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A cross-sectional investigation of the impact of COVID-19 on community pharmacy

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ABSTRACT

Background: COVID-19 caused Australian government and state legislative/regulatory changes which impacted directly on aspects of professional community pharmacy.
Objectives: To examine the views and experiences of community pharmacists regarding the impact of COVID-19 on professional pharmacy services in Western Australian community pharmacies.
Methods: A Qualtrics questionnaire link was emailed to all 668 community pharmacies in Western Australia in March 2021. Data were collected on the impact of COVID-19 on professional pharmacy services (telehealth, digital image prescriptions, continued dispensing and emergency supply, home delivery services, medicine and medical resource substitutions), the pharmacy environment (work hours) and professional pharmacy structure (staffing and any measures implemented). Questions included 5-point Likert responses as well as yes/no or option responses. Descriptive statistics were used to summarise questionnaire responses. Chi Squared analysis was used to investigate differences between metropolitan and rural community pharmacies.
Results: The response rate was 97/668 (14.5%). Many pharmacies belonged to banner groups (47/95; 40.5%). Use of telehealth was reported (25/96; 26.0%), most commonly for MedsChecks. Many received digital image prescriptions (83/88; 94.3%) and continued dispensing, emergency supply requests, or both (78/84; 92.9%) daily. For home deliveries, most used pharmacy staff (56/78; 71.8%). Shortages were reported for many medicines. Panic buying/stockpiling and the media contributed to increased panic and shortages. Little change occurred in trading hours although many reported increased workloads (67/75; 89.3%).
Conclusions: Covid-19 has fast-tracked digitisation in Western Australian community pharmacies. This change is likely similar in other parts of Australia. This was facilitated through the expedition of regulatory changes to enable digital health. Whilst electronic prescribing has progressed, telehealth in pharmacy remained underutilised. The pandemic has contributed to pronounced medicine and medical resources shortages, which increased the workloads and pressure of community pharmacists. Pharmacists were confronted with a lot of legislative change in a short period of time. There is a need for clear and concise communication from all levels of government in future pandemics.

1. Introduction

COVID-19, caused by the severe acute respiratory syndrome coronavirus 2 (SARs-CoV-2) virus, was announced by the World Health Organization to be a pandemic on the 11th March 2020.[9] The severe acute respiratory infections caused by COVID-19 have had a substantial global impact.[9–14] As of the 10th December 2021, there were 267,184,623 confirmed cases including 5,277,327 deaths reported worldwide.[10] Its rapid spread increased the need for extensive medical resources causing an increased burden on healthcare systems globally.[9,11–13] Healthcare workers were faced with high infection risks, increased workloads and psychological stress.[14,15]

Despite Australia's comparatively lower cumulative death toll compared to most of the world, the burden to its healthcare system was substantially increased, which required changes implemented as COVID-19 emergency response plans.[16] The Australian government ensured the continued supply of medicines to patients by continuing Pharmaceutical Benefits Scheme (PBS) subsidisation [see Glossary for definitions of all services]. In addition, services introduced included home delivery services (up to once a month) for PBS or Repatriation PBS medicines, digital image prescriptions, telephone medication reviews, and telehealth for MedsCheck and Diabetes MedsCheck.[16] The Pharmaceutical Society of Australia (PSA) provided information based on federal government updates on the management of

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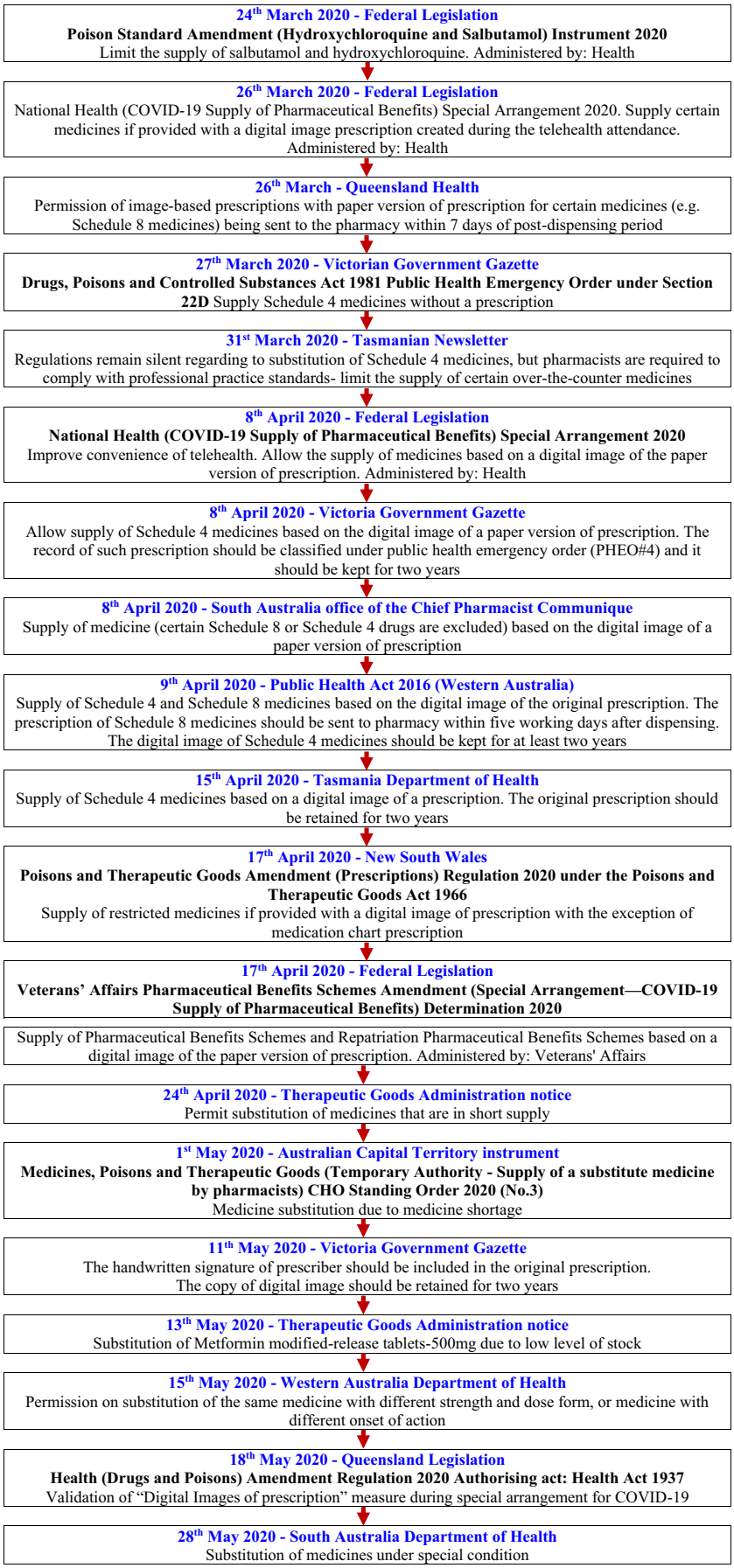

