

Challenges and experiences of general practitioners during the course of the Covid-19 pandemic: a northern Italian observational study – cross-sectional analysis and comparison of a two-time survey in primary care

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Background: General practitioners (GPs) have been among the frontline workers since the outbreak of the Covid-19 pandemic. Reflecting and analyzing the ongoing pandemic response of general practice provides essential information and serves as a precondition for outlining future health policy strategies.

Objective: To investigate the effects of the pandemic on GPs' daily work and well-being and to describe needs for improvement in primary care highlighted by the pandemic.

Methods: A 2-time cross-sectional online survey involving GPs in a northern Italian region was conducted in September 2020 and March/April 2021.

Results: Eighty-four GPs (29.6% of invited GPs) participated in the first survey, and 41 GPs (14.4%) in the second survey. Most GPs experienced a notable workload increase which was tendentially higher during the advanced stages of the pandemic. A notable increase between the first and the second survey was noted regarding the frequency of Covid-related patient contacts and phone calls. Communication with health authorities and hospitals was rated as improvable. Psychological distress among GPs tended to increase over time; female GPs were more affected in the first survey. Most practices introduced major changes in their workflow, mainly appointment-based visits and separating Covid-19-suspected patients. Availability of protective equipment considerably increased over time. In the second survey, the GPs felt more prepared to self-protection and outpatient treatment of Covid-affected patients.

Conclusion: The work of GPs has been substantially impacted by the ongoing Covid-19 pandemic. Efforts should be undertaken to efficiently strengthen primary care which plays an important role in pandemic events.

Lay summary

The Covid-19 pandemic has considerably impacted the way of daily working of general practitioners (GPs). Several studies have been conducted which reflected the immediate response of general practice to the pandemic at its early stages, but studies assessing the ongoing situation are missing. This study responded to this need and aimed to illustrate the challenges, difficulties, and the personal well-being of GPs during the first pandemic wave and during the second/third pandemic wave. The study consisted of a 2-time online survey of GPs in a northern Italian province.

The 84 GPs participating in the first survey and 41 GPs participating in the second survey indicated a notable workload increase due to the pandemic. The availability of protective equipment and of clinical guidance about how to treat Covid-19-affected patients in their homes was poor at the beginning but increased considerably over time. Psychological distress was slightly increasing. Most GPs modified their workflow and practice organization. Adequate support for general practice is required in pandemic events to enable GPs to provide safe and high-quality care; needs for improvement especially concern the provision of resources and the communication with public health institutions and hospitals.

Key words: Covid-19, general practice, primary care physicians, workload, mental health, cross-sectional survey

Background

Since its outbreak, Italy has been among the countries with the highest burden of Covid-19. Up to 14 November 2021, 80,508 cases and 2,197 deaths per million people have been reported.¹ Moreover, 365 Italian physicians have died; more than one-third of them were general practitioners (GPs).²

GPs are the patients' first point-of-contact for most health problems in the Italian healthcare system³ and play an important health-promoting role during large-scale emergency situations. In general, GPs are trusted contact persons and sources of information for patients, substantial providers of medical care for a broad population and important players

Key messages

- The public health system was not prepared to face an exceptional health crisis.
- The Covid-19 pandemic has highly impacted the general practitioners' daily work.
- The 2-time survey aimed to identify challenges in primary care over time.
- Pandemic planning should address primary care to the same extent as hospitals.
- Provision of protective equipment and necessary resources should be ensured.
- Communication with health authorities and hospitals should be improved.

in community-related issues such as surveillance, patient monitoring and reinforcing public health measures aimed at limiting the spread of infection.^{4,5}

However, ensuring safe and high-quality care has been challenging during the Covid-19 pandemic, not least because of the limited supply of testing resources and personal protective equipment (PPE) and due to the unique and continuously changing tasks during the different stages of the pandemic.⁶ Additionally, personal risks for physicians working at the "frontline" increased: exposure, quarantine and illness, fatigue due to extended working hours, professional risks due to assignments outside the usual competencies, and risk of death.⁷

Therefore, research is strongly required which systematically investigates the response of primary care to the disaster and the concrete problems and weaknesses emerged during the pandemic. Different cross-sectional GP surveys reflecting the first pandemic wave have been conducted,⁸⁻¹¹ but studies assessing the *development* of the situation in general practice by a longitudinal evaluation are lacking. This 2-time survey investigated the effects of this unprecedented crisis on GPs' work and well-being and aimed to describe lessons learned and needs for improvement in primary care.

