ORIGINAL ARTICLE

Annals of Agricultural and Environmental Medicine 2022, Vol 29, No 4, 575–581
www.aaem.pl

The response of primary care practices in rural and urban settings in Poland to the challenges of the COVID-19 pandemic

Katarzyna Nessler[1,A-D,F] ✉, **Esther Van Poel**[2,A,C,E-F], **Sara Willems**[2,A,C,E-F], **Ewa Wójtowicz**[1,C-D,F], **Mitchell R Mann**[1,C-D,F], **Adam Windak**[1,A-F]

[1] *Department of Family Medicine, Jagiellonian University Medical College, Kraków, Poland*
[2] *Department of Public Health and Primary Care, Ghent University, Belgium*
A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of the article

Nessler K, Van Poel E, Willems S, Wójtowicz E, Mann MR, Windak A. The response of primary care practices in rural and urban settings in Poland to the challenges of the COVID-19 pandemic. Ann Agric Environ Med. 2022; 29(4): 575–581. doi: 10.26444/aaem/155906

Abstract

Introduction. In the wake of COVID-19 primary care practices have had to overcome and to adapt to several challenges in providing quality care. An international consortium led by Ghent University, Belgium, set up the PRICOV-19 project to study how primary care practices in 38 countries responded to the new challenges.

Objective. The aim of the study was to describe how Covid-19 impacted the organisation of primary care practices in rural and urban environments in Poland, including the organisation of patient flows, infection prevention, information processing, and communication.

Materials and method. This is cross-sectional questionnaire-based survey among primary care practices. In Poland, the survey was distributed among primary care practices in 16 Polish regions. 180 practices participated in the study. In the analysis of the data U-Mann Whitney or t-test for independent groups, and Wilcoxon test were used to compare the organisation of care before and since the pandemic.

Results. Over two-thirds of practices made considerable changes in their structure due to COVID-19; over three-quarters introduced security procedures for phone registrations, but only a quarter still offered consultations without a prior appointment. The use of video consultation quadrupled, and teleconsultations became almost universal. Rural practices were significantly more likely to offer active care for deprived patient groups. A significant increase in infection prevention measures occurred in both urban and rural practices.

Conclusions. COVID-19 brought challenges that spurred changes to the organisation of primary care practices as they sought to continue offering quality care. Despite these hardships, new opportunities for effective changes to clinical operations and organization have emerged and will benefit global health systems in the face of new crises.

Key words

quality of care, infectious diseases, family medicine, general practice, primary healthcare, COVID-19, PRICOV-19

INTRODUCTION

With over 6.3 million deaths, 557 million confirmed infections, and the continued appearance of new variants, the reach of the SARS-CoV-2 virus has been and continues to be massive [1, 2]. The severity of the pandemic has caused the need for a plethora of institutional adjustments. It has resulted in a high-pressure system for all aspects of healthcare, including general practitioner (GP) practices. GPs are frequently the first line of contact for patients with suspected infections, and like all other healthcare providers, they have had to overcome or work with numerous new treatment obstacles during the advent of the COVID-19 pandemic. Notably, clinical examinations have become limited and, in many cases, been replaced with teleconsultations [3]. While patient and physician safety is of utmost concern, these changing practices can lead to more patient safety incidents (PSIs), such as poor follow-up of pre-existing conditions, and late or missed diagnoses. Accordingly, during COVID, PSIs have become significant global causes of morbidity and mortality [4]. According to the Eurostat database, excess deaths caused by COVID-19 in Poland were one of the highest in Europe, reaching 69.1% in December 2021 [5]. Vulnerable patients, such as those who need frequent follow-ups or have difficulties accessing healthcare, are at higher risk for PSIs. An important number of patients enrolled in GP practices are vulnerable because of chronic illnesses, long-term disabilities, or low socio-economic status.

A recent review with evidence from past epidemics has shown that primary healthcare is crucial for managing infectious disease epidemics [6]. During COVID-19, GP practices felt the need for structural and organizational changes to be able to continue providing the quality care their communities require. How GP practices can adapt to pandemic settings depends on many factors, and guidelines created by individual practices and governments to do so can both contribute to achieving quality care, but also produce barriers to it.

