (c) “network group practice” (medical practices are separate, but connected through computer systems); (d) “integrated medical group” (4 or more GPs work together as well as with specialists, nurses and other health professionals).¹⁰

Outcome measures

Post-traumatic stress was measured using the Impact of Event Scale-Revised (IES-R),¹¹ a validated 22-item self-report that assesses subjective distress caused by traumatic events; a cutoff score of 24 was used to detect symptoms deserving of clinical attention.¹²

Anxiety was assessed by the Self-rating Anxiety Scale (SAS),¹³ a brief self-reported questionnaire containing 20 items; a cutoff score of 36 was used for detecting clinically significant anxiety symptoms.¹⁴

Depression was assessed by the Patient Health Questionnaire (PHQ-9),¹⁵ a 9-item self-rated questionnaire; a cutoff score of 10 was used to indicate a condition deserving of clinical attention.¹⁶

Burnout was assessed by the Maslach Burnout Inventory-General Survey (MBI-GS),¹⁷ a modified version of the original MBI¹⁸ designed to assess burnout in any occupational setting, consisting of 16 items with 3 subscales: Exhaustion (EX) refers to the experience of both emotional and physical fatigue; Cynicism (CY) reflects indifference, a detached attitude toward work, and active disengagement from work; Professional Efficacy (EF) consists of feelings of competence, successful achievement, and accomplishment in one's work. The cutoff scores used were, respectively, >2.20 for EX, >2.00 for CY, and <3.66 for EF.^{19,20} High scores on the first 2 subscales and low scores on the third subscale indicate the presence of burnout.¹⁷

An ad hoc schedule, modified from Wong et al.,²¹ was used to explore: (1) GPs' personal information, (2) characteristics of practice organization, (3) information and training received for COVID-19, and (4) changes in practice due to the COVID-19 pandemic.

Statistical analysis

Due to a large number of potential independent variables with respect to the relatively low sample size, we decided to explore their associations with outcomes by using a trade-off strategy. We first chose a set of putative independent variables by organizing them into 4 a-priori blocks representing different and important aspects for both personal and professional life: personal characteristics, practice organization pre-COVID-19, information and training received for COVID-19, and changes in practice due to the COVID-19 pandemic. We subsequently estimated the unadjusted association of each putative independent variable with each outcome by performing univariate linear regression models. Finally, we estimated, within each block, the adjusted associations for all those independent variables belonging to the considered block, which showed statistically significant associations ($P < 0.05$) in the univariate regression models. As a result of this procedure, we found which aspects (among all those assessed in the survey) may be relevant for the considered outcomes within each personal and professional aspect of life.

Analyses were performed by SPSS 26.

Results

Personal and job-related characteristics

Overall, 215 GPs (38.3% of the eligible population) participated in the online survey. Based on the available characteristics for the 561 GPs, the study sample differed from the eligible population in gender (females, 50.5% vs. 37.4%), age (31–40 years, 18.2% vs. 9.9%; 41–60 years, 34.1% vs. 30.5%; >60 years, 47.7% vs. 59.6%), professional experience (<6 years, 18.2% vs. 5.7%; 6–20 years, 25.2% vs. 21.0%; >20 years, 56.5% vs. 73.3%), and post-graduate qualification (yes, 83.3% vs. 64.4%) (chi-square test, $P < 0.05$). On the other hand, no significant differences were found for the number of clinics (>1, 31.6% vs. 32.9%), location of the clinic (city of Verona, 26.0% vs. 25.8%; town, 44.2% vs. 40.8%; village, 29.8% vs. 33.4%), and primary practice setting (advanced group practice, 49.3% vs. 54.4%; network group practice, 24.7% vs. 22.8%; integrated medical group, 19.5% vs. 14.8%; single practice, 6.5% vs. 8.0%) (chi-square test, $P > 0.05$).

