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COMMUNITY PHARMACISTS' ROLE DURING THE COVID-19 PANDEMIC: A CROSS-SECTIONAL SURVEY

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Abstract

Community pharmacies stayed open through every phase of the COVID-19 pandemic, and pharmacists became an unplanned first point of contact for worried members of the public. This narrative review, which reports no new data, summarises published cross-sectional surveys and related literature on what community pharmacists did, how they prepared, what limited them and how they coped. It also appraises the way such surveys are designed and reported. The literature shows broad agreement on continued dispensing, advice and infection control, with wide variation in training, protective equipment and legal scope. Convenience sampling, self-reported outcomes and short observation windows limit comparison between countries, and few studies link pharmacist activity to patient outcomes.

1. INTRODUCTION

When the first lockdowns began, most outpatient services closed or moved online within days. Community pharmacies were told to stay open. People who could not reach a doctor walked into the nearest pharmacy with questions about fever, cough, travel, masks, hand sanitisers and chronic medicines they feared they would run out of. Early commentary described pharmacists as the most accessible health professionals in many towns and as a frontline workforce whose contribution had not been planned for [1, 2]. Public-health guidance from the international pharmacy federation and from national bodies quickly set out what was expected of them, including continuity of supply, accurate information and protection of staff and customers [3].

Why pharmacies mattered so much is a matter of geography and habit. In most countries a person lives closer to a pharmacy than to any

other health facility, can enter without an appointment, and usually knows the staff. Those features had always been used for minor ailments and repeat medicines. Under pandemic conditions they gained a second value, because the pharmacy offered a place where symptomatic and healthy people could seek advice without crowding emergency departments. Narrative accounts written during the first wave listed the many tasks pharmacists absorbed, from screening enquiries to maintaining supply, and argued that the profession deserved a place in emergency planning alongside doctors and nurses [2, 4]. The surveys reviewed below test how far that claim is supported.

Because the situation changed weekly, evidence about the profession's response accumulated mainly through quick surveys. A cross-sectional design suits that setting. It captures practice at one moment, can be run online within weeks, and needs no intervention. The same features that make it fast also limit it, since the data describe what respondents say they did, at a time when rules, supplies and fear were all shifting. By 2023 dozens of such surveys had been published from Asia, Europe, the Middle East, Africa and the Americas, and reviews had begun to compile them [5, 6]. Reading them side by side shows both common themes and sharp contrasts between health systems.

This article is a narrative review of that body of work. It reports no new survey and no respondent data. The questions it asks are practical. Which activities did community pharmacists carry out during the pandemic, and which were new? How prepared were pharmacies, and what did preparedness depend on? What obstacles and psychological burdens did staff describe? How good is the methodology of the surveys that produced these answers? The sections that follow deal with services and scope of practice, survey methods, the pattern of reported findings, barriers and wellbeing, and finally the implications for training, regulation and future research [7, 8, 9].

A further limit to note is the speed of publication. Many early papers were released within months of data collection, and peer review was compressed. Some report findings from the first weeks of the pandemic, when infection control rules were still unsettled, and so describe conditions that changed soon afterwards. Researchers who published later could draw on more mature data but sometimes had to rely on recall, which carries its own error. Both kinds of study have a place, provided the timing is stated, and this review notes the period of data collection where it was available from the source [5, 6].

2. PANDEMIC SERVICES AND SCOPE

The core activity never changed: supplying medicines safely. Pharmacists described heavier workloads from the start, driven by stockpiling, interrupted supply chains, prescriptions arriving by telephone or e-mail, and patients asking for early refills. Several authors noted that pharmacists in low- and middle-income countries faced shortages and price rises for medicines and protective equipment, and often had to substitute products on their own judgement [10, 11]. In many places, the response included extended supply of repeat prescriptions, delivery to housebound patients and changes to opening hours. These were dull but important tasks, and they kept chronic disease treatment going while clinics were closed [6, 12].