At the end of 2020, an international consortium led by Ghent University in Belgium initiated the PRICOV-19 project in 37 European countries and Israel to explore how GP practices were affected by and responded to the COVID-19

✉ Address for correspondence: Katarzyna Nessler, Department of Family Medicine, Jagiellonian University Medical College, Bocheńska 4, 31-061 Kraków, Poland
E-mail: katarzynanessler@gmail.com

Received: 14.09.2022; accepted: 19.10.2022; first published: 31.10.2022

pandemic [7, 8]. The presented study focuses on how these factors, including those at the levels of individual GP practices and governmental/systemic levels, have contributed to safe and effective care for patients in Polish rural and urban practices. Accordingly, the aim was to assess the differences in adapting rural and urban GP practices to the COVID-19 pandemic in Poland in terms of structural changes, patient flow, infection prevention, information processing, as well as internal and external communication. Such data will inform both medical practitioners and policymakers on the aspects of healthcare systems and GP practices that are effective, and which need refinement, aiding in the continued fight against COVID-19 and serving to prepare for future pandemics.

MASTERIALS AND METHOD

PRICOV-19 is a cross-sectional, questionnaire-based study in 38 countries. In each country, a coordinating centre was established; in Poland, the Department of Family Medicine at the Jagiellonian University Medical College in Kraków was responsible for managing PRICOV-19. The study was approved by the Research Ethics Committee at Ghent University Hospital (Project No.: BC-07617) and by the Bioethics Committee at Jagiellonian University (No. 1072.6120.302.2020). The study is described in detail elsewhere[7]. A summary is presented below.

Study tool. The final version of the PRICOV-19 questionnaire was developed and validated by the research team from Ghent University. The first draft of the questionnaire was developed after a thorough literature review. Subsequently, the Delphi procedure was used, and a panel of five PHC experts and one methodological expert evaluated the validity of the items and the length of the questionnaire, formulated suggestions for changes, and recognized missing items. After the second version of the questionnaire was developed, three cognitive interviews were organized with two GPs and one non-GP. An online version of the questionnaire was made using the Research Electronic Data Capture (REDCap) platform and pre-tested first among ten participants (both GPs and non-GPs), and then piloted among 159 Belgian GP practices. Finally, the international consortium partners reviewed the questionnaire for acceptability in their country and cultural adaptation.

The final questionnaire consisted of 53 items divided into six sections: patient flow, infection prevention, information processing, communication with patients, collaboration, collegiality, self-care, and characteristics of participants and GP practices. The final English version of the questionnaire was forward and backward translated by two independent researchers and piloted by ten Polish GPs. The final Polish version was uploaded to the REDCap platform.

Participants. A convenience sample of 207 GP practices was recruited from 16 regions of Poland in proportion to the number of inhabitants of each region, the number of participating practices being predicted by the study protocol. Managers of the practices who could potentially participate in the study were approached by telephone and email. After their initial agreement, a separate invitation and informed consent form were sent to them via email. Two additional reminders were sent to non-respondents. Those who returned a signed informed consent form were included in the study and received the link to the questionnaire. In each practice, only one person (physician or another team member) was expected to answer the questionnaire on behalf of all practice team members. Data collection in Poland started in December 2020 and finished in August 2021.

Statistical analysis. The descriptive analyses of categorical variables are reported in percentages, and in means with standard deviations and medians with inter-quartile ranges for continuous variables. Differences between practices in urban and rural settings were assessed using chi-square and U-Mann Whitney, or t-test for independent groups (respectively for the type of data). For comparison of the measurements before and since the pandemic, the Wilcoxon test was performed. A P-value of < 0.05 was considered as the level of statistical significance. All analyses were completed using Statistica 13 software package (Statsoft Inc.).

RESULTS

Respondent characteristics. Even though 207 GP practices were recruited, not all questionnaires were filled out completely, and fewer answers to some questions were included in the analysis as a result. After data cleaning, 180 practices were included in the study, 51.1% from large (inner) cities, 14.4% from small cities, and 34.4% located in rural areas.

Practices from large and small cities cared for more patients than those located in rural areas, with the median number of patients per practice (Q1; Q3) being 5,500 (3,300; 8,500), 5,750 (2,750; 10,000), and 3,600 (2,500; 5,200), respectively (p=0.0008). Also, 62.9% of practices in large cities provided medical training in family medicine, while only 26.9% of those in small towns and 35.5% in rural areas did so (p= 0.0003).

Practices varied significantly regarding the type of staff employed (Tab. 1). Three of four practices in large cities were involved in the post-graduate training of family physicians, while only half of those located in small cities or rural areas were. Community midwives were employed more frequently by practices in larger cities than in other locations. Practices from smaller cities more frequently employed receptionists and other administrative staff. More staff members worked in practices in larger cities than rural areas. A significantly higher number of GPs worked in practices in larger cities than in other locations (small cities or villages). The same difference was observed for the number of GP trainees (Tab. 2).

Structural changes. Respondents representing 122 (68.2%) practices stated that they experienced limitations related to the building or the infrastructure of the practice when providing high-quality and safe care since the onset of the COVID-19 pandemic. However, 120 (71.0%) respondents stated that the COVID-19 pandemic led their practices to consider adjusting their buildings or other infrastructure. Practices in larger cities reported these changes more frequently, but the differences were insignificant.