The study sample (Table 1, upper part) was balanced in terms of gender composition; most participants were aged 45 or older, living with family, with a post-graduate qualification, and over 20 years of working experience. About 5% had received some kind of help for

Table 1. Personal information and characteristics of practice organization of participating GPs recruited in the province of Verona on May 2020 ($n = 215$).

	n	%
PERSONAL INFORMATION		
Gender (1 missing)		
Male	106	49.5
Age (1 missing)		
<45 years	39	18.2
45–60 years	73	34.1
>60 years	102	47.7
Living situation (1 missing)		
With family members	194	90.7
Alone	20	9.3
Post-graduate qualification		
No	36	16.7
Yes	179	83.3
Professional experience (1 missing)		
<6 years	39	18.2
6–20 years	54	25.2
>20 years	121	56.5
Treatment for preexisting psychological problems		
No	205	95.3
Yes	10	4.7
Personal situation related to COVID-19		
None	184	85.6
Quarantine/self-isolation/tested positive with COVID-19	28	13.0
Admitted to hospital due to COVID-19	3	1.4
CHARACTERISTICS OF PRACTICE ORGANIZATION		
Number of clinics		
1	147	68.4
>1	68	31.6
Location of the clinic		
Village with less than 10,000 inhabitants	64	29.8
Town with more than 10,000 inhabitants	95	44.2
City of Verona	56	26.0
Distance of clinic from GP's home (1 missing)		
>5 km	113	52.8
≤5 km	101	47.2
Organization of the clinic		
GP + administrative staff + nurse	112	52.1
GP + administrative staff	52	24.2
Single-handed GP	51	23.7
Patients in charge of (1 missing)		
>1,400	156	72.9
≤1,400	58	27.1
Primary practice setting		
Advanced group practice ^a	106	49.3
Network group practice ^b	53	24.7
Integrated medical group ^c	42	19.5
Single practice	14	6.5

^aSingle practice open 7 h a day where GPs work together, often with shared secretarial or nursing staff support and common computer system;

^bSingle practices connected through computer systems; patients may apply to another GP where they need care without delay;

^cFour or more GPs work together as well as with specialists, nurses, and other health professionals.

preexisting psychological problems. Regarding personal experiences with COVID-19, 13% had been quarantined/self-isolated/tested positive with COVID-19, 1.4% admitted to a hospital and 85.6% had no contact with SARS-CoV-2.

Regarding GP practices (Table 1, lower part), most participants had 1 clinic (mainly located in villages or towns) where they treated over 1,400 patients and visited more than 150 patients per week, with at least 5 being domiciliary visits. About half worked in an advanced group, 24.7% within network groups, 19.5% in integrated groups, and only 6.5% working in a single practice; most GP practices included administrative staff and/or nurses.

Training in COVID-19 management

Nearly all GPs obtained information on COVID-19 from institutional or professional sources, and 46% additionally from newspapers or TV (Table 2).

Nearly half reported having received training for telephone triage, whereas only 14% received formal training in COVID-19 management; however, 66.5% were confident in managing infected patients. The vast majority reported that additional training would have been helpful.

Changes that occurred in GP practice due to COVID-19

Nearly all participating GPs agreed that the COVID-19 pandemic had changed clinical practices by maintaining physical distance when visiting patients, asking patients to wear masks, registering

more cancellations of specialist appointments, and encountering difficulty making specialist referrals (Table 3).

About half postponed or canceled appointments, a quarter spent less time than usual with patients, 20% avoided physical examinations, and 17% over-prescribed antibiotics. Most GPs reduced the number of clinic visits; interestingly, 39% experienced an increase in the number of visits for psychological problems.

Nearly all of the respondents (95%) found that telephone consultations had a negative impact on their personal life, as they remained on-call beyond regular work hours (80%) or had been receiving phone calls around the clock (64%). Overall, half of the respondents did not find specific problems with the use of new technologies, even if they expressed concerns that their use was abnormally increased during the pandemic; for nearly 13% the use of new technology was definitely problematic, as they found it difficult to deal with all patients' requests, whereas 19% were slowly getting used to them and 16% had already been using new technologies before the pandemic.