Methods

Study design and setting

The longitudinal observational study was conducted as 2-time online survey among practising GPs in the province of Bolzano (Italy). The first survey was conducted between 11/09 and 30/09/2020 addressing the first wave of the pandemic, the second survey between 1 March 2021 and 23 April 2021 addressing the second/third wave. Due to a low response rate, the period of the second survey was extended.

Recruitment

All 284 active GPs listed in the local Chamber of Physicians were informed and invited to participate by email. Two email reminders were sent for each survey. The time needed to complete the online questionnaire was 10 min.

Online questionnaire

The research team developed the questionnaire ad hoc in a consensus process, based on comparable surveys.⁸ It consisted of 23 (first survey) respectively 26 questions (second survey); some were multi-part items. At the time of the second survey several circumstances had changed; thus, some questions and/or subitems were modified or added to mirror the current situation more completely.

The questionnaire comprised:

- Seven questions addressing demographic information (Table 1)
- Seven questions (survey 1), respectively, 10 questions (survey 2) regarding GPs' workload and challenges (Table 2)
- Five questions addressing GPs' physical/psychological well-being (Table 3)
- Two questions regarding preparedness for future Covid-19-related challenges (Table 4)
- Two questions addressing Covid-19-related changes in daily work (Table 5)

The answer scales were ordinal or metric for demographic parameters and ordinal for the other items; some questions allowed free-text entries.

The questionnaire was programmed in German and Italian using the online tool "Q-set" (www.q-set.de) and was provided via a URL link. The tool assigned a pseudonymization codex to each participant. The responses were automatically imported into a csv-datafile, which was subsequently exported by the research team for analysis.

Statistical analysis

Data were analyzed using IBM SPSS Statistics 25.0. Descriptive statistics included absolute/relative frequencies, medians/interquartile range, and cross-tabulations; free-text comments were categorized and summarized descriptively. Only completed questionnaires were considered for analysis; in case of single missing responses the concerned individuals were excluded from analysis of the respective item.

The basic population from which participants were recruited was identical in both surveys; however, due to anonymity, we could not trace back how many GPs participated either in the first, second, or both surveys. Therefore, the study samples were considered independent. Mann-Whitney *U*, chi-square, Fisher's exact tests and Spearman correlations were used for comparison between times of measurement and subgroup analyses. All tests were 2 sided. Significance level was $P < 0.05$. For items with low participant numbers ($n < 35$), the results were presented descriptively without *P* values.

Results

Study participants

Of 284 invited GPs, $n = 84$ (29.6%) completed the first survey and $n = 41$ (14.4%) completed the second survey.

Table 1. Characteristics of the GPs participating at the first (September 2020) and second survey (March–April 2021) relating to challenges and experiences of GPs during the Covid-19 pandemic (province of Bolzano, northern Italy).

Characteristics	Survey 1 (<i>n</i> = 84 GPs)	Survey 2 (<i>n</i> = 41 GPs)	<i>P</i> -value
Age			
Median (IQR)	50.5 (41.3–61.8)	56 (45–60)	0.457 ^a
Gender			
Female: <i>n</i> (%)	41 (48.8%)	20 (48.8%)	0.998 ^b
Number of assisted patients per GP office			
Median (IQR)	1600 (1430–1770)	1633 (1557–1800)	0.238 ^a
Location of GP office			
Rural area	55 (67.9%)	29 (70.7%)	0.750 ^b
Urban area	26 (32.1%)	12 (29.3%)	
Practice organization			
	<i>n</i> = 80	<i>n</i> = 40	
Single-handed office	34 (42.5%)	13 (32.5%)	0.539 ^b
Network of GP offices	22 (27.5%)	14 (35.0%)	
Group office	24 (30.0%)	13 (32.5%)	
Duration of professional activity [years]			
Median (IQR)	12 (6–26)	22 (7–23)	0.775 ^a

GPs, general practitioners; IQR, interquartile range.