Fig. 1. – Timeline of the main legislative changes issued by the federal and jurisdictional governments in Australia from 1st March 2020 to 31st March 2020.

COVID-19.[16] The Pharmacy Guild of Australia (Guild) developed a guideline to aid in the management of 'cold-and-flu' symptoms by advertising social distancing, hygiene maintenance, and the triaging of patients.[16] The Society of Hospital Pharmacists of Australia enabled pharmacists to undergo free hospital training and upskilling packages, and the National Pharmaceutical Services Association provided updates concerning the availability of medicine stock.[16] With its first case recognised on the 25th January 2020, COVID-19's impact in Australia was marked from March 2020 onwards, where an AUD$2.4 billion dollar health package was established to provide essential care in terms of: personal protective equipment, aged care, and primary care for non-hospital treatments.[17–19] Specific to community pharmacies, legislative and regulatory changes were introduced by both the Australian and state governments, which changed aspects of professional pharmacy, especially professional pharmacy services, the pharmacy environment, and structure (Fig. 1).[1,20–22] These included adjustments to: patient-healthcare worker interactions and sharing health-information through electronic media (telehealth); prescription options moving from paper-based to include digital (digital image prescriptions), dispensing without current prescriptions (continued dispensing and emergency supply), increased medicine deliveries (home delivery services), and medicines substitution and personal protective equipment (PPE) due to shortages.[1,22,23]

In contrast to other Australian states, Western Australia (WA) has been less affected by COVID-19.[17,18,24] This was mainly due to the extended closure of the WA border to other states/territories of Australia, which was not possible for other states owing to large population areas close to their borders. This resulted in less exposure of the WA populations to especially the delta strain of COVID-19 compared to other states and internationally. WA is the largest state in Australia, with widespread pockets of rural and regional communities distributed across the state. In many of these WA communities, access to other healthcare is limited.

We have previously reported on services provided in community pharmacies in WA.[25] However, the impact of COVID-19 on WA community pharmacies has not thus far been reported.[18,24] It is unknown whether changes to professional-workplace services, environment and structure had desirable outcomes, and what impact these changes had on normal practice. Lastly, whether COVID-19 related legislative and policy changes were difficult to enforce, whether differences existed between metropolitan and rural pharmacies, or whether they lead to fragmentation in WA community pharmacy practice is unknown.[21,26,27]

1.1. Aim of study

To examine the views and experiences of community pharmacists regarding the impact of COVID-19 on professional pharmacy services in Western Australian community pharmacies.

1.2. Ethical approval

This study was approved by the Curtin University Human Research Ethics Committee (HREC) (HRE2021–0019) on the 12th Jan 2021.

2. Materials and methods

2.1. Questionnaire design

A questionnaire was developed to explore the implications of COVID-19's impact on WA community pharmacies. It consisted of 5 sections with 42 questions: Section 1 – demographic data, Section 2 – professional pharmacy services (telehealth, digital image prescriptions, continued dispensing and emergency supply, home delivery services, medicine and medical resource substitutions), Section 3 – professional pharmacy environment, Section 4 – professional pharmacy structure and Section 5 – feedback from participants. Questions used Likert scale responses (strongly agree/agree/unsure/disagree/strongly disagree), selecting a response from appropriate options or yes/no (or yes/no/sometimes) responses. References and websites used to develop the questionnaire included the PSA, Guild and Australian and state government websites.[1–5,7,8] A few questions necessitated participants to refer to their records between the 1st March 2020 and 31st May 2020.