Prevalence of post-traumatic distress, anxiety, depression, and burnout among GPs

Overall, 44.7% ($n = 92$) reported having experienced traumatic events related to COVID-19, and among them, 35.9% displayed

Table 2. Information and training on COVID-19 reported by participating GPs recruited in the province of Verona on May 2020 ($n = 215$).

	n	%
Where did you get your information regarding COVID-19? (1 missing)		
Government institutions/professional associations	113	52.8
Newspapers/magazines/TV news or programs	2	0.9
Both	99	46.3
How frequently would you have wished updates on COVID-19?		
Daily	61	28.4
Twice a week	72	33.5
Weekly	72	33.5
Less than weekly	10	4.7
Have you ever received any formal training on telephone triage? (9 missing)		
Yes	100	48.5
Partially	55	26.7
No	51	24.8
Have you ever received any formal training in the handling of COVID-19?		
No	108	50.2
Partially	77	35.8
Yes	30	14.0
Do you think you are capable of diagnosing COVID-19 based on clinical symptoms?		
Yes	143	66.5
Don't know	54	29.5
No	18	8.4
Do you think more training would have helped you diagnose and handle COVID-19? (22 missing)		
Yes	119	61.7
Maybe	57	29.5
No	17	8.8
What kind of training would have been most appropriate for helping you diagnose and handle COVID-19?		
In-person workshops/seminars/lessons/courses	100	46.5
Tutorial or info provided through Internet	90	41.9
Reading materials sent by mail	11	5.1
Other	14	6.5
How many cases of COVID-19 cases did you encounter in total?		
None	17	7.9
1-5	55	25.6
6-10	33	15.3
11-20	43	20.0
21-50	37	17.2
>50	30	14.0

Table 3. Changes in GP practices due to the COVID-19 pandemic in participants recruited in the province of Verona on May 2020 ($n = 215$).

	n	%
Did COVID-19 affect your clinical practice?		
No	6	2.8
Yes	209	97.2
If YES, in what way? (respondents were allowed to give more than 1 response)		
Kept a greater distance with patients	185	88.5
Insisted every patient wear a mask	179	85.6
Specialist appointments postponed/canceled	148	70.8
Appointments postponed/canceled	103	49.3
Difficult/unable to make specialist referrals	101	48.3
Longer waiting time for labs and investigations	98	46.9
Surgical procedures postponed/canceled	81	38.8
Reduced visit duration	68	32.5
Tested patient temperature as a routine practice	63	30.1
Avoided physical examinations	44	21.1
Over-prescribed antibiotics	36	17.2
Did COVID-19 affect your patients' behavior?		
No	6	2.8
Yes	209	97.2
If YES, in what way? (respondents were allowed to give more than 1 response)		
Fewer doctor visits	173	83.2
More doctor visits	4	1.9
More visits for depression/anxiety/insomnia	84	40.2
More patients hesitant to go to A&E after being advised to go	107	51.2
More appointment cancellations	41	19.6
Did you close your clinic due to COVID-19? (2 missing)		
No	202	94.8
Yes	11	5.2
Did telephone consultations have a negative impact on your personal life? (8 missing)		
No	11	5.3
Yes	196	94.7
If YES, in what way? (respondents were allowed to give more than 1 response) (2 missing)		
Receiving phone calls around the clock	126	64.3
No time for personal and family issues	44	22.4
Remaining on-call beyond regular work hours	158	80.6
What is your opinion on the use of new technologies in clinical practice? (9 missing)		
I find new technologies useful; I have been using them even before the pandemic	33	16.0
I have no problem with new technologies, but I think their use has abnormally increased during the pandemic	107	51.9
New technologies may be useful; I am slowly getting used to them	40	19.4
I find the use of new technologies problematic, as it is difficult to deal with all patients' requests	26	12.6

symptoms of post-traumatic distress. Moreover, in the overall sample, 36% developed symptoms of anxiety and 17.9% symptoms of at least moderate depression (see Table 4).

Regarding burnout, high scores on exhaustion and cynicism scales were reported, respectively, by 34.2 and 26.4%, while low scores on the professional efficacy scale by 37.3%. Overall, 25.4% (95% CI, 19%–32%) scored beyond the cutoff point in all the 3 MBI-GS scales.

Characteristics associated with adverse mental health outcomes in GPs

The unadjusted beta coefficients for the psychological outcomes are reported in the Online Supplementary. Table 5 shows the results for multivariate models (the results of IES-R are not reported as no variable was found to be significantly associated). Only significant associations ($P < 0.05$) were included in the model.