Patient flow. In 138 (78.4%) of the surveyed practices, patients making an appointment by phone were required to state a

Table 1. Type of allied personnel.

	Total N (%)	Large (inner) city N (%)	Small city N (%)	Rural N (%)	p-value
GP trainee	117 (65.0)	69 (75.0)	14 (53.8)	34 (54.8)	0.0159
Practice nurse	149 (82.8)	77 (83.7)	19 (73.1)	53 (85.5)	0.3518
Community nurse	158 (87.8)	84 (91.3)	20 (76.9)	54 (87.1)	0.1389
Community midwife	124 (68.9)	70 (76.1)	11 (42.3)	43 (69.4)	0.0045
Practice manager	94 (52.2)	50 (54.3)	14 (53.8)	30 (48.4)	0.7559
Receptionist/ administrator	119 (66.1)	64 (69.6)	21 (80.8)	34 (54.8)	0.0388
Cleaning employee	128 (71.1)	65 (70.7)	18 (69.2)	45 (72.6)	0.9421

Table 2. Number of staff members and medical doctors

	Total	Large (inner) city	Small city	Rural area	p-value
	Mean (± SD); Me (Q1; Q3)				
Staff members	12.6 (± 8.1) 10.0 (8.0; 15.0)	14.0 (± 8.5) 11.0 (8.0; 17.0)	12.7 (± 8.5) 11.0 (5.0; 15.0)	10.5 (± 6.9) 9.0 (7.0; 12.0)	0.0149
GPs	3.5 (± 2.5) 3.0 (2.0; 4.0)	4.3 (±2.9) 4.0 (2.0; 6.0)	2.9 (±2.2) 2.0 (1.0; 4.0)	2.4 (±1.3) 2.0 (1.0; 3.0)	0.0000
GP trainees	1.8 (± 2.1) 1.0 (0.0; 3.0)	2.4 (± 2.4) 2.0 (0.0; 3.0)	1.2 (± 1.6) 1.0 (0.0; 2.0)	1.0 (± 1.2) 1.0 (0.0; 2.0)	0.0001

reason for doing so. In 166 (92.7%) practices, patients who made an appointment where it was unclear whether they had a risk of infection were always or regularly called beforehand for verification. In 129 (71.7%) practices, sufficient time was always or at least regularly provided between consultations for the disinfection of the consultation room. In 154 (89.5%) practices, potential COVID-19 patients were seen at the end of the GP round. Walk-in hours when patients could come for a consultation without making an appointment were only available in 44 (25%) responding institutions during the pandemic.

The number of practices that reported the use of video consultations rose from 14 (7.8%) before the COVID-19 pandemic to 54 (30%) during the pandemic. One hundred thirty-five (79.9%) declared the use of either governmental (*N*=99) or other local (*N*=36) guidelines when answering phone calls from potential COVID-19 patients. Receptionists or other allied healthcare personnel performing telephonic triage could always or at least regularly rely on support from a GP when assessing a call in 161 (91.5%) practices. At most practices (*N*=136; 81.4%), GPs had immediate access to the most recent information on referring patients to triage stations (e.g., procedures, telephone numbers, which documents to provide), either in print (*N*=96) or electronically (*N*=40).

The presence of the above patient flow arrangements did not differ by location of the practice.

One hundred sixty (90.9%) respondents either agreed or strongly agreed with the opinion that since the COVID-19 pandemic, staff members were more involved in giving information and recommendations to patients contacting the practice by phone.

When asked about the role of staff members in giving information or explanations to illiterate patients, those with low health literacy, or migrants, respondents from rural areas reported significantly higher involvement than those in other locations (p=0.0034). In addition, more respondents from rural areas stated that since the COVID-19 pandemic, physicians have tried to reach patients who might postpone care more actively (p=0.0248). Differences are shown in detail in Figure 1.

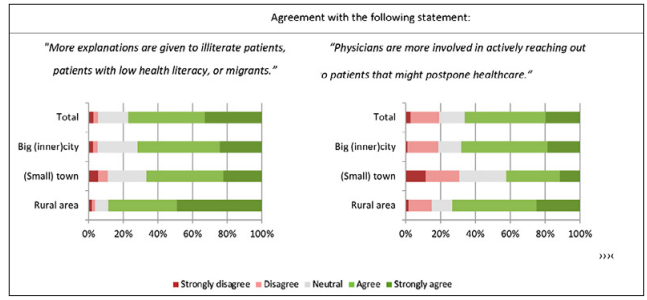

Figure 1. Opinion on the role of staff members towards deprived patients since the COVID-19 pandemic

Interviewed practices reported a risk of numerous incidents related to patient flow during the COVID-19 pandemic (range: 15–51%), and undertook measures to prevent them (range: 16–66%) (Fig. 2). No differences were observed between practices operating in different locations.

