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

Angelika Mahlknecht¹,*, Verena Barbieri¹, Adolf Engl¹, Giuliano Piccoliori¹, Christian J. Wiedermann¹,²

¹Institute of General Practice and Public Health, College of Health Care Professions, Bolzano, Italy
²Department of Public Health, Medical Decision Making and HTA, University of Health Sciences, Medical Informatics and Technology, Hall, Tyrol, Austria

*Corresponding author: Institute of General Practice and Public Health, College of Health Care Professions, Lorenz Böhler-Street 13, 39100 Bolzano, Italy.
Email: angelika.mahlknecht@am-mg.claudiana.bz.it

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

GP 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

© The Author(s) 2022. Published by Oxford University Press.
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial License (https://creativecommons.org/licenses/by-nc/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited.
For commercial re-use, please contact journals.permissions@oup.com
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.

Methods

Study design and setting

The longitudinal observational study was conducted as a 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. 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 descriptive. 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.
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). Also, Covid-related phone calls of patients were permanently more frequent during the second/third wave.

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
Challenges and experiences of general practitioners during Covid-19

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 as not only the workload increased for most GPs, 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. GPs initially received lower PPE supply than hospitals and felt neglected and not fully considered by health authorities, while the response to the pandemic was mainly concentrated on hospitals. Moreover, in the initial
phase, measures to prevent the spread of infection, to protect vulnerable patients and care providers and—at the same time—to ensure continuity of care 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. 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 GPs General practitioners.

| 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 | \( n = 81 \) | \( n = 40 \) |
| GPs tested positive for Covid-19 in the last months | 8 (9.9%) | 0 (0.0%) |
| Frequency of quarantine or self-isolation among GPs | \( n = 82 \) | \( n = 40 \) |
| GPs who were retained in quarantine or self-isolation | 15 (18.3%) | 0 (0.0%) |
| Frequency of psychologic difficulties among GPs | \( n = 81 \) | \( n = 41 \) |
| 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 | \( n = 82 \) | \( n = 40 \) |
| 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%) |

| 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 | \( n = 82 \) | \( n = 41 \) | \( n = 81 \) | \( n = 41 \) | \( n = 82 \) | \( n = 41 \) |
| Self-protection | 70 (85.4%) | 41 (100%) | 0 (0.0%) | \( 0.008^a \) |
| Handling of suspected cases | 12 (14.6%) | 0 (0.0%) | \( 0.006^a \) |
| Rather no—Not at all | 65 (79.3%) | 40 (97.6%) | 1 (2.4%) | \( 0.002^a \) |
| Outpatient therapy of Covid-19-affected patients | 17 (20.7%) | 1 (2.4%) | \( 0.002^a \) |
| Rather no—Not at all | 41 (50.6%) | 33 (80.5%) | 8 (19.5%) | \( 0.002^a \) |

\(^a\)Fishers exact test.
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, 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.

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 opportunity to move toward a more sustainable organization of general practice. As studies show, GP workforces are declining, 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. 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; however, telemedicine has the potential to be advantageous extended to a broader use in daily practice by entailing convenience and clinical benefits in chronic care, feasibility and high patient satisfaction across all age classes, appointment flexibility, and saving time and costs. However, it remains unclear how the switch to teleconsultations impacted the GPs’ workload and distress. Studies have also identified safety issues due to missing physical examination, risk of both over- and underprescribing due to remote drug prescriptions, concerns about quality of care and diminished possibility of emotional support especially in end-of-life care, risk of additional barriers for socioeconomically vulnerable persons or patients with complex needs; eventually, the long-term effects of remote care are uncertain.

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 as primary sources of stress were identified: changing contradicting indications, inadequate communication with health authorities/hospitals, modifications in daily practice, insufficient PPE supply, frequent contacts with Covid-affected patients, a sense of unpredictability, helplessness, uncertainty, and the risk of being quarantined. 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.

This finding highlights the importance of providing adequate measures. For GPs, the factors identified as sources of distress should be primarily addressed: ensuring GPs’ safety, targeted clinical indications, 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.

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.\(^1\)\(^7\) 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 Australia\(^1\) 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.