In commenting on the results, only the strongest associations (at least $P < 0.01$) are considered. Being female was associated with higher exhaustion. Being infected/quarantined/admitted to hospital for COVID-19 was associated with higher depression, exhaustion,

and cynicism. Alternatively, having longer professional experience was associated with lower anxiety and higher professional efficacy. Owning a clinic in the city of Verona was associated with lower anxiety, depression, and exhaustion. Having confidence in diagnosing COVID-19 was associated with higher professional efficacy. Longer waiting times for labs and investigations were associated with greater exhaustion, while the increase in telephone consultations was related to higher depression, exhaustion, and cynicism.

Discussion

Main findings

This study revealed that a considerable proportion of GPs had clinically significant psychological problems during the ongoing pandemic. This finding might be related both to the rapid changes that had occurred in GP practices during the COVID-19 outbreak (e.g. adoption of digital technology, fewer face-to-face consultations, more home visits, and remote appointments) and to uncertainty on how to effectively respond to the spread of the pandemic in the community.

Table 5. Factors associated with levels of mental health outcomes among participating GPs recruited on May 2020. Multivariate linear regression beta coefficients (together with 95% CI) are reported.

	Anxiety (n = 200)	Depression (n = 196)	Burnout (n = 193)	
			Exhaustion	Efficacy
				Cynicism
BLOCK 1 Personal characteristics	Gender ("female" vs. "male")	0.099 (-0.706, 3.759)	0.201* (0.180, 1.079)	
	Years of professional experience (>20 vs. ≤20)	-0.217** (-5.662, -1.127)	-0.174* (-2.942, -0.287)	0.172** (0.076, 0.756)
	Personal condition related to COVID-19 ("quarantined/admitted" vs. "No")	0.157* (0.483, 6.472)	0.238*** (1.390, 4.929)	0.252*** (0.537, 1.771)
BLOCK 2 Practice organization pre-COVID-19	Location of the clinic ("Verona" vs. "village/town")	-0.1190** (-5.716, -0.917)	-0.203** (-3.538, -0.670)	-0.175** (-1.113, -0.122)
	Updates on COVID-19 needed ("twice a week or less" vs. "daily")	-0.248*** (-6.582, -1.939)		-0.184** (-1.125, -0.157)
BLOCK 3 Information and training received for COVID-19	Training received in telephone triage ("Yes" vs. "No")	-0.075 (-3.875, 1.216)		
	Training received in handling COVID-19 outbreak ("Yes" vs. "No")	-0.123 (-4.095, 0.299)		-0.158* (-0.930, -0.060)
	Capable of diagnosing COVID-19 ("Yes" vs. "No")			
BLOCK 4 Changes in practice due to COVID-19	Longer waiting time for labs and investigations ("Yes" vs. "No")		0.163* (0.243, 2.744)	0.196** (0.186, 1.044)
	Increase of telephone consultations ("Yes" vs. "No")	0.140* (0.024, 9.396)	0.219** (1.625, 7.050)	0.182** (0.294, 2.161)

*P < 0.05; **P < 0.01; ***P < 0.001; associations with poorer mental health outcomes are highlighted in red, whereas significant associations with better mental health outcomes are highlighted in green.

Table 4. Number, percentage, and 95% CI of GPs recruited on May 2020 scoring higher than cutoff score in the various outcomes [post-traumatic distress (IES-R), anxiety (SAS), depression (PHQ-9), exhaustion (EX), professional efficacy (EF) and cynicism (CY) (MBI-GS)] (*n* = 215).

Mental health outcomes	n	%	95% CI
IES-R ≥ 24 (NA 112, missing 2)	33	35.9	26%–46%
SAS ≥ 36 (missing 15)	72	36.0	29%–43%
PHQ-9 ≥ 10 (missing 19)	35	17.9	12%–23%
EE > 2.20 (missing 22)	66	34.2	27%–41%
PE < 3.66 (missing 22)	72	37.3	30%–44%
CY > 2.00 (missing 22)	51	26.4	20%–33%

NA, not assessed.

Indeed, we found that GPs were somewhat concerned about the increase in the use of telemedicine. These concerns may be justified considering the scattered distribution of online tools, the lack of integration with electronic health records of the national health system, poor interconnection between telemedicine services operating at different levels, heavy privacy regulations, and the lack of clear guidelines in our country.²² It is also interesting to note that nearly all participants reported that the rapid increase in telephone consultations had a negative impact on their personal life, as they had to remain on-call beyond regular work hours or had been receiving phone calls around the clock.