The questionnaire was face and content validated by eight academic pharmacists with community pharmacy experience, some of whom worked in community pharmacy during COVID-19 to ensure clarity of questions, resulting in some changes. The final questionnaire was administered via Qualtrics® preceded by a two-page participant information statement highlighting the purpose of the study, benefits, participation and withdrawal, consent and confidentiality, and what the study involved. The questionnaire was anonymous. Only respondents who provided informed consent and indicated they had worked in WA community pharmacy during the 1st March 2020 to the 31st May 2020 gained access to the online questionnaire. The questionnaire is provided as Supplementary data.

2.2. Questionnaire distribution

The link to the questionnaire was dispatched to the Pharmacy Registration Board of Western Australia (PRBWA), and distributed via email to a census sample of 668 WA community pharmacies (484 metropolitan, 184 rural) on the 18th March 2021. To maximise responses, follow-up reminder emails were sent on the 14th April 2021 and 20th April 2021. The questionnaire officially concluded on the 27th April 2021. A response rate of 20–30% (134–201) was desired to obtain data enabling a full statistical analysis.

2.3. Data analysis

All data was collected by Qualtrics® into an Excel spreadsheet. The extracted Excel spreadsheet was converted into SPSS version 27, (IBM, Armonk, USA) software program for data analysis. Simple descriptive statistics included frequencies and percentages for categorical variables, and means and medians for parametric data. Chi square analysis was used to assess statistically significant differences between metropolitan and rural pharmacies. A priori level of significance for all statistical tests was set at $P \leq 0.05$. Where missing data occurred for any question the total number of respondents to that question was used as the baseline.

3. Results

3.1. Demographic data

Of the 668 questionnaires distributed by the PRBWA, 104 (15.6%) were returned. Seven respondents returned incomplete questionnaires, yielding a total of 97/668 (14.5%) useable responses. The response rates for metropolitan and rural community pharmacies were 53/484 (11.0%) and 35/184 (19.0%) respectively ($p = 0.006$) (nine respondents did not provide a postcode). Many pharmacies belonged to a banner (franchise) group (47/95; 40.5%). The distribution of male and female respondents was approximately equal (46.9% vs 52.1%) and more respondents were aged 31–40 years (35/96; 36.5%) (Table 1).

3.2. Professional pharmacy services

3.2.1. Use of telehealth

The use of telehealth services was reported by 25 respondents (26.0%), mainly for MedsChecks (14/25; 56.0%) or Diabetes MedsChecks (6/25; 24.0%). Other services included Home Medicines Reviews (HMRs) and Residential Medication Management Reviews (RMMRs).

3.2.2. Digital image prescriptions

Most respondents (83/88; 94.3%) said they received digital image prescriptions and most pharmacies (69/80; 86.3%) utilised them every day (Table 1). Most pharmacies either checked for receipt of the original prescription (legal) daily (31/80; 38.8%) or once a week (29/80; 34.9%). Only 3/80 (3.7%) never checked. On average, most pharmacies spent

Table 1
Pharmacist demographic parameters, pharmacy characteristics and data related to professional pharmacy services.

Demographic	Frequency		Parameter	Frequency		Parameter	Frequency	
	n	%		n	%		n	%
Gender (n = 96)			Usage of Telehealth (n = 96)			Frequency of Digital Image Prescriptions/week (n = 80)		
Male	45	46.9	Yes	25	26.0	Every day	69	86.3
Female	50	52.1	No	71	74.0	Every second day	9	11.3
Prefer not to say	1	1.0	Missing	1		Monthly or less often	1	1.2
Missing	1		**Usage of Continued Dispensing/ Emergency Supply (n = 84)**			Once a week	1	1.2
Age (n = 96)			Only Continued Dispensing	8	9.5	Missing	3	
21–30	13	13.5	Only Emergency Supply	14	16.7	**Frequency of checking the arrival of the original prescription (n = 80)**		
31–40	35	36.5	Emergency Supply + Continued Dispensing	56	66.7	Every day	31	38.8
41–50	21	21.9	No Emergency Supply/ Continued Dispensing	6	7.1	Every second day	10	12.5
51–60	19	19.8	Missing	13		Never	3	3.7
>60	8	8.3	**Frequency of dispensing medicines under the Emergency Supply arrangement per average week (n = 69)**			Once a week	29	34.9
Missing	1		<1	5	7.2	Twice a month	7	8.7
Qualification (n = 96)			1 to 5	41	59.4	Missing	3	
Bachelor of Pharmacy/ (Honours)	81	84.4	6 to 10	11	15.9	**Pharmacist actions (multiple responses possible)**		
Master of Pharmacy (GEM)	5	5.2	11 tov 15	3	4.3	Too busy to be able to explain	14	14.4
Graduate Diploma in Pharmacy	3	3.1	16 to 20	6	8.7	Had to manage with patient stress	63	64.9
Master of Pharmacy	5	5.2	>20	3	4.3	Happy to explain medicine shortages	42	43.3
Doctor of Philosophy (PhD)	1	1.0	Missing	28		Became tired of explaining	46	47.4
Other	1	1.0	**Frequency of dispensing medicines under the Continued Dispensing arrangement per average week (n = 63)**			There was no need to explain	1	1.0
Missing	1		<1	16	25.4	Empathetic[a]	63	64.9
Post Code (n = 88)			1 to 5	28	44.4	No medicine was suitable for patients	31	32.0
Metropolitan	53	60.2	6 to 10	11	17.5	Anxious[b]	28	28.9
Rural	35	39.8	11 tov 15	4	6.3	Concerned that consumers might go to another pharmacy	39	40.2
Missing	9		16 to 20	2	3.2	**Did pharmacy access government surgical masks (n = 72)**		
Banner Group (n = 95)			>20	2	3.2	Yes	61	84.7
Yes	47	49.5	Missing	34		No	11	15.3
No	48	50.5	**Usage of Digital Image Prescriptions (n = 88)**			Missing	25	
Missing	2		Yes	83	94.3			
			No	5	5.7			
			Missing	9				