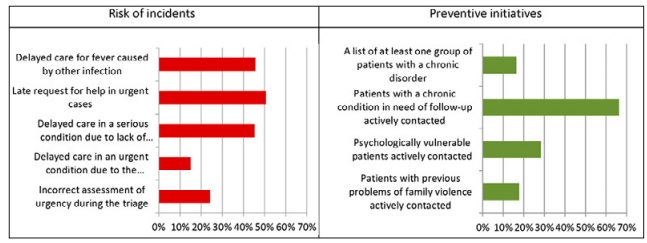

Figure 2. Primary care practices (percentages) acknowledging COVID-19 risk of accidents and initiatives to prevent them

Opinions of the respondents about the frequency of safety measures introduced toward patients requiring transportation of home isolation are presented in Figure 3. In these aspects, the respondents did not vary in relation to the location of their practices.

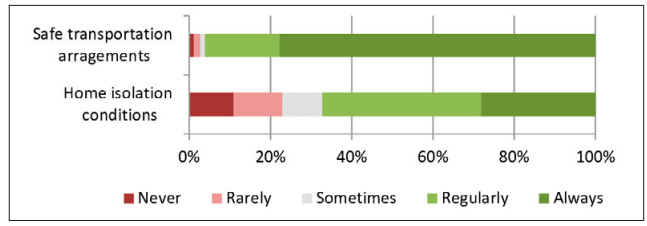

Figure 3. Ensuring safety procedures in Covid-19 -infected or suspected patients

Infection prevention. In most practices, all consultation rooms contained equipment and materials useful for preventing infection, including disposable gloves (99.4%), a sink and surface disinfectant (both 98.9%), paper to cover the examination table (98.3%), disposable medical coats (93.9%), and a waste bin that could be opened hands-free (91%). Practices were least often equipped with a tap operated via elbow or motion detector (48.3%). All the above items were present in 44.4% of the reviewed practices, and no differences related to practice location were found.

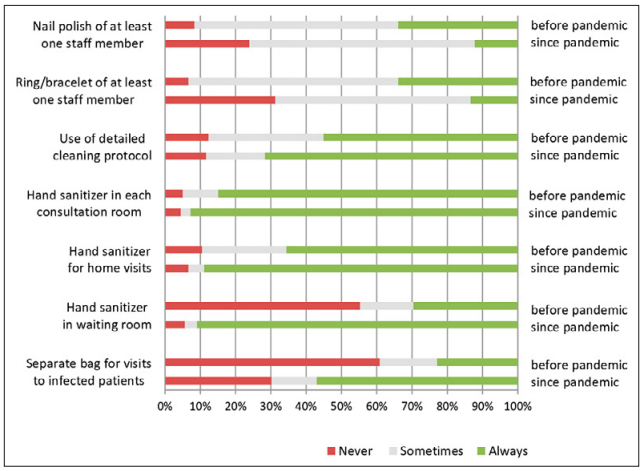

Figure 4. Change in frequency of infection prevention measures

The COVID-19 pandemic has changed the application of several infection prevention measures (Fig. 4). The percentage of the practices in which none of the staff members wore nail polish rose from 8.3% (before the pandemic) to 23.9%. In addition, the percentage of practices where none of the employees wore a ring or a bracelet increased from 6.7% to 31.3% during the pandemic. Both above changes were significant in all locations (p<0.05).

The percentage of practices declaring that they always use a detailed cleaning protocol (e.g., what to clean, frequency, method) rose from 55.1% to 71.7% (p=0.0001) during the COVID-19 pandemic and was significant in large cities (from 46.2% to 68.5%; p=0.0003), but not in small towns or rural areas. In addition, respondents declared that these were always present in each consultation room before the pandemic in 84.9% of offices and 92.7% after the pandemic (p=0.0299). A similar change was observed for the use of hand sanitizers for home visits (65.6% – 88.9%) and waiting rooms (29.6% – 91%); the changes were significant in all locations (p< 0.05).

A separate medical bag was always provided for home visits to patients with suspected infections in 22.9% of the practices before the pandemic, and 57% after its spread (p< 0.01 for all the locations).

The reviewed practices introduced numerous procedures for transferring documents to COVID-19-suspected patients during the pandemic. These include pickup at the practice, delivery by regular post, e-mail, or secured online system available always or regularly in 65.7%, 9.1%, 34.5%, and 14.7% of practices, respectively. No differences were observed between rural and urban areas.