As regards the issue of uncertainty, we found that only a negligible proportion of GPs received formal training in the clinical diagnosis and management of COVID-19. On the other hand, our multivariate analyses showed that the ability to diagnose COVID-19 was a protective factor as it increased self-perceived professional efficacy, thus reducing the risk of burnout. The role played by uncertainty on GPs' mental health is also supported by the finding that those with less professional experience and those working in small towns had higher levels of anxiety and depressive symptoms. This latter finding may be related to greater distances and/or longer travel times for referring potentially critical patients to tertiary COVID-19 hospitals (mainly located in the city of Verona), and this may have heightened feelings of isolation, uncertainty, and fear among GPs. Finally, the role of fear and uncertainty on GPs' mental health is supported by the finding that those at high risk of infection or who had been infected with COVID-19 had increased levels of depression and burnout.

Strengths and limitations

This is the first study conducted on GPs during the COVID-19 pandemic assessing a wide range of mental health outcomes using a comprehensive set of standardized measures. The collection of relevant information in an extreme pandemic situation despite time constraints and associated difficulties represents a notable strength. Finally, this study's findings are particularly relevant considering that Veneto, along with Lombardy, was the first region in Italy to register a COVID-19 outbreak and has since been one of the most affected Italian regions²³; moreover, the province of Verona was the most burdened area within Veneto during the lockdown period in Italy, in terms of both deaths and infected cases.²⁴

The present study has several limitations. First, online surveys typically exclude subjects with low experience in web use, potentially causing selection bias. Second, participation rate was somewhat low. This may have resulted in an overestimation of GPs with adverse mental health outcomes, as respondents who have had problems

dealing with COVID-19 may have been more likely to complete the survey. It should also be said that web-based surveys have generally lower response rates than face-to-face, telephone interviews, or mail surveys, with a meta-analysis²⁵ reporting a mean response rate similar to that of our study. Additionally, web-based surveys involving physicians have even lower overall response rates.²⁶ Third, this study did not include personality traits among burnout predictors. Fourth, organizational information was self-reported and may possess declaration biases. Fifth, a few variables were lacking, especially those characterizing healthcare systems at the macro level. Finally, as this study was cross-sectional, the associations detected were not necessarily causal.

Comparison with existing literature

The present study provides a further step towards a better understanding of the psychological impact of the COVID-19 pandemic on GPs. With regard to previous literature, Di Monte et al.⁸ specifically explored the effect of some psychological features (e.g. coping styles) on burnout, whereas Amerio et al.⁷ and Castelli et al.⁹ only focused on psychological symptoms, without addressing the job-related emotional response, such as burnout. Moreover, previous research investigated the effect of a limited range of personal characteristics and job-related variables (e.g. information on COVID-19 management). In contrast, our study considered a comprehensive range of adverse mental health outcomes (i.e. post-traumatic stress symptoms, anxiety, depression, and burnout) and investigated the effect of a larger set of explanatory variables, such as personal characteristics, characteristics of practice organization, job-related and COVID-19-related variables (e.g. information and training to handle COVID-19), changes in patients' behavior and in practice organization due to the COVID-19 pandemic, providing evidence that job-related variables (e.g. ability in COVID management and working in small towns) and organizational changes (e.g. increase in telephone consultations) contributed to adverse mental health outcomes in GPs.

Rapid organizational changes in practice^{27,28} and the uncertainty experienced by GPs during the COVID-19 pandemic might well have contributed to the excess of adverse mental health outcomes in our population, since pre-COVID-19 research conducted in Italy found that only 20% of GPs had symptoms of psychological stress,²⁹ a percentage that is 2 times lower than the prevalence of, e.g. anxiety found in our study. It is interesting to note that participants in the study conducted in pre-COVID time were similar to our sample in terms of age and length of working experience; in addition, they were recruited within an area of northern-east Italy (i.e. Ferrara) not far from our region.²⁹

The percentage of GPs showing anxiety symptoms in our study is substantially similar to that found in a recent study conducted in Colombia during the current pandemic.³⁰ Moreover, a survey conducted by the British Medical Association (BMA) found that nearly 43% of GPs reported work-related mental health problems including burnout, anxiety, stress, depression, or emotional distress.³¹ The slightly higher percentage of GPs experiencing adverse mental health outcomes in the BMA survey may be attributed to the open-ended questions rather than standardized measures.