<30 min (34/80; 42.5%) or between 30 and 45 min (22/80; 27.5%) checking that the paper-based prescriptions were subsequently provided.

3.2.3. Continued dispensing and emergency supply

A majority of respondents (78/84; 92.9%) reported using either continued dispensing or emergency supply with most (56/84; 66.7%) providing both services (Table 1). Most (48/69; 69.6%) reported that emergency supply dispensing increased workload, whereas 34/63 (54.0%) reported that continued dispensing did not increase workload (Fig. 2). Moreover, most respondents felt comfortable explaining the rules of continued dispensing if it was required more than once annually.

3.2.4. Home delivery services

Where pharmacies provided home delivery services, most used pharmacy staff for deliveries (56/78; 71.8%) and some utilised both Australia Post and pharmacy staff (16/78; 16.5%). Only one pharmacy used Kings Group for deliveries. Most community pharmacies stated that less than 10 deliveries were remunerated by the government (35/78; 44.9%), while 68/75 (90.7%) community pharmacies disclosed that less than 10 deliveries were paid by the patient (Table 2).

3.2.5. Medicine substitutions due to shortage of medicines and Personal Protective Equipment (PPE)

Shortages were reported for almost all medicines (Fig. 3 shows 15 medicines/ medicine groups associated with greater shortages), as well as hand sanitisers (59/73; 80.8%), face masks (55/73; 75.3%), and gloves (53/73; 72.6%). Most respondents 'strongly agreed' to experiencing greater medicine shortages during the period 1st March 2020 to the 31st May 2020 (54/75; 72.0%). Panic buying/stock-piling behaviours (54/73; 73.9%) with the influence of mainstream media/social-media platforms (51/73; 69.9%) contributed to increased shortages (Fig. 2). Metropolitan community pharmacies had significantly greater levels of medicines shortages than rural community pharmacies in relation to medicines for hypertension, gastro-oesophageal reflux disease and benign prostatic hyperplasia (p = 0.030; p = 0.012; p = 0.024, respectively).

More respondents agreed that medicine shortages added 41–60 min/day to their workload (26/74; 35.1%), however notable proportions reported increases of 20–40 min/day (23/74; 31.1%) or greater-than 1 h/day (20/74; 27.0%).

Pharmacists were vigilant regarding accessing important practice and legal information which was mainly obtained from 'Pharmacy Guild Member Updates' (22/73; 30.1%), 'Local WA Department of Health Updates' (18/71; 25.4%) and colleagues (16/70; 22.9%).

3.3. Professional pharmacy environment

More than one-quarter of WA community pharmacists reported working six days per week (28/72; 38.9%) and 49/72 (68.1%) respondents worked over 40 h per average week (Table 3). A majority of pharmacies had no changes in pharmacy trading hours (48/72; 66.7%) and few extended pharmacy hours (7/72; 9.7%), although some shortened their trading hours slightly (14/72; 19.4%).

3.4. Professional pharmacy environment

All pharmacies (69/69; 100%) displayed social distancing guides and most initiated increased frequency of store-cleaning (68/69; 98.6%), hand-washing (67/69; 97.1%) and set up signs of entry conditions (67/69; 97.1%). However, some pharmacy staff started wearing masks (29/69; 42.0%), using gloves (17/69; 24.6%), promoting outside seating (24/69; 34.8%), checked body temperature (22/69; 31.9%) or used 'drive through pharmacy' (10/69; 14.5%) (Fig. 4).

