ABSTRACT

Background

The first UK wave of the Covid-19 pandemic in 2020 placed unprecedented stress on community pharmacy. Various policies and initiatives were announced during this period to support community pharmacy to continue to perform in a manner that prioritised patient safety. However, little is understood about how these policies and initiatives were implemented by staff working in community pharmacy, and the system adaptions and responses that were initiated to maintain patient safety.

Objective

The study aimed to investigate how staff working in UK community pharmacy during the first waves of the COVID-19 pandemic in 2020 responded and adapted to system stressors to maintain patient safety.

Methods

We adopted a qualitative interview approach, underpinned by Resilient Healthcare theory, with interview data collected between July 2020 and January 2021. Data were synthesised and analysed using Framework Analysis.

Results

23 community pharmacy staff from England and Scotland were interviewed. We identified five themes supported by between two and six sub-themes: 1. Covid-19, an impending threat to the system. 2. Patient safety stressors during the first waves of Covid-19. 3. Altering the system, responding to system stressors. 4. Monitoring and adjusting. 5. Learning for the future.

Conclusion

Privileging the accounts of community pharmacy staff working on the frontline during the pandemic illuminated how responses and adaptions were developed and deployed, how continual monitoring occurred, and the factors that supported or hindered system resilience. The key learning derived from this study can serve to shorten the gap between 'work as imagined' and 'work as done', and in doing so, support the future resilience performance of community pharmacy during future outbreaks of Covid-19 or similar events.

Key words: Community pharmacy, COVID-19 pandemic, resilient healthcare, patient safety, Safety II

INTRODUCTION

The concept of resilience has been applied to and theorised within a variety of academic fields including psychology, biology, and healthcare (1). Resilient healthcare can be thought of as the capacity to adapt to threats and changes to maintain high quality, safe care (1). Resilient healthcare is underpinned by four key concepts of resilience engineering widely applied across disciplines, namely, the ability to respond, monitor, learn, and anticipate threats and changes (1-2). Furthermore, it is built on the premise that healthcare environments are complex, dynamic systems; therefore, understanding how to make healthcare safer requires a dynamic approach to performance, acknowledging how a system responds and adapts in the face of uncertainty, threats, and sustained pressure, to continue to deliver safe care. This approach is referred to as Safety II and denotes a shift in thinking about safety from a focus on only identifying incidents, understanding their causes, and developing ways to reduce them (referred to as Safety I), to learning from all outcomes, including positive outcomes (i.e., when systems deliver safe care) (3-4). In this paper, we adopt a resilient healthcare approach, to understand how staff working in community pharmacy during the Covid-19 pandemic monitored and responded to threats and stressors to maintain patient safety.

When considering threats to patient and staff safety, it is possible to classify these threats into three categories, namely, regular, irregular, and unexampled threats (5). First, regular threats are those that occur with such frequency that they enable a system to develop a standardised response (5). Such threats are often internal, and therefore can be well monitored; for instance, the threat of a community pharmacist dispensing the wrong medicine to a patient can be counteracted by a standardised response in the form of the double checking of prescriptions. Indeed, community pharmacy as a system has multiple standardised processes to mitigate against regular threats. Second, is the irregular threat – this type of threat is unexpected and rare, and therefore can be challenging to develop anticipatory responses to; instead, there is a reliance on the system to be able to self-organise rapidly and effectively (5). Finally, the unexampled threat is one that is so rare and unexpected that it is outside of the collective experience of the system, and thus the effectiveness of the response is determined by the fundamentals of the system, including whether it can sufficiently organise, monitor, and respond appropriately (5). In March 2020, community pharmacies in the UK experienced such an unexampled threat, when the World Health Organisation (WHO) declared a global pandemic due to Covid-19 (6). What followed, including a complete lockdown of non-essential services to protect the National Health Service (NHS) (7) and limit transmission of the virus, brought community pharmacy into unchartered and unexampled territory, testing the fundamentals of the system to respond to patient safety threats that were to ensue.

A Safety II approach acknowledges that events can be viewed from multiple perspectives (8). These perspectives have been labelled in the resilience engineering literature as the 'sharp' and the 'blunt' end (9). The sharp end is depictive of those who have direct experience and interaction with 'work as done;' for instance, staff working on the frontline in community pharmacy during the pandemic. Conversely, the blunt end encompasses those who have direct influence over how work is formally done, including making strategic decisions around resource, but do so from a distal and indirect position, also referred to as 'work as imagined.' Such persons might include senior management, committees, or local Government. Whilst individuals at the sharp end directly experience the impact of responses

initiated, those at the blunt end experience such impact indirectly, often reliant on standard measurements or reports to judge their impact (9).