In summary with previous literature points out less care should be addressed to the same extent as hospital care. In pandemic management. Thus, in pandemic planning, 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 less care should be addressed to the same extent as hospital care. In pandemic management. Thus, in pandemic planning, 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.

- 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.

**Acknowledgments**

We thank the participating physicians for their collaboration. All study procedures were in accordance with the 1964 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.

**Funding**

No explicit funding sources were involved.

**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.

**References**

1. Our world in data. 2021. [Accessed 2021 Nov 16]. https://ourworldindata.org/explores/coronavirus-data-exploiter?zoomToSelection=true&time=2020-03-01...latest&facet=none&pickerSort=desc&pickerMetric=total_cases&hideControls=true&Metric=Confirmed&caseInterval=Cumulative&Relative=to=Population&true&Align+outbreaks=false&country=~ITA.
2. Federazione Nazionale degli Ordini dei Medici Chirurghi e degli Odontoiatri FNOMCEO. Elenco dei Medici caduti nel corso dell’epidemia di Covid-19. 2021. [Accessed 2021 Aug 30]. https://portale.fnomeceo.it/elenco-dei-medici-caduti-nel-corso-dell’epidemia-di-covid-19/.
3. Lo Scalzo A, Donatini A, Orzella L, Cicchetti A, Profili S, Maresso A. Italy: health system review. *Health Syst Transit*. 2009;11:243.
4. Kearon J, Risdon C. The role of primary care in a pandemic: reflections during the COVID-19 pandemic in Canada. *J Prim Care Commun Health*. 2020;11:2150132720962871.
5. Li DKT, Zhu S. Contributions and challenges of general practitioners in China fighting against the novel coronavirus crisis. *Fam Med Commun Health*. 2020;8(2):e000361.
6. Windak A, Frese T, Hummers E, Klemenc Ketis Z, Tsukagoshi S, Vilaseca J, Vinker S, Ungan M. Academic general practice/family medicine in times of COVID-19—perspective of WONCA Europe. *Eur J Gen Pract*. 2020;26(1):182–188.
7. Johnson SB, Butcher F. Doctors during the COVID-19 pandemic: what are their duties and what is owed to them? *J Med Ethics*. 2021;47(1):12–15.
8. Ordine dei Medici e degli Odontoiatri OMCEO. Elenco dei Medici caduti nel corso dell’epidemia di Covid-19. 2021. [Accessed 2021 Aug 3]. http://www.quotidianosanita.it/allegati/allegato5457606.pdf.
9. Kurotschka PK, Serafini A, Demontis M, Serafini A, Mereu A, Moro MF, Carta MG, Ghirotto L. General practitioners’ experiences during the first phase of the COVID-19 pandemic in Italy: a critical incident technique study. *Front Public Health*. 2021;9:623904.
10. Kippen R, O’Sullivan B, Hickson H, Leach M, Wallace G. A national survey of COVID-19 challenges, responses and effects in Australian general practice. *Aust J Gen Pract*. 2020;49(11):745–51.
Challenges and experiences of general practitioners during Covid-19