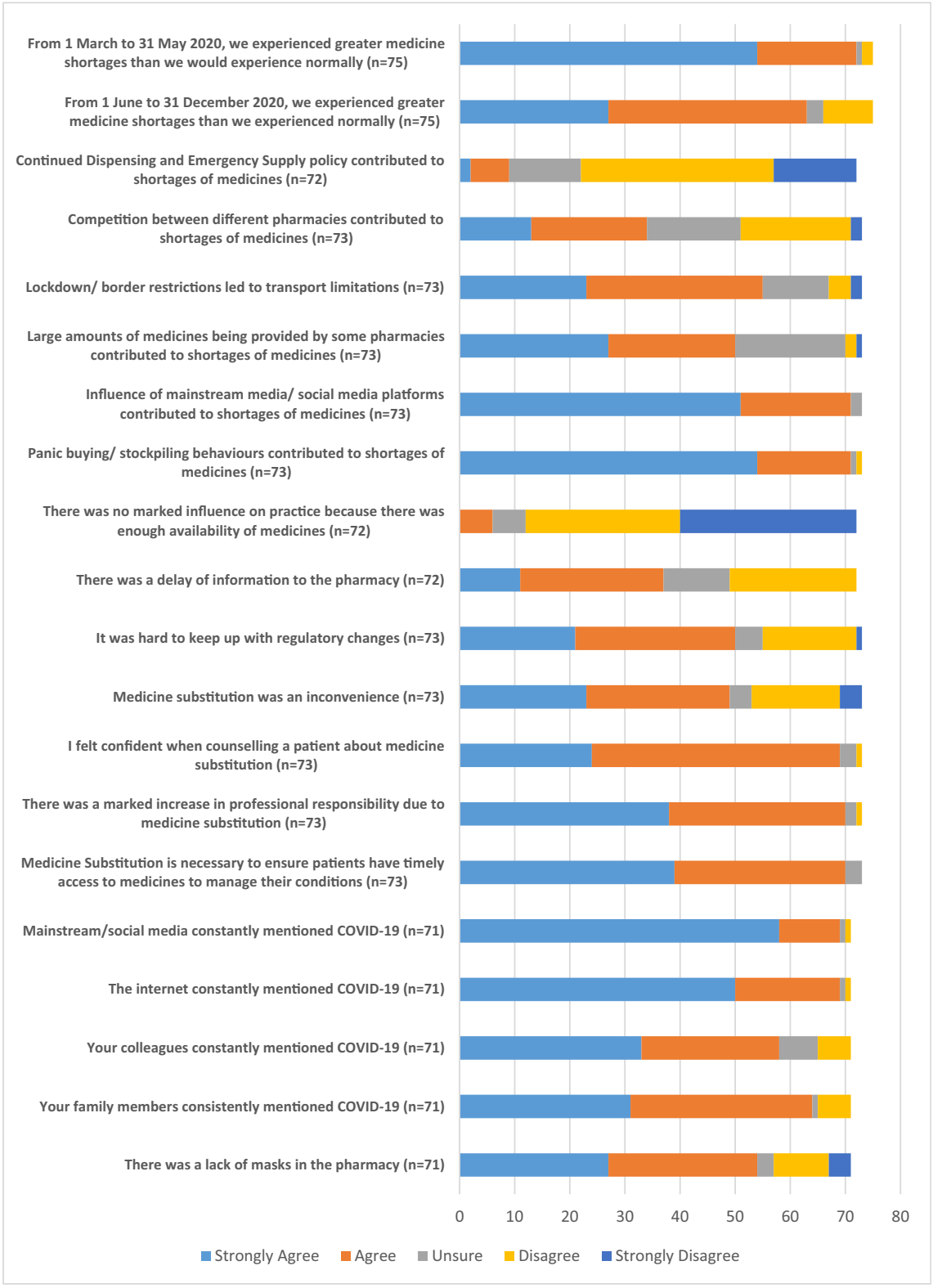

Fig. 2. Views of community pharmacies with respect to the provision of medicines and essential care within different aspects of professional pharmacy, namely professional pharmacy services, environment and structure.

3.5. Professional pharmacy structure

With respect to pharmacist views, one-quarter to one-half of respondents agreed with most of the following statements: my workload increased considerably (67/75; 89.3%); pharmacies were cleaned thoroughly (62/75; 82.7%) and I felt confident when asking about the symptoms of COVID-19 and giving advice (62/68; 91.2%) .

Table 2
Data on home delivery services, including the number of deliveries provided by rural and metropolitan pharmacies per month, payment for the service and the level of satisfaction with various home delivery services.

Statements	Less than 10 deliveries		10–20 deliveries		21–30 deliveries		31–40 deliveries		Over 40 deliveries		Missing (excluded)
	n	%	n	%	n	%	n	%	n	%	n
Total number of deliveries that your pharmacy provided per month (n = 78)	25	32.1	15	19.2	3	3.8	3	3.8	32	41.0	19
• **Rural** (n = 32)	15	46.8	5	15.6	2	6.3	2	6.3	8	25.0	3
• **Metropolitan** (n = 43)	8	18.6	10	23.3	1	2.3	1	2.3	23	53.5	10
The number of deliveries that were paid/renumerated by the government as part of the Home Medicines Service (n = 78)	35	44.9	17	21.8	4	5.1	4	5.1	18	23.1	19
The number of deliveries that were paid by the patients (n = 75)	68	90.7	3	4.0	2	2.7	0	0	2	2.7	22
The number of deliveries that were unremunerated (n = 76)	41	53.9	12	15.8	8	10.5	5	6.6	10	13.2	21
Levels of satisfaction to each Home Delivery Service (0 = least satisfied; 10 = most satisfied)							**Median**		**Minimum**		**Maximum**
Australian Post (n = 20)							6.5		1		10
Kings Group (n = 2)							5		4		6
Pharmacy staff (n = 69)							9		3		10
Satisfaction of government fee (n = 77)							5		0		10

3.6. Feedback

When asked if a similar pandemic/ emergency situation arose in future, a majority of respondents stated that they were 'very confident' or 'confident' (55/67; 82.1%) in coping with a similar situation in the future.