^aMann–Whitney *U* test.

^bChi-square test.

The median age was 50.5 and 56 years for the first and second survey, respectively; 48.8% were female in both surveys. The characteristics of the study samples are shown in [Table 1](#).

Challenges and workload of the GPs

Most GPs reported a notable workload increase during the pandemic which tended to be higher in the second survey; however, in both surveys, some GPs reported their workload not to be augmented ([Table 2](#)).

In the second survey, considerably more GPs were in frequent contact with Covid-19-suspected/confirmed cases compared to the first survey, which is in line with the fact that most of the questioned GPs conducted antigenic tests during the second/third wave, while during the first wave the only (and limitedly) available diagnostic method was PCR testing. Also, Covid-related phone calls of patients were permanently more frequent during the second/third wave.

The GPs indicated to be frequently contacted regarding the SARS-CoV-2 vaccination in the second survey; a considerable part of the GPs did not feel prepared to provide patients with adequate information in this regard ([Table 2](#)).

The availability of PPE and the number of conducted swab tests improved considerably in the second survey.

The access to information about the clinical conditions of hospitalized Covid-19-patients was rated low by the physicians and did not change throughout the observation period ([Table 2](#)).

The availability of local health authorities worsened notably over time. Crisis management conducted by the different representatives of the health authorities was rated relatively inadequate in the initial phase and improved over time, but findings indicate there remained room for improvement.

The workload increase negatively correlated with the GPs' age in the first survey and was tendentially higher among female GPs ([Supplementary Table 1](#)).

Physical and mental well-being of the GPs

During the first wave, a considerable part of the GPs was in quarantine/self-isolation or tested positive for SARS-CoV-2, while no physician was affected during the second/third wave ([Table 3](#)).

More GPs reported to suffer from psychological distress in the second compared to the first survey. The most frequent emotions reported by GPs were fear of infecting their family or patients, while fear for themselves was less prevalent. The indicated emotions did not change substantially over time, except “low serenity” but also “positive professional experiences” which tended to increase ([Table 3](#)). Furthermore, the GPs indicated anger, disappointment, exhaustion, uncertainty, and irritability.

Females reported higher psychological disturbances during the first wave. The GPs' age was not associated with distress ([Supplementary Table 1](#)).

Preparedness for future challenges

The feeling of preparedness to face possible future pandemic waves notably increased over time, especially regarding handling of suspected Covid-19 cases and outpatient treatment of infected patients. All GPs felt prepared regarding self-protection at the second survey ([Table 4](#)).

In the first survey, the rapid execution of swab tests and sufficient availability of PPE were mentioned as first-line aspects to be ensured in case of a further pandemic wave, while in the second survey efficient quarantining and contact tracing were considered most relevant. Moreover, the GPs indicated a demand for clearer information for GPs/patients and improved communication with health authorities.

Pandemic-related changes of daily work

The Covid-19 pandemic has changed the organization of the GPs' professional activity in various aspects. The most

Table 2. Comparison of GPs' workload and challenges faced during the first wave (Survey 1) and second/third wave (Survey 2) of the Covid-19 pandemic in the province of Bolzano (northern Italy)

Issues	Survey 1			Survey 2			P-value
Workload increase during the Covid-19 pandemic	<i>n</i> = 84			<i>n</i> = 41			0.300 ⁱⁱ
0%	6 (7.1%)			3 (7.3%)			
10–20%	32 (38.1%)			13 (31.7%)			
30–50%	35 (41.7%)			14 (34.1%)			
>50%	11 (13.1%)			11 (26.8%)			