A second group of activities concerned information. Pharmacists were asked about symptoms, testing, isolation, vaccines (once they existed), unproven remedies and rumours. The World Health Organization described an infodemic, an overload of accurate and false information that makes it hard for people to find guidance they can trust [13]. Community pharmacists were in a good position to counter this because they were trusted, available without appointment and able to answer in the local language. Surveys from several regions found that pharmacists used official sources such as health ministry websites and professional bodies, yet some admitted relying on social media, which shows how difficult it was to keep up with the pace of change [7, 14].

Infection prevention in the premises themselves was another demand. Pharmacies installed screens, limited the number of customers inside, marked distances on the

floor, increased cleaning and in some cases moved dispensing to a window or doorway. Guidance on the rational use of personal protective equipment stressed that supply was limited and that use should match risk [15]. Reports from China described detailed pharmaceutical care recommendations for epidemic conditions, including remote counselling and the screening of customers with fever [16, 17]. Others described the awkward reality that masks were scarce and that staff worried about their own exposure. Measures were often adopted before any formal protocol reached the pharmacy [7, 18].

Screening and triage at the counter was a newer activity. Pharmacy teams in several countries asked customers about symptoms and contacts before they entered, advised on when to self-isolate, and directed people with severe symptoms towards hospital or testing sites by telephone first. Guidance written in China for epidemic conditions recommended that pharmacists identify customers with fever and respiratory symptoms and refer them without delay [16]. Commentary elsewhere noted that these tasks needed training and a clear referral pathway, since a pharmacist could neither diagnose the infection nor exclude it [4, 19]. Surveys that ask whether pharmacists screened customers rarely ask how, with what protocol, or with what result, which limits their value.

Scope of practice expanded in a number of jurisdictions. A review of legal changes found that some countries allowed pharmacists to extend prescriptions, dispense without a new prescription in defined situations, substitute drugs during shortages, perform point-of-care testing or deliver medicines to patients' homes, while others kept restrictions in place [20]. Vaccination by pharmacists, already established in several countries before 2020, offered a template. A meta-analysis found that pharmacist involvement in immunisation was associated with higher vaccination rates, and the experience of community vaccination for influenza informed later planning [21, 22]. These legal shifts were frequently temporary, and whether they remain is a recurring policy question.

Demand created by rumour caused its own difficulties. When early reports suggested that certain existing medicines might help against the virus, patients and sometimes prescribers rushed to buy them, and people who needed the same drugs for long-term rheumatological or other conditions found shelves empty. Pharmacists in low-income settings in particular described pressure to supply antimicrobials and unproven preparations on request [11]. Reviews of the profession's contribution highlighted the ethical position this created: maintain access for chronic patients, resist inappropriate sales and explain the evidence status of remedies to anxious customers [6]. These tensions are evident in survey comments even where closed-ended questions do not reveal them.

Pharmacists also contributed to disease management beyond COVID-19. American authors described how community pharmacists supported people with diabetes, hypertension, asthma and other conditions through adherence checks, home monitoring advice and telephone follow-up [12]. European data from sixteen countries showed that clinical pharmacy services continued during the pandemic but were often delivered in a modified way, by telephone or video, and that some services lost ground [8]. Evidence from Africa and South Asia likewise pointed to disruptions in medicine access that pharmacists worked to reduce [10, 11]. Medication adherence was a particular concern, and pharmacists were among the few professionals able to notice missed refills and intervene before an exacerbation developed.

3. SURVEY METHODS IN PRACTICE RESEARCH

Most pandemic surveys of pharmacists used a self-administered online questionnaire distributed through professional associations, social media groups and e-mail lists. This approach reached large numbers quickly, but it also meant that the sampling frame was unknown. Respondents were those who belonged to the groups, had internet access and chose to answer. Textbooks on survey design stress that clear sampling plans, contact procedures and follow-up are central to the validity of results [23]. When a survey describes itself as nationwide without any information on how many pharmacists were invited, readers cannot judge how far the

findings can be generalised, and a high enthusiasm among a few active members may be mistaken for the profession's view.

Reporting standards exist to fix some of these weaknesses. The STROBE statement lists items that observational studies should report, such as the setting, eligibility, variables, bias, sample size and statistical methods [24]. For web-based surveys, the CHERRIES checklist asks for details on how the questionnaire was hosted, whether participation was voluntary, how duplicate entries were prevented and what the response and completion rates were [25]. Many published surveys mention neither guideline. Authors who follow them make it far easier for reviewers to see whether a result came from 100 or 1,000 respondents and whether the same person could answer twice, which is a real risk in anonymous online forms.