Participation in the COVID-19 vaccination programme was considered by 63.7% of practices located in large cities, 61.5% of those in small towns, and 90.3% in rural areas (p=0.0006).

Information processing. During the pandemic, the problem of shortage of time to read the new guidelines and relevant and reliable literature concerned a greater number of practices (56.2%) than before the pandemic (49.4%) (p=0.0019) (Fig. 5). Before the pandemic, insufficient time to update practitioner medical knowledge was reported slightly less frequently in facilities located in rural areas (42.6%) than in small (48%) and large cities (54.4%) (p=0.0873). This percentage increased to 55.7% in villages (p=0.0041); there was no difference in other locations.

The frequency of meetings to discuss tasks increased significantly during the pandemic (p=0.0000) (Fig. 6). A significant change in this aspect was noticed in large cities (p=0.0004) and villages (p=0.0000). Before the pandemic, no significant differences in the frequency of practice meetings were observed depending on their location; because of pandemic changes, a higher frequency of meetings was reported more often in rural areas than in large cities.

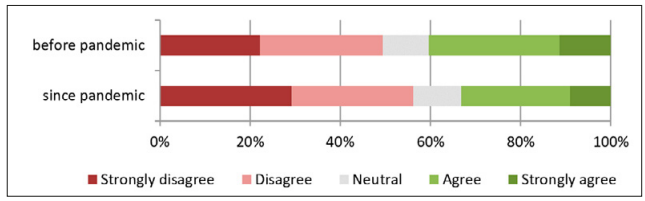

Figure 5. Enough protected time for reviewing guidelines and scientific literature

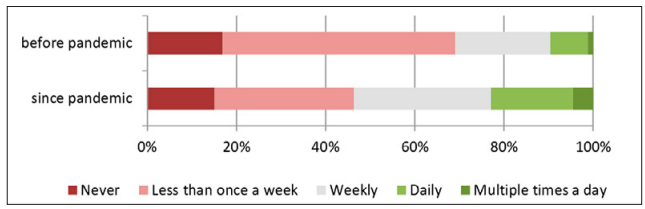

Figure 6. Frequency of meetings to discuss existing, new, or amended directives

Communication with patients. Only 106 respondents answered the question about updates to their practice website. One-third (34%) of the declared changes to website information were carried out less frequently than once a month, 17% approximately once a month, and 20.8% once a week. The respondents from two practices confirmed the daily renewal of website content. Over two-thirds (69.8%) of facilities had a patient leaflet with information on COVID-19. The patient communication policy did not differ due to the practice location.

Collaboration, collegiality, and self-care. When staff members left the practice, the files (administrative and medical) that required follow-up were always transferred to another colleague in 39.8% of practices, usually transferred in 35.4%, sometimes transferred in 9.9%, rarely transferred in 8.1%, and never transferred in 6.8%. The frequency of the transfers did not differ by the location of the practice.

If an incident about quality of care occurred in practice, it was discussed regularly during online team meetings (either with the whole team present or only with the healthcare professionals) in 31.4% of practices, or always in 19.8% of them. The topic was never addressed in 23.3% of practices, rarely in 11.0%, and sometimes in 14.5%. There were no differences found due to location.

DISCUSSION

Summary of main findings. The COVID-19 pandemic has had a significant impact on primary healthcare in Poland. More than two-thirds of participating GPs felt the need to introduce changes to the structure of their practice. There were also significant restrictions to the flow of patients. In over three-quarters of the practices, additional security procedures were introduced related to telephone registration,

and only in a quarter of the participating practices patients could consult without a prior appointment. Almost always, GPs aided support staff in case of doubts related to patient registration.

The use of video consultation quadrupled during the pandemic but remained relatively low. Teleconsultation has become almost universal. Most physicians used guidelines and other forms of information support when using these media; the activities of practices located in different localities did not differ significantly in this respect. However, it is worth noting that doctors in rural areas were significantly more likely to engage in active care for deprived patient groups.

Respondents identified risks related to possible delays in care for various groups of patients, the most common of which could occur in up to half of the practices. The most common preventive measures included active care for chronically ill patients. Almost all practices were involved in the transportation arrangement of infected patients, and two-thirds declared consistent interest in home isolation conditions. GP practices declared good sanitary equipment for infection prevention. The pandemic also significantly increased the frequency of declared infection prevention measures in practices at all locations. Almost twice as many respondents from rural areas declared their interest in participating in the COVID-19 immunization programme, compared to urban practices.

Practice teams had less time to regularly review guidelines or medical literature during the pandemic, but the frequency of staff meetings increased significantly, especially in large cities and rural settings. However, practice websites were rarely updated with more recent information for patients, and inward communication between practice staff members was relatively low, regardless of location.