Issues	Survey 1			Survey 2			
	Mar 2020	Apr 2020	May 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021
Self-estimated frequency of GPs' contact with Covid-19 suspected or confirmed cases, by month							
	<i>n</i> = 80	<i>n</i> = 79	<i>n</i> = 77	<i>n</i> = 32	<i>n</i> = 32	<i>n</i> = 32	<i>n</i> = 32
Rarely—Never	24 (30.0%)	39 (49.4%)	50 (65.0%)	4 (12.5%)	6 (18.8%)	6 (18.7%)	9 (28.2%)
Every week	28 (35.0%)	19 (24.1%)	17 (22.1%)	10 (31.3%)	6 (18.8%)	5 (15.6%)	4 (12.5%)
Daily—Every other day	28 (35.0%)	21 (26.6%)	10 (13.0%)	18 (56.2%)	20 (62.5%)	21 (65.7%)	19 (59.4%)
Self-estimated number of daily phone calls of patients with Covid-19-like symptoms per GP, by month							
	<i>n</i> = 80	<i>n</i> = 78	<i>n</i> = 75	<i>n</i> = 35	<i>n</i> = 35	<i>n</i> = 35	<i>n</i> = 35
None	1 (1.3%)	2 (2.6%)	4 (5.3%)	0 (0.0%)	2 (5.7%)	0 (0.0%)	0 (0.0%)
1–10	24 (30.0%)	23 (29.5%)	45 (60.0%)	15 (42.9%)	11 (31.4%)	13 (37.1%)	13 (37.1%)
11–30	33 (41.3%)	38 (48.7%)	22 (29.3%)	12 (34.2%)	15 (42.9%)	11 (31.4%)	13 (37.1%)
>30	22 (27.6%)	15 (19.2%)	4 (5.4%)	8 (22.9%)	7 (20.0%)	11 (31.4%)	9 (25.7%)

Issues	Survey 1	Survey 2
Preparedness to inform patients about the SARS-CoV-2 vaccination		<i>n</i> = 36
Not prepared	—	12 (33.3%)
		Why not: [Free text]: Poor communication with local health authorities, lack of clear and updated indications and information, lack of time for continued self-education

Issues	Survey 1 (<i>n</i> = 84 GPs)	Survey 2 (<i>n</i> = 41 GPs)
GPs considering sufficient the following measures/availabilities		
Availability of protective equipment	30 (35.7%)	40 (97.6%)
Number of conducted swab tests	10 (11.9%)	36 (87.8%)
Clinical indications for diagnosis/treatment of Covid-19	25 (29.8%)	26 (63.4%)
Information about conditions of hospitalized patients	25 (29.8%)	12 (29.3%)
Availability of the local health authorities	20 (23.8%)	2 (4.9%)

GPs, general practitioners.

ⁱChi-square test.

important changes introduced by the GPs since the outbreak of the pandemic were: practice visits only with previous appointment, separating patients with a suspicion of Covid-19 from other patients in the GP office, and restriction of visits for those patients with Covid-like symptoms, respectively permitting the access of these patients with a negative test result (second survey). However, some GPs indicated to have maintained an unlimited patient access (Table 5).

Between the first and second survey, no substantial differences regarding modifications of daily work were noted; exceptions were a higher number of appointment-based visits in the second survey, as well as reinforced measures to separate Covid-19-suspected patients from other patients in the GP office (Table 5).

Most of the GPs stated to be likely to retain the introduced changes, especially appointment-based visits and teleconsultations.

Discussion

This study is among the first to illustrate the ongoing general practice response to Covid-19 during different stages of the pandemic. Our results, with some limitations around generalizability, confirm that the disaster has demanded extraordinary adaptation by GPs^{4,12} as not only the workload increased for most GPs,¹⁰ but also the way of working and the challenges modified over time.