Since March 2020, various Government legislation and initiatives have been introduced with the intention of supporting community pharmacy to respond to stressors to maintain patient safety. Examples include the introduction of social distancing measures (10), infection control (e.g., mandatory face coverings) (11), and the deployment of a volunteer 'GoodSAM' scheme (12) aimed at providing the necessary resource to support efforts. Each of these are representative of responses developed at the blunt end, based on work as imagined, chosen so that they can be monitored using common indicators, such as falls in infection rate. At the opposite 'sharp' end, international studies have highlighted practices deployed by community pharmacy staff to maintain patient safety. These include the use of Personal Protective Equipment (PPE) (13-17), changes to pharmacy layout (18-22), enhanced cleaning and disinfecting of surfaces (16-21), and the introduction of social distancing measures (13-14,16,18, 22). Similarly, evidence of pharmacies reconfiguring their systems and redeploying staff to deliver services such as the expansion of medicines delivery services (13,16,23,26), or the uptake of technology such as telephone/video consultations and use of social media to engage with customers, have been cited (24-26). However, the perspectives of staff working in community pharmacy in the UK are largely underrepresented.

To narrow the gap between 'work as imagined' and 'work as done', it is necessary to understand how staff working in UK community pharmacy during the first waves of the pandemic responded and adapted to stressors to maintain patient safety. By privileging the accounts of staff working on the frontline in the response to the pandemic, through the adoption of a qualitative methodology, this study aimed to capture how staff working in community pharmacy monitored and responded to threats, and learnt from their experiences. In sharing their accounts, we aim to support anticipatory decision-making in community pharmacy practice based on key learning from the initial waves of the pandemic.

METHODS

This qualitative study is reported using the Consolidated Criteria for Reporting Qualitative Research (COREQ) (28)

Research team and reflexivity

The primary research team consisted of one academic pharmacist (JO) and one academic psychologist who had experience in qualitative research methodology (GP). Both researchers were supported by three senior academic and applied health researchers (LB, BF and DPA), and two psychology undergraduate placement students (CG and IH). GP and JO conducted all interviews, and led on the analysis of interviews, supported by CG and IH.

Study design, setting, and sampling

The study adopted a qualitative design and used purposive sampling to recruit community pharmacists and community pharmacy technicians registered with the General Pharmaceutical Council (GPhC) and practicing in the UK during the Covid-19 pandemic. Recruitment took place via social media (Twitter®), and through existing networks such as Local Pharmaceutical Committees (LPCs). A recruitment flyer, advertising the study, was distributed to existing established local networks, with details on how to contact the research team to express interest in taking part in the study. Similarly, a Twitter® post detailing the study and providing instructions on how to contact the research team was posted following a

'Twitter Chat' with community pharmacy professionals on the topic of Covid-19 and its impact on patient safety Individuals who contacted the research team were sent a participant information sheet and consent form via email. Those who agreed to participate provided informed consent via email. Recruitment took place between August and December 2020.

Data collection

Semi-structured telephone interviews were conducted between July 2020 and January 2021, audiorecorded and transcribed verbatim. Prior to data collection, a 'Twitter Chat' was held on 7th July 2020 to identify the most salient topics of interest relating to the response of community pharmacy to stressors to patient safety associated with Covid-19. The chat was attended by community pharmacists, technicians, and academics. Findings from the chat supported the development of the interview guide (see appendix). Resilient Healthcare theory (1-2) including the underlying principles of resilience engineering, namely, the ability to respond, monitor, learn, and anticipate, were also drawn on to develop the interview guide. Interviews were conducted by GP and JO, both of whom have experience of semi-structured interviewing.

Data analysis

Framework Analysis was used to analyse the data, which offers a structured approach to the management and analysis of large sets of qualitative data (27). In line with the five stages of analysis outlined by Ritchie and Spencer (1994), GP and JO first engaged in a process of data familiarisation, whereby interview transcripts were read, and thoughts shared during data analysis meetings. Drawing on the interview guide, and working with an initial sample of ten transcripts, a framework was iteratively developed for the purpose of data management. Data from each transcript were then indexed through systematically coding quotations and placing them in one (or more) of the framework categories. A process of data summarisation followed whereby codes were developed that provided short text summaries of quotes. Completion of these steps provided a manageable data set to analyse.

 GP and JO led the data analysis and were supported by CG and IH. Codes first identified for the process of data summarisation were revisited, with the research team working to group codes into sub-themes, representative of patterns of meaning that relayed an aspect of the lived experience of community pharmacists during Covid-19, and the way they responded to threats to maintain patient safety. The process of working from codes to sub-themes was heavily iterative, with each author offering their own interpretations based on their interaction with the data. Furthermore, Resilient healthcare theory (1) was used to support the interpretation of data, offering a theoretical position to explore the performance of community pharmacy, whilst ensuring sub-themes and themes remained 'grounded in the data' (28). Over several data analysis workshops, a final set of sub-themes were identified that represented the dataset. A final layer of data analysis was then undertaken, with the aim of developing themes to represent and group identified sub-themes. In identifying broad themes, the aim was to provide a conceptual pattern across the data, with each theme representative of a central concept distinguished from other identified themes, but that collectively addressed the research aim.