Interestingly, the percentages of GPs recruited in this study reporting clinically significant symptoms of general anxiety and depression substantially overlap with those found among physicians working in a COVID-19 tertiary hospital located in the same geographical area and assessed during the same phase of the pandemic. The GPs, however, had only a lower percentage of symptoms of post-traumatic distress as compared to hospital physicians.³²

The percentages of GPs in our sample scoring above the cutoff point for exhaustion and professional efficacy were remarkably higher than those reported in a previous study conducted on Italian GPs.²⁹ It should, however, be acknowledged that this study's results are not directly comparable with ours as it used a different measure (MBI-HSS). Additionally, the percentages of GPs in our sample scoring above the cutoff point in 1 of the 3 MBI-GS dimensions were substantially similar to those found in a previous multisite European research conducted in general practice,³³ and a more recent study conducted on a large sample of Danish GPs.³⁴ However, the proportion of respondents in our sample scoring high on all 3 of the MBI-GS subscales was more than 2 times greater than those found in both the European and the Danish studies. Finally, compared to hospital physicians evaluated in the Verona area during the same period,²⁰ a larger proportion of GPs reporting high scores on exhaustion and cynicism was found, indicating a higher impact of burnout among this specific population. This finding should be interpreted considering the specific role of GPs within the Italian healthcare system. GPs in Italy work as private contractors, generally in single practices or in small group practices; the lack of training, information, and support from regional authorities and clear guidance from healthcare managers might have resulted in feelings of loneliness and isolation. On the other hand, hospitals generally provide a safer and better organized working environment that helps to cope better with feelings of uncertainty and loneliness that are associated with burnout.³⁵

As regards factors associated with adverse mental health outcomes, we found that being quarantined, infected, or admitted for COVID-19 were the main variables associated with increased levels of post-traumatic stress, anxiety, depression, exhaustion, and detachment from work. Studies that evaluated people in quarantine reported similar types of emotional reactions and psychological problems,³⁶ suggesting that experiencing the COVID-19 infection could be very stressful.³⁷ Moreover, being female was also found to be associated with higher levels of anxiety and depressive symptoms; this is an expected finding that probably reflects the well-known gender gap for anxiety and depressive symptoms existing in the general population.³⁸ Finally, we found that the ability to clinically diagnose COVID-19 contributes to increase self-perceived professional efficacy, thus emphasizing the need to provide specific training in diagnosing and managing COVID-19 and further supporting the notion that the lack of clear guidelines has represented a critical issue in general practice during the initial phases of the pandemic.^{3,9,39}

Implications

As this study suggests that the psychological impact of the pandemic on GPs is related to lack of clear and shared guidelines on COVID-19 management, more pragmatic research is needed to address unresolved clinical management questions. Additionally, institutional providers of primary health care or primary care organizations should implement psychological screening programs to identify GPs at risk of mental health problems and possibly refer them for psychological treatment. In this latter regard, future research should design psychological interventions addressing the specific needs of this population and evaluate their potential impact. A future longitudinal study will be needed to evaluate, e.g. at 12 months, whether GPs' mental health has improved, in the light of updated guidelines, new protocols, better treatments, and vaccinations that may hopefully be discovered and made available. It is recommended that government and healthcare administrators deploy multidisciplinary teams of mental health providers capable of implementing programs that

benefit adjustment, prevent mental illness, and promote recovery in healthcare providers during social and public health crises, especially when routine capacity is overwhelmed as it has been during the COVID-19 pandemic.

Conclusions

The results of our study suggest that a considerable proportion of GPs experienced adverse mental health outcomes during the current pandemic. Sudden organizational changes at the practice level, uncertainty on how to respond to the community spread of COVID-19, and concern for one's own health may have contributed to increased levels of psychological distress among GPs. This highlights the importance of timely interventions to promoting targeted preventive actions for healthcare professionals working outside institutions.

Supplementary material

Supplementary material is available at *Family Practice* online.