4. Discussion

This is the first study investigating the impact of COVID-19 in Australia and on both metropolitan and rural WA community pharmacies. The findings indicated that COVID-19 required changes that moved community pharmacy practice away from paper-based methods of ensuring continuation of patient care towards digital/online-based methods. COVID-19 expedited regulatory changes and increased the use of many professional pharmacy services investigated, including digital image prescriptions, continued dispensing and emergency supply, but not telehealth. Although WA was less affected by COVID-19 due to extended border closures to other states/territories of Australia and international travellers, resulting in less exposure of the Western Australian population to pre-omicron strains of COVID-19, most of the COVID-19 pharmacy practice changes were Australia wide. WA being at the end of supply chains was affected in this way more than some other states. COVID-19's impact caused an increased pharmacist workload, a perceived lack of support from government regulatory bodies, and pronounced medicine and medical resource shortages requiring medicine substitutions. COVID-19 did not seem to induce alterations in staffing structure, or trading hours and team rostering, however it yielded conflicting reports concerning rostering schedules. Despite a level of fragmentation due to a general lack of clear guidance from government regulatory bodies, WA community pharmacies were generally able to adapt to COVID-19-related changes. Amidst COVID-19, pharmacists showed generally high levels of resilience and confidence in dealing with pandemic/emergency situations.

Although continued patient care was already being piloted in some pharmacies it caused rapid movement towards more digital/online-based methods. The current investigation indicates that COVID-19 impacted on WA community pharmacy by accelerating the uptake of digital image

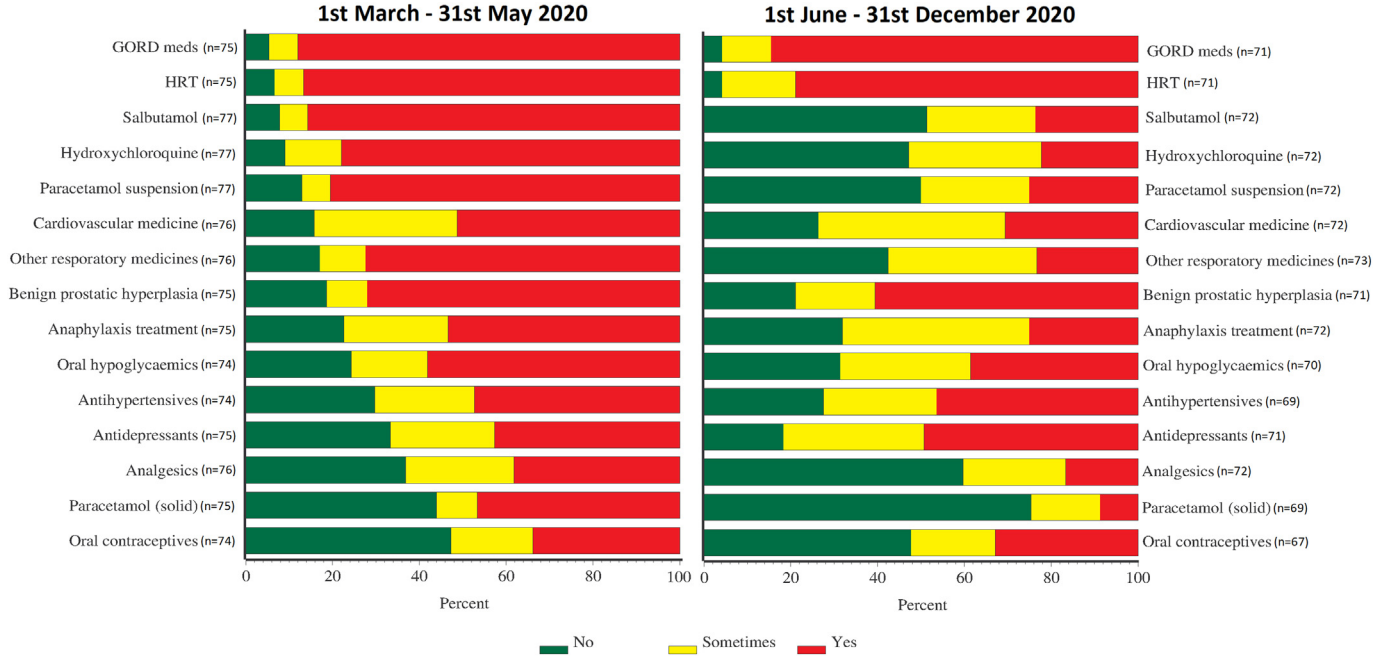

Fig. 3. Medicine shortages from the 1st March 2020 to 31st May 2020 (left hand side) and from the 1st June 2020 to 31st December 2020 (right hand side). 'Yes' (red) indicates that there were medicine shortages, 'sometimes' (yellow) indicates that there were sometimes medicine shortages, and 'no' (green) indicates that there were no medicine shortages.

Table 3
Professional pharmacy environment, professional pharmacy structure, and associated parameters (* due to personal health issues, some staff were asked not to work and replaced by new staff).