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RESULTS

Twenty-three telephone interviews were undertaken with staff working in community pharmacies including independent pharmacies, supermarket pharmacies, and large chain pharmacies during the first wave of the Covid-19 pandemic (Table 1). Participants included 21 community pharmacists, 1 pharmacy technician, and 1 area l manager. Participants worked for community pharmacies predominately in England in areas such as Kent, Greater London, Yorkshire, Merseyside and Tyne and Wear, with one community pharmacist based in Scotland. Participants were interviewed once via telephone with an average of 30 minutes duration.

Five themes were developed from the data. Theme one, 'Covid-19: An impending threat to the system,' is supported by three sub-themes and describes how participants first became aware of the pandemic, and the responses they initiated in anticipation of potential threats to patient safety. Theme two, 'Patient safety stressors during the first UK wave of Covid-19,' is supported by four sub-themes and describes the stressors faced by community pharmacy. Theme three, 'Altering the system, responding to system stressors,' is supported by six sub-themes, and is illustrative of the system measures implemented to respond to safety threats. Theme four, 'Monitoring and adjusting,' is supported by two sub-themes and describes how staff working in community pharmacy continually monitored the efficacy of responses and macro system changes and responded accordingly. Finally, Theme five, 'Learning for the future,' is supported by three sub-themes and provides insight into the key learning, drawn from the experiences of participants regarding maintaining patient safety during future outbreaks or similar events.

A thematic map (Figure 1) provides an overview of the themes and sub-themes. A table of the themes, sub-themes, and exemplar quotes is provided in the appendix.
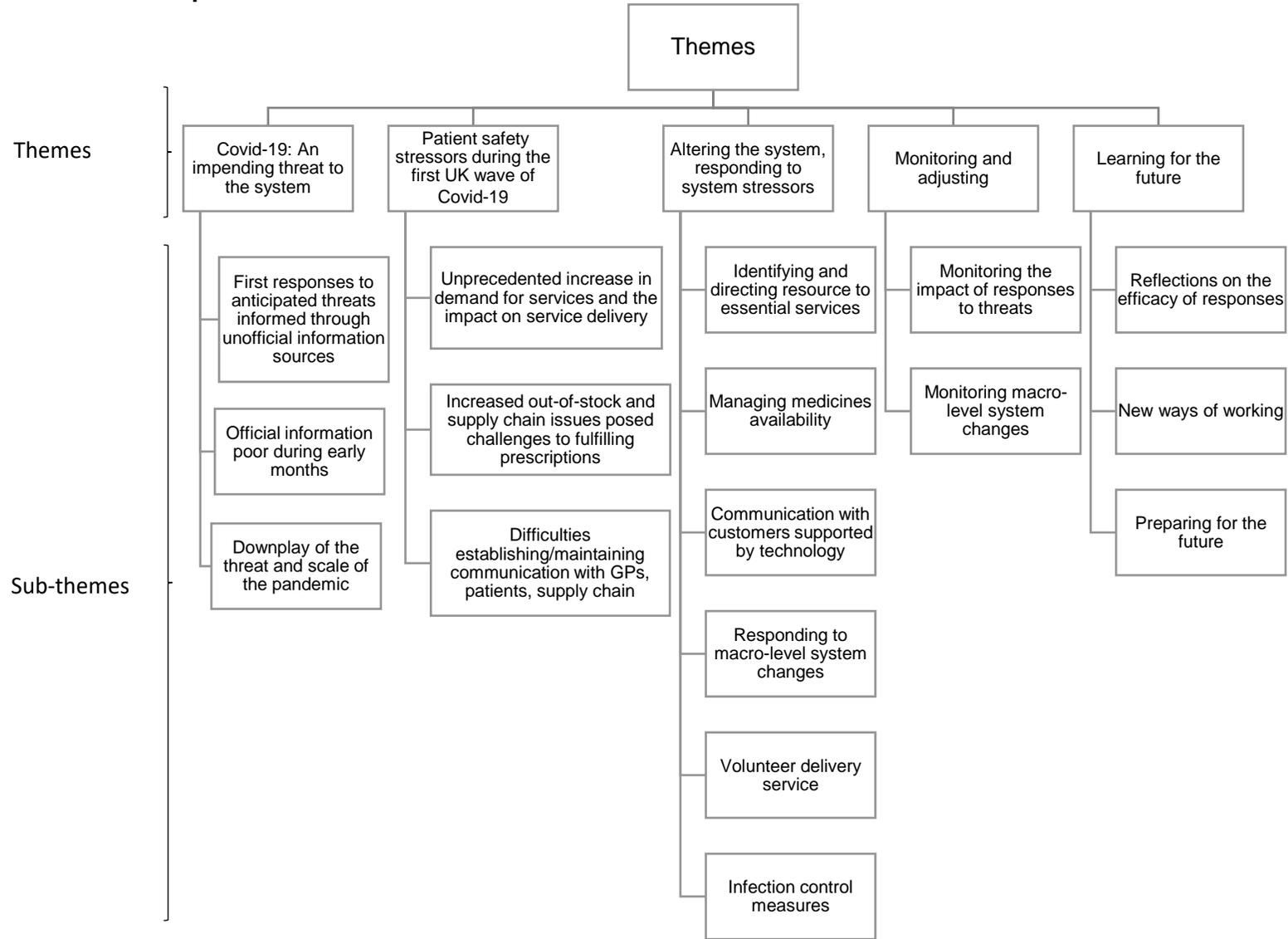
Figure 1: Thematic map