Sample size is another sore point. Classical tables and formulas give the number of respondents needed to estimate a proportion with a given precision, and they depend on the size of the target population [26, 27]. A survey of a few dozen pharmacists from one city cannot say much about a national workforce, yet such small convenience samples are common. Even a sample of adequate size loses value when the response rate is low, since non-respondents may differ in important ways. Pharmacists who were overwhelmed during the pandemic may have been the least able to answer a questionnaire, which would bias findings towards the more relaxed or more engaged part of the profession.

Mode of administration affects who answers. Web surveys are cheap but reach those who are online and attentive to e-mail, whereas telephone or face-to-face approaches reach more of the profession at higher cost. Methodological texts recommend multiple contacts, a clear statement of purpose, assurance of anonymity and a short, well laid-out form, all of which raise response [23]. During the pandemic, shortened forms were the norm, so complex constructs were measured with only one or two items. Where a scale is made up of many items from several domains, respondents may also answer in a patterned way. Awareness of these design effects helps explain why seemingly similar surveys came to different conclusions about the proportion of pharmacists who had received training.

The instruments deserve scrutiny. Questions about knowledge, attitudes and practice are typically scored on Likert scales, which turn agreement into ordered categories, although whether such scores can be treated as interval data has long been debated [28]. Internal consistency is often reported using Cronbach's alpha, which indicates how closely items in a scale vary together, and a value that is too low or extremely high both call for explanation [29, 30]. When a questionnaire was translated, cross-cultural adaptation with forward and back translation and pretesting is recommended [31]. Many pandemic surveys were drafted within days and piloted on a handful of colleagues, which is understandable, but the consequence is that validity evidence is thin and results across studies are not strictly comparable.

Self-report brings its own distortions. Respondents tend to answer in ways that appear professional, so the proportion who claim to have followed infection control rules is likely to overstate real behaviour. When one questionnaire collects both predictors and outcomes from the same person at the same time, common method bias can inflate relationships between them [32]. Cross-sectional design also prevents any claim about cause, so a finding that pharmacists with training reported greater confidence cannot show that the training produced the confidence. Critical readers therefore treat these surveys as descriptions of perceptions and reported practice, not as proof of effectiveness, and they look for corroboration from observational or administrative data where available [5].

Measuring the same thing twice offers a partial remedy. If a questionnaire asks for both reported behaviour and an independent indicator, such as whether the pharmacy has a written protocol that could in principle be inspected, discrepancies become visible. Procedural remedies for common method bias, including separating predictor and outcome questions, guaranteeing anonymity and mixing item formats, are described in the

methodological literature and were rarely applied in pharmacy surveys [32]. Ethical review and informed consent were generally reported, but data protection and the handling of free-text comments received less attention. Reporting these issues in a standard way, as suggested by the STROBE and CHERRIES lists, would improve transparency [24, 25].

4. REPORTED FINDINGS FROM SURVEYS

The main patterns reported across surveys are brought together in table 1 and counted by theme in fig. 1. Several consistent messages emerge. Pharmacists took on information and counselling roles in nearly every setting. Preparedness was uneven and often depended on whether the pharmacy had written procedures and received training. Willingness to take on new tasks was high, while perceived barriers, notably lack of protective equipment, time and recognition, were widely listed. Few studies extended beyond self-reported activities. The table is not a formal systematic synthesis. It illustrates the range of topics, and each row is based on the cited source only [7, 14, 18].

A study of community pharmacists in Kosovo, among the early reports, described how pharmacists were using preventive measures and where they obtained information, finding that most took protective steps but that training and official guidance reached them unevenly [7]. A study in Jordan on pharmacists' readiness assessed awareness and perceived roles, reporting that pharmacists felt able to educate the public but identified gaps in knowledge about the virus and its management [18]. A Saudi review framed the pharmacist's role in terms of disaster and emergency response, arguing for formal inclusion in national plans [33]. These findings were repeated in different forms elsewhere.