Parameter	Frequency	
	n	%
Section 3: Professional Pharmacy Environment		
How many days pharmacists worked per average week (n = 72)		
1 day a week	0	0.0
2 days a week	0	0.0
3 days a week	3	4.2
4 days a week	13	18.1
5 days a week	20	27.8
6 days a week	28	38.9
7 days a week	8	11.1
Missing	25	
How many hours pharmacists worked per average week (n = 72)		
<8 h	1	1.4
8–20 h	0	0.0
21–30 h	3	4.2
31–40 h	19	26.4
>40 h	49	68.1
Missing	25	
Hours that pharmacists worked per average day (*n* = 72)		
0–2	3	4.2
3 to 4	1	1.4
5 to 6	0	0.0
7 to 8	20	27.8
9 to 10	33	45.8
>10	15	20.8
Missing	25	
Changes in the rostering schedule (n = 72)		
Shorter hours	10	13.9
Longer hours	25	34.7
No change	37	51.4
Missing	25	
Usage of team-rostering approach (n = 72)		
Yes	27	37.5
No	45	62.5
Missing	25	
Professional Pharmacy Services		
Changes in staffing as a consequence of COVID-19 (*n* = 67)		
Employed	10	14.9
Health issues*	1	1.5
Health issues*, Employed	4	6.0
Health issues*, Resigned	6	9.0
Health issues*, Resigned, Employed	9	13.4
No change	17	25.4
No change, Health issues*	4	6.0
No change, Health issues*, Resigned	1	1.5
No change, Resigned	7	10.4
Resigned	4	6.0
Resigned, Employed	4	6.0
Missing	30	

prescriptions, continued dispensing and emergency supply, and home delivery services. These findings are also supported by research from the Netherlands, France, China, Egypt and the United States that established a preference for electronic-prescriptions over paper-based prescriptions, increased authorisation and reliance on new services, and increasing the provision of essential services by increasing the supply of medicines in order to limit face-to-face contacts and decrease the risk of transmission.[28–32] It was notable that most respondents used their own pharmacy staff to conduct home delivery services and rated themselves highest (median score 9/10) in terms of satisfaction of completing said delivery services. Interestingly, a study in China reported increased usage of telepharmacy during COVID-19 as opposed to face-to-face consults, which was at variance with these findings which indicated a very limited uptake of telehealth.[31] This could be due to different healthcare systems but it could also be due to the fact that community pharmacies in WA were deemed as essential and remained open during the pandemic, so the need for increased telehealth appeared to be less than for other health professional services such as doctors who were usually only available via telehealth.

COVID-19 increased pharmacist workloads, and medicine and medical resource shortages and therefore medicine substitutions, especially during the period from the 1st March 2020 to the 31st May 2020 rather than from the 1st June 2020 to the 31st December 2020. Metropolitan community pharmacies had significantly greater levels of medicine shortages than rural community pharmacies. The shortage of medicines and medical devices was expected and may be partially explained by panic buying/stock-piling behaviours, and the influence of mainstream/social-media platforms. Supporting the current findings, a cross-sectional study in Egypt also reported an increased demand for medicines leading to medicine (antivirals) and medical devices, including PPE shortages.[32] The requirement of having to check that original paper-based prescriptions were subsequently provided to the pharmacy, and that changes to professional pharmacy practice in terms of the utilisation of new services also contributed to increased workloads. Regarding actions taken in the pharmacy, most metropolitan community pharmacies reported availability of customer shields, and selected 'yes' to wearing masks and asking for a consumers travel history, however rural community pharmacies had mixed responses.

COVID-19 resulted in regulatory and legislative changes which led to digital/online methods of practice. This impacted on professional pharmacy services, environment, and structure and caused some level of fragmentation in work pattern but little or no change in staffing or rostering schedules. In addition to the remuneration for services by the Australian Government, a significant number of community pharmacies did not receive payment for most home delivery services. Medicine and medical resource shortages were a major factor increasing workload and almost half had their workload increased by more than 40 min per day.

In response to 'coping with a similar pandemic/emergency situation in the future', a majority of respondents were confident of their abilities. However, respondents emphasised that there were increases in workload; there was a general 'silence' from the government surrounding changes; there was conflicting information between federal and state Ministers. Additionally, most argued that better exemption and compensation systems were needed, that pharmacy owners and other professions were more supported than pharmacy staff who were overworked and received no benefits therefore needing to overwork for little remuneration. These findings may contribute to increasing awareness within the pharmacy profession by providing feedback to government authority-bodies about regulatory changes and their impact on community pharmacy..

There were several limitations associated with this study. Although COVID-19 expedited regulatory changes and increased the use of several pharmacy services, some digital services were in the pilot phase in some pharmacies prior to COVID-19. However, COVID-19 caused them to be immediately implemented in all pharmacies. Further, other services such as emergency supply, digital image prescriptions and continued dispensing had temporary legislation implemented specifically due to COVID-19 of which some legislation has subsequently been retained.[33] A low response rate was this investigation's greatest limitation; this was likely due to completing the questionnaire on the dispensing computer, which was also used for other purposes; the length of questionnaire, its large scope, competing demands of pharmacists leading to time constraints. This limits the generalisability of its findings within the broader Australian context. In addition, the respondents may not represent the collective thoughts of all pharmacists. Another limitation is the lapse in time before the data were collected, considering that COVID-19 is a rapidly changing space (i.e., the situation is different now to when the pandemic first started). However, we ensured that a requirement of respondents was that they had worked during the COVID-19 period. The pandemic has been a very memorable event for pharmacists, especially as it is an ongoing issue. Further, the lessons learned are still relevant as the profession needs to be agile to respond to emergencies like this when future pandemics, bushfires or other emergencies arise.