Table 1- Participant demographics (community pharmacists).

Participant Code	Gender	Ethnicity	Role
P1	Female	White British	Pharmacist/+ store manager
P2	Female	White British	Area Manager
P3	Male	Black British	Pharmacist/+ store owner
P4	Female	Black British	Pharmacist/+ store manager
P5	Male	White British	Technician
P6	Male	Black British	Pharmacist/+ store owner
P7	Male	Black British	Locum pharmacist
P8	Male	Black British	Pharmacist/+store manager
P9	Female	British Asian	Locum pharmacist
P10	Male	British Asian	Pharmacist/+store manager
P11	Female	British Asian	Pharmacist
P12	Male	Black British	Pharmacist
P13	Female	White British	Pharmacist
P14	Female	Black British	Pharmacist/+store owner
P15	Female	White British	Pharmacist/+store owner
P16	Male	Black British	Pharmacist
P17	Female	White British	Pharmacist/+store manager
P18	Male	British Asian	Pharmacist/+store manager
P19	Male	British Asian	Pharmacist
P20	Male	White British	Pharmacist
P21	Female	White British	Pharmacist
P22	Male	Black British	Pharmacist
P23	Male	British Asian	Pharmacist

N:B. a 'locum' pharmacist refers to a pharmacist who is employed on a contractual basis as opposed to a permanent salaried position,

Qualitative findings

Theme one: Covid-19-an impending threat to the system

The ability of a system to anticipate future events to prepare adequate response/s is a core attribute of resilient performance. Reports of the Covid-19 outbreak in Wuhan China, emerged in January 2020. Between the months of February and March, the pandemic began to take hold in Europe, with countries such as Italy and Spain reporting high case numbers. Participants in this study spoke of an awareness of Covid-19 during these months due to engaging with social media content and news channels, and in some instances, engaging with community pharmacists abroad via social media:

> *"…a lot of things were happening in Italy that everybody looked at and I actually was talking to professionals on Facebook forums…they were talking about how the UK needs to be prepared and put PPE on and screen protectors and things like that." P12.*

Information obtained via news and social media sources was shared via team discussions and meetings at individual pharmacies: "*We as a team here had a bit of a discussion about it really early on*" (P17). More widely, Telegram® groups run by Local Pharmaceutical Committees (LPCs) played an important role in "*feeding back what was happening on the ground*" (P1) to keep practices informed. Official information provided by Government sources and health bodies during the early months was described as poor and sometimes conflicting:

> *"You couldn't imagine it being as bad as it got at all, and we didn't really have any communications. Although it is funny because I was tidying up in the pharmacy the other day and I found something from the NHS…that was dated the 18th February and the first paragraph was something like, "The NHS is well equipped to cope, and Public Health England is well equipped to cope with such pandemic crisis. We're going to protect patients and staff while maintaining business as usual!" P21*

Staff instead drew on the experiences of those in countries such as Italy to implement first measures in anticipation of potential stressors to patient safety. Broadly, these included increasing pharmacy stock holdings (medicines and relevant appliances e.g. pain killers, thermometers etc.) in anticipation of stockpiling and potential supply chain issues, implementation of infection-control measures (handwashing, use of Perspex protective screens/shields, gloves, facemasks, and aprons), prioritising anticipated staffing/workload issues, and being proactive with respect to keeping abreast of information through pharmacist-led staff/team education, meetings, and briefings. Amongst participant accounts also existed an under-acknowledgement of the threat and scale of the pandemic that would materialise in the proceeding months. As such, some participants described initial measures put in place as unnecessary:

> *"At the time, January and February, [I] didn't really realise how serious it was or was going to be and I think a lot of people felt like that as well. We'd be talking to other pharmacists and people at work and stuff, and you'd be saying, like, "It can't be that bad." P21*

Theme two: Patient safety stressors during the first wave of the pandemic.