In the first period, the poor availability of PPE, diagnostic testing and low clinical knowledge about how to handle Covid-19-affected persons were among the most critical concerns. This was confirmed by other Italian and international studies.^{8–10,13} GPs initially received lower PPE supply than hospitals^{14,15} and felt neglected and not fully considered by health authorities, while the response to the pandemic was mainly concentrated on hospitals.^{16,17} Moreover, in the initial

Table 3. Physical and psychological well-being of GPs during the first wave (Survey 1) and second/third wave (Survey 2) of the Covid-19 pandemic in the province of Bolzano (northern Italy)

Issues	Survey 1	Survey 2
Frequency of positive testing results among GPs	<i>n</i> = 81	<i>n</i> = 40
GPs tested positive for Covid-19 in the last months	8 (9.9%)	0 (0.0%)
Frequency of quarantine or self-isolation among GPs	<i>n</i> = 82	<i>n</i> = 40
GPs who were retained in quarantine or self-isolation	15 (18.3%)	0 (0.0%)
Frequency of psychologic difficulties among GPs	<i>n</i> = 81	<i>n</i> = 41
GPs suffering from psychologic difficulties (depression, anxiety, burnout) due to the pandemic [self-appraisal]	28 (34.6%)	17 (41.5%)
Prevalent emotions and their impact during and after the most acute phase of the pandemic	<i>n</i> = 82	<i>n</i> = 40
Fear of infecting family members	41 (50.0%)	18 (45.0%)
Fear of infecting patients	32 (39.0%)	11 (27.5%)
Fear of infecting colleagues	13 (15.9%)	8 (20.0%)
Fear for themselves	20 (24.4%)	8 (20.0%)
Helplessness	20 (24.4%)	13 (32.5%)
Sleeping disorders	12 (14.6%)	8 (20.0%)
Sadness	8 (9.8%)	6 (15.0%)
Poor serenity at working	27 (32.9%)	21 (52.5%)
Positive professional experience	10 (12.2%)	11 (27.5%)
Less direct contact with patients	41 (50.0%)	20 (50.0%)
Others [free text]: anger and disappointment because of insufficient communication/indications/support/information by the local health authorities, exhaustion, overload, tiredness, uncertainty, irritability, anxiety, aggression.	33 (40.2%)	16 (40.0%)

GPs General practitioners.

Table 4. GPs' preparedness for future challenges entailed by the Covid-19 pandemic: results from the first wave (Survey 1) and second/third wave (Survey 2), province of Bolzano, northern Italy

Issues	Survey 1	Survey 2	p-value
Do you feel prepared to face a possible next wave of the pandemic in regard to the following aspects			
Self-protection	<i>n</i> = 82	<i>n</i> = 41	
Yes—Rather yes	70 (85.4%)	41 (100%)	0.008 ^a
Rather no—Not at all	12 (14.6%)	0 (0.0%)	
Handling of suspected cases	<i>n</i> = 82	<i>n</i> = 41	
Yes—Rather yes	65 (79.3%)	40 (97.6%)	0.006 ^a
Rather no—Not at all	17 (20.7%)	1 (2.4%)	
Outpatient therapy of Covid-19-affected patients	<i>n</i> = 81	<i>n</i> = 41	
Yes—Rather yes	41 (50.6%)	33 (80.5%)	0.002 ^a
Rather no—Not at all	40 (49.4%)	8 (19.5%)	

^aFishers exact test.

phase, measures to prevent the spread of infection, to protect vulnerable patients and care providers and—at the same time—to ensure continuity of care¹² were implemented such as appointment-based visits and increased teleconsultations.

During the advanced stages of the pandemic, in addition to maintaining the introduced changes in daily work, contact tracing, the ongoing poor availability/communication with health authorities and inconsistency of information, prolonged psychological strain, frequent patients' phone calls, and patient information about the SARS-CoV-2 vaccination were challenging issues in our cohort as well as in other studies^{9,10,13} A considerable part of the GPs in our cohort did not feel sufficiently prepared to provide patients with appropriate information about clinical and organizational aspects

of the SARS-CoV-2 vaccination, mainly due to missing organizational information by the local health authorities, but the GPs also reported a lack of clear and updated clinical information and missing time for continued self-education.

Diagnostic antigen testing became an additional task in primary care. Although GPs' contacts with infected persons increased, fear tended to decrease over time as sufficient PPE was available and vaccination programs had started in early 2021; moreover, the GPs felt more prepared to face critical issues (e.g. outpatient treatment of Covid-19-affected patients) which were no longer totally novel.