11. Tieler JM, Weber JP, Simon ST, Bausewein C, Stiel S, Schneider N. Experiences, challenges and perspectives for ensuring end-of-life patient care: a national online survey with general practitioners in Germany. PLoS One. 2021;16(7):e0254056.
12. Matenge S, Sturgiss E, Desborough J, Hall Dykgraaf S, Dur G, Kidd M. Ensuring the continuation of routine primary care during the COVID-19 pandemic: a review of the international literature. Fam Pract. 2021;20:1–15.
13. Verhoeven V, Tsakitzidis G, Philips H, Van Royen P. Impact of the COVID-19 pandemic on the core functions of primary care: will the cure be worse than the disease? A qualitative interview study in Flemish GPs. BMJ Open. 2020;10(6):e039674.
14. Savoia E, Argentini G, Dori D, Neri E, Pitchc-Loeb R, Fantini MP. Factors associated with access and use of PPE during COVID-19: a cross-sectional study of Italian physicians. PLoS One. 2020;15(10):e023904.
15. Tielker JM, Weber JP, Simon ST, Bausewein C, Stiel S, Schneider N. Experiences, challenges and perspectives for ensuring end-of-life patient care: a national online survey with general practitioners in Germany. PLoS One. 2021;16(7):e0254056.
16. Dutour M, Kirchhoff A, Janssen C, Meleze S, Chevalier H, Levy-Amon S, Detrez MA, Piet E, Delory T. Family medicine practitioners’ stress during the COVID-19 pandemic: a cross-sectional survey. BMC Fam Pract. 2021;22(1):36.
17. Plagg B, Piccoli G, Oschmann J, Engl A, Eisendle K. Primary health care and hospital management during COVID-19: lessons from Lombardy. Risk Manag Healhce Policy. 2021;14:3987–3992.
18. Ministero della Salute—Italian Ministry of Health. 2021. [Accessed 2021 Sep 29]. https://www.salute.gov.it/portale/archivioMonitoraggiNuovoCoronavirus.jsp.
19. Marshall M, Howe A, Howsam G, Mulholland M, Leach J. COVID-19: a danger and an opportunity for the future of general practice. Br J Gen Pract. 2020;70(695):270–271.
20. Napier J, Clinch M. Job strain and retirement decisions in UK general practice. Occup Med (Lond). 2019;69(5):336–341.
21. Mann DM, Chen J, Chiranea R, Testa PA, Nov O. COVID-19 transforms health care through telemedicine: Evidence from the field. J Am Med Inform Assoc. 2020;27(7):1132–1135.
22. van der Velden AW, Bax EA, Bongard E, Munck Aabenhus R, Anastasaki M, Anthierens S, Balan A, Bohmer F, Bruno P, Chalibic S, et al. Primary care for patients with respiratory tract infection before and early on in the COVID-19 pandemic: an observational study in 16 European countries. BMJ Open. 2021;11(7):e049237.
23. Sarti TD, Lazarini WS, Fontenelle LF, Almeida A. What is the role of primary health care in the COVID-19 pandemic? Epidemiol Serv Saude. 2020;29(2):e2020166.
24. Mian A, Al-Asad S, Khan S. Mental health burden of COVID-19. Fam Pract. 2021;38(2):195–197.
25. Chada BV. Virtual consultations in general practice: embracing innovation, carefully. Br J Gen Pract. 2017;67(659):264.
26. Joy M, McGagh D, Jones N, Liyanage H, Sherlock J, Parimalanathan V, Akinyemi O, van Vlijmen J, Howsam G, Marshall M, et al. Re-organisation of primary care for older adults during COVID-19: a cross-sectional database study in the UK. Br J Gen Pract. 2020;70(697):e540–e5e7.
27. Huy MNN, Marzo RR, AlRifai A, Kamberi F, El-Abasiri RA, Nyamache JM, Hlaing HA, Hassanin M, Moe S, Su TT, et al. Immediate impact of COVID-19 on mental health and its associated factors among healthcare workers: a global perspective across 31 countries. J Glob Health. 2020;10(2):020381.
28. Alrawashdeh HM, Al-Tammemi AB, Alzawahreh MK, Al-Tamimi A, Elkholy M, Al Sarireh F, Abusamak M, Elehamer NMK, Malkawi A, Al-Dolat W, et al. Occupational burnout and job satisfaction among physicians in times of COVID-19 crisis: a convergent parallel mixed-method study. BMC Public Health. 2021;21(1):811.
29. Lange M, Joo S, Couette PA, Le Bas F, Humbert X. Impact on mental health of the COVID-19 outbreak among general practitioners during the sanitary lockdown period. Ir J Med Sci. 2021. doi:10.1007/s11845-021-02513-6.
30. Amerio A, Bianchi D, Santi F, Constantini 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.
31. Tsamakis K, Rizos E, Manolis AJ, Chaidou S, Kypouroupoulou S, Spartalis E, Spandidos DA, Tsitsios D, Triantafyllis AS. COVID-19 pandemic and its impact on mental health of healthcare professionals. Exp Ther Med. 2020;19(6):3451–3453.
32. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsi 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.
33. Kidd M. Australia’s primary care COVID-19 response. Aust J Gen Pract. 2020;49. doi:10.31128/AJGP-COVID-02.