Comparison with other publications. The use of survey- and interview-based studies to assess the state of GP practices was common during the COVID-19 pandemic. Grossman *et al.* (2020) conducted a web-based survey among 169 Israeli paediatricians in May 2020 to assess the frequency of teleconsultations in their practices [9]. Daily use of video conferences and pictures increased from 1% and 15% before the first COVID-19 lockdown, to 12% and 40% during the first lockdown, respectively [9]. Likewise, the current study showed an increase in the frequency of video consultations, reaching a maximum of 30%. A French study observed a similar increase of video consultations (30.7%) among GPs working at multi-professional group practices [10]. In other nations, the observed rise of video teleconsultations was even more meaningful. A 2022 study by Groenewegen *et al.* assessed the PRICOV-19 questionnaire data of 155 Dutch GP practices [11]; the authors found that teleconsultations increased greatly during the COVID-19 pandemic, particularly video consultations (rising from 6% to 65% of practices in pre- vs. post-pandemic levels).

Gomez *et al.* (2021) described the results of the qualitative study among GPs and physicians undergoing training in Southern California, finding that teleconsultations improved access to care through increased convenience, increased time for counselling patients, opportunities for improved medication reconciliations, and the capability to visualise patient domestic environments and meet patient families [12]. However, the authors noted increased difficulties in conducting physical examinations, and that the loss of touch and personal connections diminished the perceived strength of the patient-physician relationship. Also, Verhoeven *et al.* (2020) noted a decisive shift towards teleconsultations and triage for COVID-19- and non-COVID-19-related situations, with clinical decision-making focused on triage and respiratory assessment, and a postponement of most chronic care as a consequence [13]. Moreover, another review published in 2020 confirmed that telehealth plays a key role in COVID-19 primary care operations, offering effective clinical service delivery in the wake of the pandemic [14].

The current study shows that the frequency of staff meetings in both large cities and rural settings increased significantly during the pandemic. This development is critical; team meetings have proven to be essential for providing support, setting common goals, reflecting on performance, and enabling effective team functioning [15]. Regular and well-facilitated team meetings in primary care settings can provide a forum for several functions and are especially important during a crisis like a pandemic [16, 17, 18].

The results of the current study also showed the improvement of applying several infection preventions measures due the pandemic. For example, significantly fewer employees in all the surveyed locations wore nail polish, rings, or bracelets during the pandemic. This behaviour is in line with the World Health Organisation's recommendations in which appropriate hand hygiene is listed in priorities in the prevention of healthcare-associated infection caused by COVID-19 [19, 20].

In a study that assessed the impact of the COVID-19 pandemic on health service delivery and frontline workers in Malawi, south-east Africa, key barriers to implementing COVID-19 prevention measures included periodic shortages of basic resources (e.g., soap, hand sanitizer, water, masks, and staff); this was not the case in the current study [21]. Nevertheless, the same as in that study, there were no significant differences between rural and urban facilities regarding either the availability and use of preventative measures, or the uptake of routine services.

In the current study, the percentage of practices declaring that they always used a detailed cleaning protocol rose during the COVID-19 pandemic. The tendency of health care workers to make positive changes in hand hygiene and other infection prevention and control (IPC) measures due to the COVID-19 pandemic, was confirmed in another study conducted in China in 2020 [22]. Previously, it was shown that outbreak risk had an effective and long-term impact on the practice of infection prevention and control measures as healthcare worker behaviours are ameliorated [23, 24].

A recently published study (2022) showed that rural GP practices in New Zealand had a different response to the COVID-19 pandemic than urban practices [25]. The authors claimed that this observation demonstrated the strengths and resilience of rural practices. One of the possible reasons for this observation may be the demographic differences between the rural and urban general practice workforce of New Zealand, a factor that may play a role in the Polish PRICOV-19 results.

Some differences in the current study showed that a rural model of care might be more adaptive to new situations compared to the urban one. For example, significantly more respondents from rural areas reported involvement in giving information or explanations to the fragile groups (illiterate patients, those with low health literacy, or migrants). Rural

GPs have also tried to reach patients who might postpone care more actively compared to the doctors from other locations. This is in line with the literature that rural general practice has the capacity to manage conditions differently than urban practices [26].

As part of the Europe-wide PRICOV-19 study, the efforts undertaken in this investigation represent the Polish aspect of an international effort to optimise GP practices during pandemic conditions. A principal strength of this investigation is the international nature of PRICOV-19, allowing for comprehensive inter-country comparisons and the thoroughness of the study design and tool developmental process, which was vital in the collection of reliable, reproducible, and accurate data on the impact of the COVID-19 pandemic on European GP practices.