On preparedness, a study of community pharmacy readiness explored how pharmacies had planned for the pandemic, from stock control to staff rostering [34]. Findings suggested that pharmacies with a continuity plan and clear leadership adapted more quickly. Qualitative work from Canada on resilience showed that pharmacists drew on teamwork, adaptation of workflows and a sense of professional purpose, even while describing exhaustion and conflict with customers frustrated by restrictions [9]. The emerging view is that preparedness is not only about equipment but also about communication, authority to adapt, and psychological readiness. The surveys are consistent on this point, though they measure it in different ways.

Table 1: Themes reported in published surveys and reviews of community pharmacists during the COVID-19 pandemic

Source and setting	Main reported theme	Ref.
Community pharmacists Kosovo	Preventive measures taken; official information reached them unevenly	[7]
Pharmacists Jordan	Felt able to educate the public; knowledge gaps about the virus	[18]
Community pharmacies pandemic planning	Continuity plans and clear leadership linked to faster adaptation	[34]
Pharmacists 16 European countries	Core services continued; many moved to telephone or video	[8]
Pharmacy teams China	Telepharmacy and remote counselling used to extend access	[16, 17]
Community pharmacists United States	Support for chronic disease management and adherence	[12]
Pharmacists low- and middle-income countries	Shortages, price rises and pressure for unproven remedies	[10, 11]
Pharmacists Canada	Resilience through teamwork alongside exhaustion and conflict	[9]
Review of legal changes	Temporary extension of prescribing and dispensing powers in some countries	[20]
Global overview of contributions	Roles in supply, information, testing and vaccination	[6]

Knowledge about the virus itself was a common topic. Surveys of pharmacists in several countries found good general awareness of transmission routes, symptoms and preventive measures, with weaker knowledge on points that were evolving quickly, for example the duration of isolation or the place of particular drugs in treatment [7, 18]. Sources of information were a

recurring theme. Official health authority bulletins and professional organisation websites were preferred, but television and social media also featured strongly [7, 13]. Pharmacists who relied on informal channels were more likely to repeat unverified claims to customers, a risk the infodemic literature had anticipated. It follows that distribution of short, regularly updated guidance should be a priority.

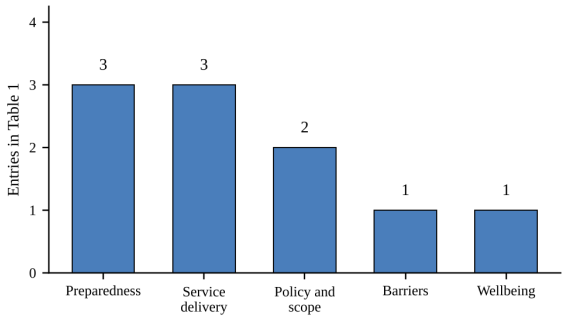


Fig. 1: Number of entries in table 1 by theme

Reports from Europe tell a story of adaptation. In a multi-country survey, pharmacists said that they continued core services but shifted counselling, medication review and follow-up to telephone and electronic channels, and some services such as health screening were reduced or halted [8]. Chinese descriptions of telepharmacy and online consultation illustrated how digital tools could extend access, with pharmacy teams answering questions about medicines for infection and chronic disease at a distance [16, 17]. Surveys in low- and middle-income settings highlighted limited digital infrastructure and a stronger reliance on in-person contact, which exposed staff to greater risk [11]. Differences of this kind make pooled estimates of activity almost meaningless.

One striking feature of the literature is the amount of attention given to beliefs and attitudes compared with outcomes. Many pharmacists thought they should participate in vaccination, point-of-care testing or triage, and many felt their skills were underused [6, 19, 20]. Much less is known about whether those activities reduced hospital referrals, improved adherence or altered infection rates. Some evidence from vaccination suggests that pharmacist involvement increases uptake [21, 22], but for most pandemic roles no comparable analysis exists. This asymmetry means that the profession can argue convincingly that it was willing and able, while still lacking data to show how much difference it made.