In our sample, the workload increased especially for younger GPs and tendentially at the advanced stages of the pandemic. Possible explanations may be (i) the fact that younger

Table 5. Changes introduced by the GPs regarding the organization of their professional activity during the first wave (Survey 1) and second/third wave (Survey 2) of the Covid-19 pandemic (province of Bolzano, northern Italy)

Issues	Survey 1	Survey 2
Changes in the way of daily working since the beginning of the pandemic	<i>n</i> = 81	<i>n</i> = 41
Practice visits only after appointment	42 (51.9%)	33 (80.5%)
Measures to separate Covid-19-suspected cases from other patients (e.g. separate waiting rooms, different timeslots)	44 (54.3%)	29 (70.7%)
Exclusion of Covid-19-related symptoms (e.g. fever) before a patient is allowed to access the GP office	25 (30.9%)	20 (48.8%)
No practice visits in case of respiratory symptoms	26 (32.1%)	15 (36.6%)
Maintained unlimited patient access to GP office	11 (13.6%)	8 (19.5%)
Home visits only in urgent cases/emergencies	25 (30.9%)	13 (31.7%)
Others [free text]: increased telephonic/telematic contacts, more accurate hygiene measures	30 (37.0%)	7 (17.1%)
Pandemic-related changes which GPs would like to maintain		<i>n</i> = 41
GPs having introduced changes which they would like to maintain	—	32 (78.0%)

GPs, general practitioners; PCR, polymerase chain reaction.

physicians miss the long-term working experience and thus might present lower capacity to adapt to extraordinary situations, (ii) or—by contrast—that younger physicians may have been more adaptable and less established in their working patterns, (iii) that the duration of the second/third wave was considerably longer and entailed higher infection rates,¹⁸ and (iv) different tasks had added to the daily workload, e.g., antigen testing (including subsequent organization of PCR testing for positive cases and bureaucratic tasks), vaccination-related issues, and increased administrative burden.¹³

The GPs' way of working has been notably impacted in all organizational aspects. Patient access was extensively limited and mostly granted only after appointment and/or exclusion of Covid-19-related symptoms or negative testing results; Covid-19-suspected patients were separated from other patients in the office; teleconsultations and hygienic measures were increased.

However, pandemic-related modifications also hold an opportunity¹⁹ to move toward a more sustainable organization of general practice. As studies show, GP workforces are declining,²⁰ which may entail an overburden of primary care in the near future. In our study, most GPs reported appointment-based practice visits as measures which they intend to maintain after the pandemic. Also, an increased use of teleconsultations was indicated as potentially maintainable.

Generally, communication between GPs and patients has substantially changed during the pandemic. Telemedicine and remote consultations have been leveraged on a wider scale since the Covid-19 outbreak in primary care worldwide.²¹ This tendency was also noted in our cohort, although telehealth-interconnections are less effectively implemented in Italy than in other countries. Previous studies have highlighted the potential of using telehealth in emergency situations;^{22,23} however, telemedicine has the potential to be advantageously extended to a broader use in daily practice²⁴ by entailing convenience and clinical benefits in chronic care,²⁵ feasibility and high patient satisfaction across all age classes,²¹ appointment flexibility,²⁶ and saving time and costs.²⁵ However, it remains unclear how the switch to teleconsultations impacted the GPs' workload and distress.¹⁶ Studies have also identified safety issues due to missing physical examination, risk of both over- and underprescribing due to remote drug prescriptions,⁶ concerns about quality of care and diminished possibility of emotional support especially in end-of-life care,¹¹ risk of additional barriers for socioeconomically vulnerable persons or

patients with complex needs;²⁶ eventually, the long-term effects of remote care are uncertain.⁶

Despite the increasing clinical knowledge about how to handle the Covid-19 disease, moral distress and immersive psychological pressure on GPs have not decreased over time. In our sample, serenity at working was even more impaired at the second survey. Moreover, the GPs indicated anger and disappointment due to insufficient communication with health authorities which were less available at the advanced stages of the pandemic. Also, the communication with the hospitals regarding the clinical conditions of Covid-19-affected patients was unsatisfying for the GPs and did not improve over time.