The presented study utilised a large convenience sample of GP practices, including those from rural areas, small towns, and large cities. Furthermore, practices were recruited proportionally in all regions of Poland; their diversity and the large sample size imply that the trends observed regarding the impact of COVID-19 on the subject practices can be applied to Polish GP practices at large. Indeed, upon further analysis of the international data, it is likely that many of the observed trends will be seen in practices across Europe and Israel.

Strengths and limitations of the study. Despite the robust study design of the investigation, some limitations can be noted. The data-collection method of the PRICOV-19 study is a self-reported questionnaire, the integrity of which is dependent on the responses of participant GPs. However, answer honesty was probably high due to voluntary and anonymous participation of practices.

Also, the survey took place over a relatively long period. It is a limitation that the questionnaire did not collect data on the waves and stages of COVID at the time of completion. This is because the study was a part of the international survey, and it is not possible to establish the exact COVID burden accurately retrospectively at each time point in each participating country.

Recommendations for practice and research. The results of the Polish sample of the PRICOV-19 study indicate the need to review the infrastructure of primary healthcare practices, and possible implementation of changes in this area, which could enable safe and high-quality medical care during a pandemic. They also show the need to improve remote communication with patients, especially with the use of visual techniques (video), as well as the flow of information with the use of websites. Doctors, nurses, and other staff, especially in cities, should pay more attention to the needs of deprived patients (elderly, people with multi-morbidity, immigrants). Accurate understanding and defining the needs in this area requires further, in-depth research, using both quantitative and qualitative methods.

CONCLUSIONS

In response to the crisis caused by the COVID-19 pandemic, primary care practices in Poland reacted with numerous changes in the structure and organization of their work. In all analyzed areas, practices located in villages coped at least as well as those located in small and large cities. The staff of rural practices were significantly more likely to engage in active care for deprived groups of patients. Rural institutions also declared greater readiness to participate in the COVID-19 vaccination programme than those located in cities. Despite the many struggles caused by the COVID-19 pandemic, the crisis has offered an important opportunity for improvement in primary care systems, both in rural and urban locations.

REFERENCES

1. Guo YR, Cao QD, Hong ZS, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak – an update on the status. Military Med Res. 2020;7(1):11. doi:10.1186/s40779-020-00240-0
2. COVID-19 Map. Johns Hopkins Coronavirus Resource Center. Accessed July 13, 2022. https://coronavirus.jhu.edu/map.html
3. Thornton J. Covid-19: how coronavirus will change the face of general practice forever. BMJ. 2020;368:m1279. doi:10.1136/bmj.m1279
4. Institute of Medicine (US) Committee on Quality of Health Care in America. Crossing the Quality Chasm: A New Health System for the 21st Century. National Academies Press (US); 2001. Accessed December 18, 2021. http://www.ncbi.nlm.nih.gov/books/NBK222274/
5. Data Browser. Eurostat. Accessed July 6, 2022. https://ec.europa.eu/eurostat/databrowser/view/DEMO_MEXRT__custom_1210067/bookmark/table?lang=en&bookmarkId=fc27a3a9-082b-461d-830b-a4c7b36caf4f
6. Desborough J, Dykgraaf SH, Phillips C, Wright M, Maddox R, Davis S, Kidd M. Lessons for the global primary care response to COVID-19: a rapid review of evidence from past epidemics. Fam Pract. 2021 Nov 24;38(6):811–825.
7. Van Poel E, Vanden Bussche P, Klemenc-Ketis Z, Willems S. How did general practices organize care during the COVID-19 pandemic: the protocol of the cross-sectional PRICOV-19 study in 38 countries. BMC Prim Care. 2022;23(1):11. Published 2022 Jan 15. doi:10.1186/s12875-021-01587-6
8. Ghent University PRICOV-19 Team. (n.d.). PRICOV-19 STUDY: A cross-sectional study in 38 countries on the organization of care in general practices during the COVID-19 pandemic. PRICOV-19 Study: Quality and Safety in Primary Care in Times of COVID-19. Retrieved June 6, 2022, from https://pricov19study.ugent.be/
9. Grossman Z, Chodick G, Reingold SM, Chapnick G, Ashkenazi S. The future of telemedicine visits after COVID-19: perceptions of primary care pediatricians. Isr J Health Policy Res. 2020 Oct 20;9(1):53. doi: 10.1186/s13584-020-00414-0. PMID: 33081834; PMCID: PMC7573530.
10. Saint-Lary O, Gautier S, Le Breton J, Gilberg S, Frappé, Schuers M, Bourgueil Y, Renard V. How GPs adapted their practices and organisations at the beginning of COVID-19 outbreak: a French national observational survey. BMJ Open 2020;10:e042119. doi:10.1136/bmjopen-2020-042119
11. Groenewegen P, van den Muijsenbergh M, Batenburg R, Van Poel E, van den Broek S, Bussche PV, Willems S. Snelle aanpassing praktijkorganisatie tijdens de coronapandemie. Huisarts Wet. 2022;65(5):16–20. Dutch. doi:10.1007/s12445-022-1439-5. Epub 2022 Apr 1. PMID: 35400733; PMCID: PMC8976212.
12. Gomez T, Anaya YB, Shih KJ, Tarn DM. A Qualitative Study of Primary Care Physicians' Experiences With Telemedicine During COVID-19. J Am Board Fam Med. 2021 Feb;34(Suppl):S61-S70. doi:10.3122/jabfm.2021.S1.200517. PMID: 33622820.
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 Jun 17;10(6):e039674. doi:10.1136/bmjopen-2020-039674. PMID: 32554730; PMCID: PMC7306272.
14. Haldane V, Zhang Z, Abbas RF, Dodd W, Lau LL, Kidd MR, Rouleau K, Zou G, Chao Z, Upshur REG, Walley J, Wei X. National primary care responses to COVID-19: a rapid review of the literature. BMJ Open. 2020 Dec 8;10(12):e041622. doi: 10.1136/bmjopen-2020-041622. PMID: 33293398; PMCID: PMC7725079.
15. Gray R, Sanders C. A reflection on the impact of COVID-19 on primary care in the United Kingdom. J Interprof Care. 2020 Sep-Oct;34(5):672–678. doi: 10.1080/13561820.2020.1823948. Epub 2020 Sep 22. PMID: 32962462.
16. Greenberg N, Docherty M, Gnanapragasam S, Wessely S. Managing mental health challenges faced by healthcare workers during covid-19