There was a consensus across participant accounts that the period between March and April 2020, synonymous with the first UK lockdown, saw an unprecedented increase in demand for services, prescriptions, and footfall, unparalleled to any previous experience: *"I've never seen anything like it."* (P17). Participants identified factors such as patient panic, increased demand for information, the perceived or actual closure of some general practices and other primary care services, patients shielding, and pharmacy team staffing issues, as contributors to the huge increase in demand for services:

> *"And higher amount of work in all aspects, you know, patients wanting to speak to pharmacists, dispensing going wrong, trying to organise deliveries, trying to get in touch with doctors for certain things that needed to be substituted that we have to legally, you know, ask them to do." P2*

> *"…but the Saturday just before lockdown there was somebody in and the General Practice (GP) receptionist came round with a pile of prescriptions and just said, "We're going into complete lockdown from Monday. You're not having anybody in, so I've just rung all of these people with prescriptions and told them to come to you." And it's, like, "So you're on lockdown and you're not letting anybody in, but you're just going to tell everybody to come and see us instead and we have to manage with that." P21*

A concern to patient safety voiced by participants was the inability to accurately process prescriptions in a timely fashion. Participants described the risk of *"urgent medications (requests) not getting done as quickly as they should"* (P1) due to not being able to *"distinguish which ones were urgent, to be done now, and which ones could actually wait because they'd been ordered too early"* (P17), because of the increase in the sheer volume of electronic prescriptions to be processed (through the Electronic Prescription Service). One participant, a 'locum' pharmacist (a pharmacist who is employed on a contractual basis, as opposed to a permanent salaried position), summarised the situation:

> *"I remember one of the pharmacies I went to, there was like a pile of prescriptions from like last week that hadn't even been labelled yet so there was a lot of work to have been done and the prescriptions just, every time you hit the download button, there were more and more prescriptions to be done." P9*

Increased demand for over-the-counter (OTC) medicines, and patients requesting two- to three-month's worth of prescriptions, combined with external issues with the manufacturing and supply of medicines, also led to items being out of stock, including frequently prescribed medicines, OTCs, and infection control products such as hand sanitiser. Participants described challenges in fulfilling prescriptions, with reference to difficulties obtaining deliveries of medicines from suppliers on time, or indeed at all, *"…but you just don't have things coming in, or in case, no delivery, no notice, nothing." (P2).*

These stressors were exacerbated with challenges in establishing/maintaining communication with General Practitioners (GPs)s, patients, and the supply chain. Pharmacies described difficulties in being able to contact GP practices via usual telephone calls, for example, to sort out prescription issues like switching inhalers. In addition, challenges with patient engagement due to increased workload, the inability to use the (frequently) small consultation rooms in community pharmacies, and the initial lack of PPE were cited:

> *"They* [General Practices] *were the hardest to get hold of for anything to get done, all they did was just keep sending prescriptions but weren't sorting any underlying*

issues that you would have. It could be as easy as changing something from tablets to capsules and we couldn't get through." P2

Theme three: Altering the system, responding to system stressors

To continue to function successfully, participants described various system responses to threats. Managing the intense workload during the first months of the pandemic was prioritised and involved identifying services of primary importance to maintaining patient safety and directing staff and resources to those services. To do so, other services usually offered, such as retail, were reduced:

> *"…so, what we decided was we really needed to prioritise our dispensing business, rather than the retail side; so, we reduced that side." P10.*

To manage demand for OTC and prescription medicines, measures such as restricting the quantities of sale of certain medicines and liaising with GPs to identify safe alternatives were introduced. In addition, in some cases the dispensing of two-to three-months' worth of prescriptions was paused and replaced by dispensing monthly prescriptions to support the immediate availability of medicines. Clear communication with customers, to manage expectations and enable staff to work productively was prioritised; key patient safety messages were communicated to patients over the telephone, social media, and via store notices. Furthermore, video and telephone consultations were promoted, enabling patient contact whilst adhering to social distancing guidelines and rules.

Macro system changes, such as the introduction of reduced opening hours across community pharmacy practices, supported by LPCs and the Pharmaceutical Services Negotiating Committee (PSNC), allowed community pharmacists to open later, close earlier, and close to the public over the lunch period. These measures provided staff valuable and essential time to 'catch up' on activity such as organising prescriptions, stock, and to do so without the distraction of attending to customers:

> *"…so often we'd close the pharmacy in the nominated hours we could, that was the amount officially that we could by the PSNC, just to give everybody a chance to catch up and obviously for staff, for patient safety, dispense safely..." P2*

Responding to the demand for medicine deliveries was supported in some instances by volunteers. Where community pharmacists were located in rural settings, examples of volunteers such as local villagers supporting medicine deliveries were reported. Community pharmacists in urban areas reported engagement with taxi drivers and local council initiatives such as a collaboration with the fire service to support efforts to respond to the demand for medicine deliveries. Each of these responses aimed to ensure shielding patients received their medicines:

> *"…our local council in collaboration with the fire service, they popped by to do some deliveries for us, so anytime we saw that we were inundated with deliveries…there was a dedicated phone line to ring…and the fire service volunteers came to pick up their medication from us and deliver them to the patient." P4*

Not all participants were confident to use volunteers to support medicine deliveries. Concerns regarding the lack of time to adequately train volunteers and indemnity cover were factors that discouraged the use of volunteers:

'We didn't want to use anyone that hadn't been trained and we didn't have the time to train anyone'. P1

The introduction of infection control and social distancing measures was a further response initiated. Measures included the promotion of personal hygiene for patients and staff (e.g., handwashing/sanitising), the use of plastic screens at counters to allow staff to engage with customers whilst providing a physical barrier to limit infection, introduction of two-metre social distancing in stores, and limiting the number of people allowed into the premises at any given time using queues and one-way systems. Measures evolved in line with official directives from UK Government and healthcare governing bodies, Public Health and the NHS, and the head offices of community pharmacies with multiple branches.

Theme four. Monitoring and adjusting

The first wave of the Covid-19 pandemic resulted in events and experiences that were largely novel to participants. Whilst reference was made to the 2002-2004 Severe Acute Respiratory (SARs) virus outbreak by one participant, for most, the quick and at times ad-hoc responses they developed were done from a novel position of reference, based on the limited guidance available at the start of the pandemic. As the pandemic progressed, it was imperative that initial responses to threats were monitored to ensure they continued to be effective.

Participants described how they continually monitored the impact of responses to patient safety threats (as outlined in Theme three). The adjustment of store opening times provided time to discuss the events of the day, what had worked well, and what responses needed adjusting. In addition, prioritising time to discuss responses provided the opportunity for staff to feedback on their efficacy. Monitoring responses daily also helped to quickly adapt and alter often on a 'ad-hoc' basis, although independent pharmacies suggested that they had greater autonomy to implement changes quicker than chain pharmacies:

> *"…because we were closing half an hour early, in that half an hour, what we did was as a team have an informal discussion on what's gone right that day, what's gone wrong, anything that we can do differently." P10*

Monitoring macro-level system changes, such as the introduction of laws by UK Government that influenced pharmacy practice, supported participants to implement responses in line with current guidance, such as the introduction of mandatory mask wearing. In addition, participants who worked in pharmacies part of a chain, described how information from head office was also monitored, and acted on accordingly:

> *"…as we got more information we implemented other things as well." P1*

> *"And we still do it with the Public Health England announcement and now obviously face masks coming in this Friday, so we've done posters for that." P2*

Theme five: Learning for the future

Creating a system that learns from experience and reinforces or adjusts its responses based on such learning is integral to resilience. Furthermore, integrating and feeding outcomes from learning as they occur, can support a system to better anticipate future events.

Participants reflected on the impact of responses to patient safety stressors, to learn from both what went well, as well as responses that were less effective or feasible. Overall, participants were generally pleased with the impact of responses: *"yeah I think they worked*

well, definitely." (P2). However, in some instances, guidelines on social distancing and infection control were not always perceived as feasible or effective. For example, participants referenced the introduction of two-metre social distancing for dispensary staff as difficult to adhere to due to the physical makeup of stores and limited space. Similarly, staff also questioned the efficacy of using gloves as an infection control measure, instead prioritising the adoption of good hand-washing protocol. Conversely, several participants were complimentary of responses associated with infection control measures and social distancing. The use of Perspex screens, two-metre distancing for patients in store, and handwashing protocols were all identified as responses that were particularly effective at maintaining patient safety. For example, improved hygiene also meant that no cases of the common cold were recorded amongst staff in most pharmacies.

Responding to patient safety stressors associated with Covid-19 acted as a catalyst for the rapid uptake of new/existing systems and services, or the introduction of new ways of working and operating. Participants felt that whilst the pandemic put a significant strain on daily practice, responding to stressors associated with the pandemic brought about changes to practice that had long-lasting benefits. For example, the increased uptake of the Electronic Prescription Service (EPS) and Repeat Dispensing (RD) service were highlighted as improving efficiency. The increase in the number of repeat dispensing was also cited as beneficial to planning workload, managing stock levels, and as being a more financially sustainable model of managing prescriptions. Similarly, the switch to telephone appointments and consultations was viewed as a new mode of patient communication that had the potential to be implemented long-term. Alterations to previously established practices were also referenced. For example, participants highlighted the ability to do a Medicines Use Review (MUR) over the telephone '*without it being a long complicated process'* (P21) as a positive change to practice.