Comparisons by pharmacist characteristics appear in a number of surveys. Longer experience, previous training in infectious disease or emergency response, and working in a chain with central guidance were each reported to be associated with higher self-rated preparedness, though the associations were often modest and sensitive to what else was adjusted for [7, 18, 34]. Gender, age and pharmacy location were included in many analyses with inconsistent results. Because these studies are cross-sectional and based on small samples, such subgroup findings are better regarded as hypotheses for later research than as established risk factors. Authors are generally cautious here, and readers should be equally so.

5. BARRIERS, WELLBEING AND WORKFORCE

The barriers listed by pharmacists are strikingly alike from one report to the next. Shortages of masks, gloves, sanitiser and visors in the first months were reported almost everywhere. Staff shortages followed when employees fell ill or had to isolate. Lack of clear, timely guidance and frequently changing rules created confusion, while the absence of remuneration for new services left pharmacies absorbing costs [7, 14]. Some pharmacists felt unprotected by employers and by government. Others reported conflict with customers over restrictions, queueing and rationing of products in short supply, a type of stress that is rarely captured in dispensing statistics but that wore down morale over time [9].

Qualitative work captured the human cost more vividly than questionnaires could. Pharmacists described fear of infecting their families, long hours without a break, and the strain of being asked for medical advice that went beyond their authority. At the same time they described pride and a new public recognition. Research on resilience in Canadian community pharmacy found that these two sets of feelings coexisted, and that

supportive management and peer contact helped people cope [9]. A global overview of pharmacists' contributions likewise emphasised that the workforce delivered under pressure and that wellbeing needed attention [6]. Few surveys used validated burnout or anxiety scales, which leaves the scale of the problem uncertain.

Questions of role and legal authority run through the literature. In some countries, pharmacists were encouraged to expand their services, while in others they were told to keep to supply alone, even when physicians were unreachable. The legal review mentioned earlier suggested that wider scope in places such as the United Kingdom, Canada and parts of the United States rested on temporary emergency orders [20]. Pharmacists often argued for permanent change, citing their training and accessibility. Policy makers are more cautious, concerned about safety, remuneration and fragmentation of care. Surveys that record pharmacists' wishes without the views of physicians, patients and payers present only one side of this debate [2, 19].

Training emerges as a recurring need. Pharmacists reported that undergraduate education had not equipped them for a pandemic, and that postgraduate courses on infection prevention, risk communication and emergency planning would have helped [18, 33]. Professional bodies produced webinars and guidance quickly, and surveys show high uptake of such material, though some respondents said the volume itself became a burden [3, 7]. There is a case for including disaster and public-health preparedness in the pharmacy curriculum, a point made well before 2020 in a Delphi study that tried to define pharmacists' roles in disasters and found a considerable consensus on communication, medicine supply and surge support [35].

Vaccination brought a new type of pressure. Once vaccines became available, in some places pharmacists were asked to administer them, while in others they were asked about safety, side effects and eligibility without being authorised to vaccinate. Experience with influenza immunisation suggested that pharmacy-based vaccination could improve coverage by offering convenient hours and locations [21, 22]. At the same time, misinformation about vaccines created hesitancy that pharmacists had to address with limited time at the counter [13]. Surveys on this topic found willingness to take part but concern about training, storage, remuneration and liability, issues which resemble the barriers reported for earlier pandemic tasks [6, 20].

The picture from low-resource settings differs in important ways. Pharmacists there often serve as the first, and sometimes the only, health contact, handle patients with undiagnosed illness, and work with limited regulation of sales. Authors from sub-Saharan Africa described how the pandemic increased the pressure to sell antimicrobials and unproven remedies without prescription, and they stressed the need for stewardship and enforcement [11]. Others described innovative responses, such as community education campaigns and local production of sanitiser. These observations argue that findings from high-income countries cannot be applied wholesale. They also underline that surveys need to be designed with the local pharmacy sector in mind, with regional partners involved from the start.