Fig. 4. Pharmacy protocols, procedures and actions surrounding the identification of individuals with COVID-19. 'Yes' (red) indicates that the option was conducted, 'sometimes' (yellow) indicates that the option was sometimes conducted, and 'no' (green) indicates that the option was not conducted.

5. Conclusion

The current investigation has established that community pharmacies have adopted additional mechanisms to reduce paper-based methods of ensuring continued patient access to medicines and care in a timely manner, with increased use of digital/online-based methods. This is particularly relevant especially in cases when a person needed to be in isolation and had accessed telehealth and digital image prescriptions. This holds true for all professional pharmacy services excluding telehealth. Additionally, COVID-19 contributed to pronounced medicine and medical resource shortages, which increased the workloads of community pharmacists. Pharmacists accepted and adapted to new rules/regulatory changes, making policy changes overall not difficult to enforce. During the main COVID-19 crisis a general lack of consistent guidance from government regulatory bodies occurred. However, community pharmacies typically showed high levels of resilience in responding to pandemic/emergency situations.

Author contributions

Dr. Petra Czarniak and Emeritus Professor Bruce Sunderland devised the study. External supervisors Dr. Tin Fei Sim and Ms. Christianne White provided a consultation session that assisted with the searching method. The Pharmacy Registration Board of WA distributed the questionnaire. Richard Parsons contributed to the preparation of a figure. Amin Gicic, Shabnam Amini, and Shiyi Li performed the literature search, analysed the data set, developed the manuscript outline, wrote the draft, and finalised the manuscript. All authors provided comment on the draft. Amin Gicic, Shabnam Amini, and Shiyi Li undertook the final proofreading, development of the tables and figures, and approved submission of the final manuscript. All authors reviewed and approved the final manuscript.

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Declaration of Competing Interest

The authors have no conflicts of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rcsop.2022.100145.

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Glossary

Term: Definition
Banner group: Groups of community pharmacies which are marketing groups similar to franchise groups.
Continued Dispensing[1]*:* Supply of a standard quantity (usually one month's supply) of an essential Schedule 4 (S4) *Prescription Only Medicine* **without a prescription** in an emergency (the same medicine can only be supplied by Continued Dispensing once every 12 months).
Digital Image Prescriptions[1]*:* 'Digital images' of paper-based prescriptions are the paperless transfer of prescriptions from a prescriber to a pharmacist following a medical telehealth consultation. The original paper prescription was required to be forwarded to the pharmacy usually by post to confirm legality.
Electronic prescribing[2]*:* Allow patients to receive prescriptions electronically via email, SMS or mobile app, so they can be provided to a pharmacy for dispensing. By December 2021, electronic prescribing will replace digital image prescriptions. Digital image prescriptions are not examples of electronic prescriptions/ prescribing.
Emergency supply[1]*:* Supply of a small quantity (usually 3 days supply) of a *Prescription Only Medicine* **without a prescription** in an emergency, when it is not possible to contact the patient's prescriber. There is no requirement for a follow-up prescription under this arrangement.
Home delivery[3]*:* A temporary program funded by the Australian Government Department of Health, to provide home delivery of Pharmaceutical Benefits Scheme (PBS)/ Repatriation Pharmaceutical Benefits Scheme (RPBS) medications (once per month), to remove the need for vulnerable patients to visit a pharmacy.
Home Medicines Review (HMR)[4]*:* Involves the review of a patient's medicines by an accredited pharmacist, usually in their home, to improve the quality use of medicines and reduce the number of adverse events. An Australian initiative introduced in 2001.
MedsCheck/Diabetes MedsChecks[5]*:* A MedsCheck is an in-pharmacy service that aims to enhance the quality-use-of-medicines by educating patients' on their medicines, medical conditions, interactions and any issues experienced as a result of taking medicines. A Diabetes

MedsCheck provides a similar service, however focusses on providing a review of a patients type 2 diabetes medicines, monitoring devices and overall management. The MedsCheck/Diabetes MedsCheck Programs are funded by the seventh Community Pharmacy Agreement, a community pharmacy contractual agreement between the Australian government and the Pharmacy Guild of Australia. The program provides for in-pharmacy reviews of consumers who are taking multiple medications and/or have newly diagnosed or poorly controlled Type 2 diabetes.

Pharmaceutical Benefits Scheme (PBS)[6]*:* An Australian Government scheme which provides a wide range of medicines for Australian citizens and permanent residents at a subsidised price.
Repatriation Pharmaceutical Benefits Scheme (RPBS)[6]*:* Provides eligible veterans of Australia's defence force with a range of medicines and wound care items at a concessional rate.
Residential Medication Management Review (RMMR)[7]*:* Accredited pharmacist review of the medication management needs of a patient in a residential aged care facility.
Telehealth[8]*:* A telephone or video consultation with a healthcare provider.