Other studies confirmed the immense mental strain on GPs;^{27–29} as primary sources of stress were identified: changing/contradicting indications, inadequate communication with health authorities/hospitals, modifications in daily practice,¹⁶ insufficient PPE supply, frequent contacts with Covid-affected patients,³⁰ a sense of unpredictability,¹³ helplessness, uncertainty,^{8,31} and the risk of being quarantined.²⁴ Studies from SARS/Ebola epidemics have revealed that the physical and mental pressure on healthcare workers enormously increases during emergencies, and growing evidence indicates that the current disaster considerably affects the well-being of healthcare professionals, sadly culminating in suicides.³² This finding highlights the importance of providing adequate measures.²⁴ For GPs, the factors identified as sources of distress should be primarily addressed: ensuring GPs' safety, targeted clinical indications,³² and clear communication with health authorities which comprises regular, direct and first-line information about the ongoing epidemiologic situation as well as timely and consistent updates regarding testing strategies, quarantining, vaccination-related information, and administrative tasks such as sick leave procedures etc.

On the other hand, several GPs in our cohort reported a positive professional experience during the pandemic. This was confirmed by a survey from Lombardy where 85% of the questioned physicians reported positive experiences during the pandemic despite enormous challenges.⁸

Studies have highlighted that pandemic-related problems in general practice revealed system-related weaknesses due to continuous deprivation of resources in Italian primary care during the past decades. Recognizing the value and strengthening of primary care by re-organization and enhancement of structural, technical and personal resources (including

nursing staff and administrative support) enables outpatient surveillance for more patients, thus limiting hospitalizations,^{8,17} infectious spread and mortality in emergency situations.⁴ Moreover, targeted emergency action plans and early additional funding for primary care (addressing PPE supply, telemedicine, and others) as in Australia³³ could serve as an example for an optimized pandemic response.

Limitations

Generalizability is limited by the recruitment of physicians in a specific Italian region. However, the implications of our study might also be applicable to other circumstances as our results are largely confirmed by international studies.

The response rate was low thus leading to a small sample and compromising validity and representativeness of the results; however, GP surveys usually have comparable or even lower response rates.¹⁰

The cohort of the questioned GPs was probably not identical in the 2 measurements. Female GPs were slightly over-represented (48.8% vs. 41.5% in the whole province); the survey results were not weighted.

The results may have been biased by a potential overrepresentation of GPs who had been infected or who suffered from particularly high distress (selection bias).

Some parameters, such as psychological disorders among GPs, are self-estimated and are therefore not fully reliable epidemiological measures. The applied questionnaire was developed ad hoc and did not include validated instruments.

Conclusion

The Covid-19 pandemic has profoundly affected general practice. Although the availability of PPE, testing resources, and clinical indications for diagnosis/treatment of ambulatory Covid-19 patients had improved considerably during the ongoing pandemic, the pressure on primary care continued to increase especially in terms of workload, communication difficulties with authorities/hospitals and psychological strain due to the ongoing crisis and possible fatigue. Primary care has shown the ability to respond flexibly to the demands posed by an extraordinary public health event and to play a crucial role in pandemic management. Thus, in pandemic planning, primary care should be addressed to the same extent as hospital care. This survey in synopsis with previous literature points out lessons learned which should be considered for future preparation:

- Prioritized and sufficient provision of all kinds of PPE, testing resources and development of clinical guidelines for GPs to improve ambulatory follow-up and surveillance and to ensure continuity of care.
- Investment in technology to enable high-quality virtual care.
- Improved communication between the different levels of care and with health authorities.
- Appropriate guidance from public health institutions to enable physicians to provide patients with clear information.

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Helsinki Declaration and its amendments, the EU-General Data Protection Regulation (679/2016), and the Italian Data Protection Law (196/2003). According to Italian legislation, ethics approval and written informed consent are not required in questionnaire-based investigations. The provision of written information about the study along with the questionnaire and voluntary participation provided implied consent. Participating physicians completed the questionnaires fully anonymously.

Supplementary material

Supplementary material is available at *Family Practice* online.

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Conflict of interest

The authors report no conflict of interest.

Data availability

The datasets used in this study are available from the corresponding author upon reasonable request.

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