6. IMPLICATIONS AND RESEARCH GAPS

For practice, the surveys suggest a short list of lessons. Pharmacies benefit from written continuity plans covering staffing, stock, infection control and communication, and from early inclusion in public-health alerts and supply allocation of protective equipment [15, 34]. Remote service models developed during the pandemic, from telephone counselling to delivery and electronic prescriptions, seem worth retaining where they improve access [8, 16, 17]. Pharmacists need a single reliable stream of official guidance to combat information overload [3, 13]. Finally, payment models should recognise the time spent on counselling and public-health work, otherwise the capacity built during the emergency may disappear once the crisis passes [12, 20].

Regulators face particular choices. Temporary measures were introduced quickly

under emergency powers, and surveys suggest pharmacists value them [20]. If they are to become permanent, the rules need accompanying standards for training, documentation, indemnity and communication with physicians so that the extra responsibilities improve care and do not fragment it. Payment is the other half of the question. Services such as medication review, telephone follow-up and delivery cost time, and where no fee exists they depend on goodwill. Evidence on whether these services are cost-effective is scarce, so a pragmatic approach is to introduce them with built-in evaluation, collecting simple process and outcome indicators from the start [2, 12, 19].

Generalisation requires care. Findings from one country, one health system and one wave of infection cannot simply be exported. Differences in pharmacy ownership, regulation of over-the-counter sales, prevalence of infection and public trust in pharmacists all alter what is feasible. Readers should look for the sampling description and the date of data collection before applying any survey in their own setting. Comparisons between early and late pandemic surveys are especially hard because the number of cases, the supply of equipment and the guidelines themselves had changed [5, 32, 34]. A cumulative, living synthesis of surveys, updated as new reports appear, would address this and would suit the rapid evolution of the topic.

For research, the main need is better surveys. Future studies should state their sampling frame and response rate, follow reporting guidelines, use validated and culturally adapted instruments, and avoid claims of national representativeness unless the design supports them [23, 24, 25, 31]. Standard core outcome sets would make results comparable across countries. Repeated cross-sectional surveys, or panels that follow the same pharmacists over time, would be far more informative than isolated snapshots because they would show how practice changed as supplies recovered and vaccines arrived. Mixed-methods work that combines questionnaires with interviews and dispensing records would give a fuller picture than any single approach [9].

A further gap concerns patients. Almost all of the evidence is from the pharmacist's side of the counter. Surveys of customers, linked prescription data and measurement of outcomes such as adherence, vaccination uptake, appropriate use of antibiotics and avoidable emergency visits would test whether pharmacy activity made a difference. Some authors have proposed frameworks that define the pharmacist's contribution in terms of outcomes, from containment of infection to management of chronic disease and mental health support [19]. Applying such frameworks prospectively, with pre-agreed indicators, would convert the broad enthusiasm seen in the surveys into evidence that policy makers can use when they decide how to plan for the next health emergency [5, 6].

7. CONCLUSION

The published surveys agree on a basic message. Community pharmacists stayed open, kept medicines flowing, answered questions that no one else was available to answer, and adapted their premises and services at speed, often with little preparation and scarce protective equipment [6, 7, 8, 14]. Differences between countries in legal scope, digital capacity and resources explain much of the variation in what pharmacists could do [6, 16, 20]. The experience also exposed a heavy psychological burden that merits formal support [9]. These are consistent and credible findings, even though they rest mostly on self-reported accounts.

The weaknesses are equally consistent. Convenience sampling, unvalidated instruments and cross-sectional timing limit generalisation, and few studies tested whether pharmacist activity improved patient outcomes [5, 23, 24, 25]. Practice should therefore build on the clear lessons about planning, communication, training and remote service models, while research should adopt better design, reporting and outcome measurement [3, 31, 34]. Policy makers who wish to retain the extended roles seen during the emergency will need stronger evidence, ideally from repeated surveys linked to patient and system data, than the present literature provides [2, 19, 22].

8. ABBREVIATIONS

CHERRIES-Checklist for Reporting Results of Internet E-Surveys, COVID-19-Coronavirus disease 2019, FIP-International Pharmaceutical Federation, PPE-Personal protective equipment, STROBE-Strengthening the Reporting of Observational Studies in Epidemiology, WHO-World Health Organization, KAP-Knowledge, attitudes and practice, LMIC-Low- and middle-income country

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Nil

10. AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

11. CONFLICT OF INTERESTS

Declared none

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