Participants identified, based on their experiences, recommendations to support responses to future outbreaks. The requirement for the ready availability of voluntary staff, and the need to ensure sufficient checks and indemnity cover was in place was one recommendation, based on indemnity concerns with the UK Government-initiated volunteer schemes at the start of the pandemic:

> *"I think that's something that could be pre-prepared, have people who have already had the checks in place (to act as volunteers)". P10*

A further recommendation was to ensure that Primary Care Networks (PCNs) were appropriately utilised in the planning and risk assessment of future related Covid-19 events. For example, participants noted the benefit of utilising PCNs to engage with other pharmacists to develop continuity plans in the event of further Covid outbreaks:

> *"We've been working together (as a PCN) to work out if for example, our pharmacy went down because all staff tested positive, how would we work together (as a PCN) to manage our patients. So, we've been using the PCN to work together and come up with plans to help each other in case of disaster". P21*

Lessons learned from the start of the pandemic, which saw community pharmacies often struggling to obtain the required supply of medicines, were cited as important in developing plans for similar events in the future. For example, one participant described the importance of '*staying ahead of stock just in case deliveries fail*' (P17). Finally, there was a consensus across participant accounts that lessons learned since the start of the pandemic had provided the necessary foundations to be able to continue to respond to patient safety threats related to Covid-19.

DISCUSSION

Standard operating procedures in community pharmacy guard against regular internal threats to deliver safe and reliable care. The findings of this study have highlighted how the Covid-19 pandemic represented an external, unexampled threat (5) to local systems, and therefore required non-standardised, adaptive, and creative responses to effect swift and accurate decision-making. In focusing on the 'sharp end' of the response to the pandemic, our study has illuminated the adaptive and responsive practices undertaken by 23 staff working in community pharmacies across the UK to respond effectively to patient safety threats. More so, by utilising resilient healthcare theory, we have mapped out how staff initially anticipated threats (theme one), responded to these threats (themes two and three), continued to monitor the situation (theme four), and learnt from their experiences (theme five). This is in contrast to previous studies on Covid-19 and community pharmacy that have focused on topics such as the use of social distancing and PPE (22), exposure to Covid-19 (17), the personal resilience of pharmacy teams (29), or highlighted ways that community pharmacy could support other areas of the health service (26), with many adopting survey approaches to their studies (14,16-18,20,22,30).Thus, this study, utilising a qualitative, theoretically informed approach, offers a novel perspective on how staff working in community pharmacy adjusted, monitored, and learnt from their performance to continue to deliver safe care during the Covid-19 pandemic.

During the initial waves of the Covid-19 pandemic, numerous government measures were introduced and recommended to community pharmacy to maintain patient safety. Examples included the introduction of social distancing measures (10) and infection control (e.g., mandatory face coverings) (11). Findings from international studies (e.g., 13-15,17,18) on Covid-19 and community pharmacy suggest these measures were also adopted worldwide, reflective of advice from global health bodies such as the World Health Organisation (WHO) to stop the transmission of the virus (31). Indeed, a UK survey-based study also found the uptake of social distancing measures in UK community pharmacies (18). Our findings concur with previous studies, participants described the reorganisation of store layouts, implementation of queue systems, and displaying of public health messages, as adaptions to implement social distancing measures. However, we found dissonance between the perceived adoption and efficacy of these measures, and their actual implementation and impact in community pharmacy practice. For example, we found that social distancing protocol for dispensary staff was difficult to adhere to due to the limited space within community pharmacies. In addition, the implementation of mandatory social distancing often prohibited the use of private consultation rooms, due to the spatial parameters of stores. Consequently, whilst measures such as social distancing undoubtedly supported the minimising of Covid-19 transmission in stores, they also impacted the everyday functioning of pharmacies in ways that were previously under-acknowledged.

Several workarounds, referred to as 'props' by Fylan et al (4), were developed to mitigate against patient safety threats that manifested as an indirect result of introduced measures such as social distancing. For example, our findings showed how staff drew heavily on technology such as telephone consultations and developed new 'private' spaces within the pharmacy to continue to offer consultations with patients. We also found this to be the case in relation to other measures. For instance, guidance on the use of PPE in community pharmacies offered by the Pharmaceutical Services Negotiating Committee (32) was not always found to be effective. Such guidance recommends the use of single-use gloves by pharmacy staff. Our findings suggest that staff felt the use of gloves led to a relaxed approach towards infection control and therefore they adopted a strict hand-washing policy instead. A further example identified was the response to unprecedented demand for home

medicine delivery service. Whilst government schemes to support this response existed (12), our findings showed that staff were hesitant to engage with such schemes, citing concerns around indemnity and time to adequately train volunteers. Instead, we found that staff adapted to foster relations with local councils, villagers, taxi services, and the fire brigade to support efforts to match patient demand for the service. The Safety II paradigm acknowledges healthcare environments as complex and non-linear systems (8). Thus, successes and failures manifest within the same system and acknowledging both is key to delivering future safe performance. Illuminating the testimony of staff working at the 'sharp end' has offered insight into how measures introduced at the 'blunt end' were interpreted and implemented, and the workarounds deployed to deliver successful, safe care.