pandemic. BMJ. 2020 Mar; 26;368:m1211. doi:10.1136/bmj.m1211. PMID:32217624.
17. Baird B, Reeve H, Ross S, Homeyman M, Nosa-Ehima M, Sahib B, Omojomolo D (2018). Innovative models of general practice. London: The King's Fund. Available online: https://committees.parliament.uk/writtenevidence/41913/pdf/ (accessed on 14 September 2022).
18. Anderson E, Sandars J, Kinnair D. The nature and benefits of team-based reflection on a patient death by healthcare professionals: a scoping review. J Interprof Care. 2019 Jan-Feb;33(1):15–25. doi: 10.1080/13561820.2018.1513462. Epub 2018 Sep 24. PMID: 30247946.
19. World Health Organization. Strengthening in Primary Care: A Collection of Existing Standards, Measurement and Implementation Resources; World Health Organization: Geneva, Switzerland, 2021; Available online: https://www.who.int/publications/i/item/9789240035249 (accessed on 14 July 2022).
20. World Health Organization. Hand Hygiene. Technical Reference Manual; World Health Organization: Geneva, Switzerland, 2009; ISBN 9789241598606. Available online: http://apps.who.int/iris/bitstream/handle/10665/44196/9789241598606_eng.pdf? sequence=1 (accessed on 14 July 2022).
21. Phiri MM, MacPherson EE, Panulo M, Chidziwisano K, Kalua K, Chirambo CM, Kawalazira G, Gundah Z, Chunda P, Morse T. Preparedness for and impact of COVID-19 on primary health care delivery in urban and rural Malawi: a mixed methods study. BMJ Open. 2022 Jun 10;12(6):e051125
22. Lai X, Wang X, Yang Q, Xu X, Tang Y, Liu C, Tan L, Lai R, Wang H, Zhang X, Zhou Q, Chen H. Will healthcare workers improve infection prevention and control behaviors as COVID-19 risk emerges and increases, in China? Antimicrob Resist Infect Control. 2020 Jun 11;9(1):83. doi:10.1186/s13756-020-00746-1. PMID: 32527300; PMCID: PMC7289224.
23. Wong TW, Tam WW. Handwashing practice and the use of personal protective equipment among medical students after the SARS epidemic in Hong Kong. Am J Infect Control. 2005;33(10):580–6.
24. Loh LC, Chelliah A, Ang TH, Ali A. Mohd. Change in infection control practices and awareness of hospital medical staff in the aftermath of SARS. Med J Malaysia. 2004;59(5):659–64.
25. Eggleton K, Bui N, Goodyear-Smith F. COVID-19 impact on New Zealand general practice: rural-urban differences. Rural Remote Health. 2022 Feb;22(1):7185.
26. Tham R, Humphreys J, Kinsman L, Buykx P, Asaid A, Tuohey K, Riley K. Evaluating the impact of sustainable comprehensive primary health care on rural health. Aust J Rural Health. 2010 Aug;18(4):166–72. doi: 10.1111/j.1440-1584.2010.01145.x. PMID: 20690913.