Acknowledgments

The authors thank all participating GPs for their time and excellent cooperation in the survey. The authors also acknowledge Charley Nyzio for the linguistic revision of an early version of the manuscript.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Ethical approval

The survey was approved by the Ethics Committee of the Provinces of Verona and Rovigo (approval No. 24367; April 30, 2020).

Conflict of interest

None declared.

Data availability

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

References

1. Torri E, Sbrogiò LG, Rosa ED, Cinquetti S, Francia F, Ferro A. Italian public health response to the COVID-19 pandemic: case report from the field, insights and challenges for the Department of Prevention. *Int J Environ Res Public Health*. 2020;17(10):3666.
2. Modenese A, Gobba F. Increased risk of COVID-19-related deaths among general practitioners in Italy. *Healthcare*. 2020;8(2):155.
3. Fiorino G, Colombo M, Natale C, Azzolini E, Lagioia M, Danese S. Clinician education and adoption of preventive measures for COVID-19: a survey of a convenience sample of general practitioners in Lombardy, Italy. *Ann Intern Med*. 2020;173(5):405–407.
4. Anelli F, Leoni G, Monaco R, Nume C, Rossi RC, Marinoni G, Spata G, De Giorgi D, Peccarisi L, Miani A, et al. Italian doctors call for protecting healthcare workers and boosting community surveillance during covid-19 outbreak. *BMJ*. 2020;368:m1254.
5. Kamerow D. Covid-19: don't forget the impact on US family physicians. *BMJ*. 2020;368:m1260.

6. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsis E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Brain Behav Immun*. 2020;88:901–907.
7. Amerio A, Bianchi D, Santi F, Costantini L, Odone A, Signorelli C, Costanza A, Serafini G, Amore M, Aguglia A. Covid-19 pandemic impact on mental health: a web-based cross-sectional survey on a sample of Italian general practitioners. *Acta Biomed*. 2020;91(2):83–88.
8. Di Monte C, Monaco S, Mariani R, Di Trani M. From resilience to burnout: psychological features of Italian general practitioners during COVID-19 emergency. *Front Psychol* 2020;11:567201.
9. Castelli L, Di Tella M, Benfante A, Taraschi A, Bonagura G, Pizzini A, Romeo A. The psychological impact of COVID-19 on general practitioners in Piedmont, Italy. *J Affect Disord*. 2021;281:244–246.
10. Ghiotto MC, Rizzolo Y, Gandolfo E, Zuliani E, Mantoan D. Strengthening primary care: the Veneto Region's model of the Integrated Medical Group. *Health Policy*. 2018;122(11):1149–1154.
11. Weiss DS, Marmar CR. The impact of event scale-revised. In: Wilson JP, Keane TM, editors. *Assessing Psychological Trauma and PTSD*. New York (NY): Guilford Press; 1997. p. 399–411.
12. Creamer M, Bell R, Failla S. Psychometric properties of the impact of event scale - revised. *Behav Res Ther*. 2003;41(12):1489–1496.
13. Zung WW. A rating instrument for anxiety disorders. *Psychosomatics*. 1971;12(6):371–379.
14. Dunstan DA, Scott N. Norms for Zung's Self-rating Anxiety Scale. *BMC Psychiatry*. 2020;20(1):90.
15. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16(9):606–613.
16. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatr Ann*. 2002;32(9):1–7.
17. Schaufeli WB, Leiter MP, Maslach C, Jackson S. Maslach burnout inventory-general survey. In: Maslach C, Jackson SE, Leiter MP, editors. *The Maslach Burnout Inventory*. 3rd ed. Palo Alto (CA): Consulting Psychologists Press; 1996. p. 19–26.
18. Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory Manual*. 3rd ed. Palo Alto (CA): Consulting Psychologists Press, 1996.
19. Lasalvia A, Bonetto C, Bertani M, Bissoli S, Cristofalo D, Marrella G, Ceccato E, Cremonese C, De Rossi M, Lazzarotto L, et al. Influence of perceived organisational factors on job burnout: survey of community mental health staff. *Br J Psychiatry*. 2009;195(6):537–544.
20. Lasalvia A, Amadeo F, Porru S, Carta A, Tardivo S, Bovo C, Ruggeri M, Bonetto C. Levels of burn-out among healthcare workers during the COVID-19 pandemic and their associated factors: a cross-sectional study in a tertiary hospital of a highly burdened area of north-east Italy. *BMJ Open*. 2021;11(1):e045127.
21. Wong SY, Wong W, Jaakkimainen L, Bondy S, Tsang KK, Lee A. Primary care physicians in Hong Kong and Canada – how did their practices differ during the SARS epidemic? *Fam Pract*. 2005;22(4):361–366.
22. Omboni S. Telemedicine during the COVID-19 in Italy: a missed opportunity? *Telemed J E Health*. 2020;26(8):973–975.
23. Ministero della Salute [2020 Feb 12]. <http://www.salute.gov.it/portale/nuovocoronavirus/homeNuovoCoronavirus.jsp>.
24. Regione del Veneto, Azienda Zero [2020 Feb 12]. <https://www.azero.veneto.it/-/emergenza-coronavirus>.
25. Cook C, Heath F, Thompson R. A meta-analysis of response rates in Web- or Internet-based survey. *Educ Psychol Meas*. 2000;60(6):821–836.
26. Cunningham CT, Quan H, Hemmelgarn B, Noseworthy T, Beck CA, Dixon E, Samuel S, Ghali WA, Sykes LL, Jette, N. Exploring physician specialist response rates to web-based surveys. *BMC Med Res Methodol*. 2015;15:32.
27. Gray DP, Sidaway-Lee K, Harding A, Evans P. Reduction in face-to-face GP consultations. *Br J Gen Pract*. 2020;70(696):328.
28. Gregory S, Brown VT. I don't want to be a call centre GP! *Br J Gen Pract*. 2020;70(697):405.
29. Grassi L, Magnani K. Psychiatric morbidity and burnout in the medical profession: an Italian study of general practitioners and hospital physicians. *Psychother Psychosom*. 2000;69(6):329–334.
30. Monterrosa-Castro A, Redondo-Mendoza V, Mercado-Lara M. Psychosocial factors associated with symptoms of generalized anxiety disorder in general practitioners during the COVID-19 pandemic. *J Investig Med*. 2020;68(7):1228–1234.
31. British Medical Association, COVID-19 Survey Results for General Practitioners, May 2020 [accessed 2020 Feb 12]. <https://www.bma.org.uk/media/2497/bma-survey-results-for-covid-19-for-gps-4-may-2020.pdf>.
32. Lasalvia A, Bonetto C, Porru S, Carta A, Tardivo S, Bovo C, Ruggeri M, Amadeo F. Psychological impact of COVID-19 pandemic on healthcare workers in a highly burdened area of north-east Italy. *Epidemiol Psychiatr Sci*. 2020;30:e1.
33. Soler JK, Yaman H, Esteva M, Dodds F, Spiridonova Asenova R, Katić M, Ožvačić Z, Desgrange JP, Moreau A, Lionis C, et al.; European General Practice Research Network Burnout Study Group. Burnout in European family doctors: the EGPRN study. *Fam Pract*. 2008;25(4):245–265.
34. Pedersen AF, Nørøxe KB, Vedsted P. Influence of patient multimorbidity on GP burnout: a survey and register-based study in Danish general practice. *Br J Gen Pract*. 2020;70(691):e95–e101.
35. Ofei-Dodoo S, Ebberwein C, Kellerman R. Assessing loneliness and other types of emotional distress among practicing physicians. *Kans J Med*. 2020;13:1–5.
36. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenburg N, Rubin GJ. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020;395(10227):912–920.
37. Sahoo S, Mehra A, Dua D, Suri V, Malhotra P, Yaddanapudi LN, Puri GD, Grover S. Psychological experience of patients admitted with SARS-CoV-2 infection. *Asian J Psychiatr*. 2020;54:102355.
38. Alonso J, Angermeyer MC, Bernert S, Bruffaerts R, Brugha TS, Bryson H, De Girolamo G, De Graaf R, Demyttenaere K, Gasquet D, et al. Prevalence of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand Suppl*. 2004;420:21–27.
39. Thornton J. Covid-19: how coronavirus will change the face of general practice forever. *BMJ*. 2020;368:m1279.