A resilient system is underpinned by its ability to successfully anticipate, respond, monitor, learn from challenges and changes to continue to provide successful outcomes (2). Our findings identified factors that supported and facilitated the system to anticipate, respond, monitor, and learn effectively. The introduction of flexible opening hours was viewed as integral in providing time to complete essential tasks such as the processing of prescriptions, to support staff to monitor the continued efficacy and suitability/sustainability of responses initiated, and to disinfect work areas. These flexibilities were removed from the standard operating procedure on 11th August 2020 (10), with emergency regulations further expiring on 30th November 2020 (33). A UK survey study found community pharmacists were keen to keep flexible opening times long-term (34). Our findings concur, as staff voiced the benefits of doing so, including implementing daily staff huddles and supporting staff wellbeing.

The rapid adoption or uptake in technology was also found to be pivotal in supporting the system response to stressors. Examples included the use of telephone consultations, the approval of previously face-to-face services such as medicine use reviews (MURs) to be undertaken via telephone, and the rapid uptake of the electronic prescribing service (EPS). Each of these adaptions to practice were viewed as beneficial to factors such as management of workload, engagement with patients, and being more financially stable than previous work models. However, in the case of the uptake of EPS, staff also described the challenges of its rapid implementation. A further factor that supported system resilience was the utilisation of recently established Primary Care Networks (PCNs). PCNs are designed to bring services across primary care (e.g., General Practitioners, pharmacists, mental health services, district nursing teams) together to deliver national service specifications linked to the NHS Long-Term Plan (35). Our findings suggest that drawing on PCNs to promote communication and engagement across primary care services, something that was seemingly absent during the initial waves of the pandemic, can support the resilience performance of community pharmacy.

Two further recommendations for practice were also identified. First, the ability of a system to anticipate future events can hinder or benefit a system in its response (2) Whilst anticipatory systems exist in community pharmacy to guard against standardised internal threats in the form of risk assessments, our findings highlighted how in the case of an external threat such as Covid-19, community pharmacy staff were reliant on unofficial sources to aid preparedness. Official sources of information were described as poor and sometimes conflicting. To support the system to anticipate future events, the creation of coherent lines of communication between those at the 'blunt end' such as official bodies and government, and those at the 'sharp end' should be prioritised. Second, we have identified several factors that appeared to support the resilient performance of community pharmacy during Covid-19. These included the rapid adoption or uptake of technology, the introduction of flexible working hours, and utilisation of PCNs. To be successful in their intended manner of supporting community pharmacy, each of these factors required the ingenuity,

adaptiveness, and willingness of staff working in community pharmacy. We recommend that the testimonies of those working on the 'frontline' of community pharmacy are heard and acknowledged in future preparation and planning for similar events.

There are strengths and limitations associated with our study. To the best of our knowledge, this is the first qualitative interview study to utilise a resilient healthcare approach to understand how staff working in community pharmacy in England and Scotland adapted and responded to stressors to maintain patient safety during the Covid-19 pandemic. To gain a broad and rich understanding of the stressors faced by staff and their responses, we recruited a diverse sample including staff from different ethnic backgrounds, with varied experiences based on their role (e.g., locum pharmacists, pharmacy owners and managers of a chain), working across geographically dispersed community pharmacies in England, with one in Scotland. In addition, we interviewed most participants between July and November 2020, after the first UK lockdown and prior to the second UK lockdown. Interviewing during this period provided a sample of participants that had sustained experience of the pandemic and were able to reflect on their recent experiences. Some limitations were also noted. Despite achieving a diverse and rich sample of community pharmacy staff, representations from Wales and Northern Ireland were absent, and limited for Scotland. Given the pressure staff working in community pharmacy were under at the time of our study, it would have been inappropriate to continue to circulate and send reminders to potential participants working in community pharmacies in these parts of the UK.

CONCLUSION

Undoubtedly, without the dedicated efforts of staff working in community pharmacy during the initial waves of the pandemic in 2020, patient safety would have been compromised. This study offers novel insight into how staff working on the frontline during Covid-19 responded and adapted to patient safety stressors, continually monitored their responses, and the factors they identified that hindered or supported system resilience. Our findings offer key learning that can serve to narrow shorten the gap between 'work as imagined' and 'work as done', and in doing so support the future resilient performance of community pharmacy. The study also identifies key areas of service adaptations that worked well to support business continuity in community pharmacy during unprecedented times and also reasserted the value of informal networks in supporting community pharmacy teams during the pandemic. at this time.

DATA SHARING STATEMENT

All data relevant to the study are included in the article.

ETHICS APPROVAL STATEMENT

Ethical approval was granted by the Chair of the Biomedical, Natural, Physical and Health Sciences Research Panel at the University of Bradford 17th June 2020.

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