



## Original Research

## Crisis management in community pharmacies during a pandemic

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## ABSTRACT

**Background:** Although the COVID-19 pandemic required community pharmacies to implement several adaptation strategies to ensure medicines' and services' availability, related empirical research based on crisis management theory is lacking.**Objective:** This study sought to holistically depict crisis management in Finnish community pharmacies and explore whether (1) pre-existing crisis plans, (2) crisis teams, (3) shared decision-making or (4) collaboration and communication with external stakeholders can protect staff resilience, pharmacy owners' resilience, organisational cohesion ('team spirit') and pharmacies' resources or finances during the pandemic.**Methods:** A cross-sectional survey was developed based on the crisis management process model and sent to Finnish community pharmacy owners (n = 602) during the pandemic's second wave in October–November 2020. Descriptive statistics were calculated, and logistic regression analysis was performed to explore effects of crisis management efforts. Open-field responses were analysed qualitatively using deductive content analysis.**Results:** In total, 221 (36.7 %) pharmacy owners participated in the study. Pharmacies responded to the pandemic with increased order volumes and new suppliers, home deliveries and remote consultations, hand sanitiser production and additional customer counselling concerning the COVID-19. Shared decision-making with pharmacy colleagues (p = 0.025) and collaboration with peers or stakeholders in the supply chain (p = 0.015) protected pharmacy owners' resilience during the pandemic. Additionally, shared decision-making protected pharmacies' finances (p = 0.040). Crisis teams or collaboration with social and healthcare operators did not provide advantage to pharmacies. However, pre-existing pandemic plans associated with reduction of pharmacies' resources (p = 0.006).**Conclusions:** Community pharmacies responded to the COVID-19 pandemic with several measures to ensure the continuity of pharmaceutical services and care and the availability of medicines, disinfectants and personal protective equipment. Developing shared decision-making in pharmacies and active collaboration with peers and supply-chain stakeholders could improve pharmacies' finances and their owners' resilience in future crises.

## 1. Introduction

The Coronavirus disease 2019 (COVID-19) pandemic profoundly affected the global pharmaceutical supply chain and posed significant challenges for community pharmacies.<sup>1–3</sup> An exceptionally high demand for medications and personal protective equipment led to global shortage issues.<sup>4,5</sup> The safety of employees and customers faced uncertainty. Community pharmacists undertook a series of actions to ensure services' continuity and medicines' availability, such as initiating infection prevention measures and hand sanitiser production, seeking

alternative distributors and increasing collaboration with pharmaceutical companies and wholesalers.<sup>1–3</sup>

Crisis management process models assume that, despite each crisis' unique nature, they all comprise a similar developmental structure.<sup>6,7</sup> Early stages affect latter stages; for example, a slow response at an early stage could cause damage or prolong subsequent stages. Although developmental process models ignore the possibility of stages overlapping or occurring simultaneously during complex and dynamic crises, they provide holistic frameworks for research on organisational crisis management and communication.<sup>11</sup>

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The current study utilises the widely accepted three-stage process model, which divides such management into pre-crisis, crisis, and post-crisis macro-level stages.<sup>6,7,11</sup> The pre-crisis stage focuses on mapping and addressing risks and potential signals, establishing crisis management teams, creating response plans and conducting training to improve preparedness.<sup>6,7</sup> Preparations depend on institutionalised practices, industry regulations and managers' perceptions of risks.<sup>7,8</sup> The crisis stage begins with an event, which can be sudden or evolve slowly.<sup>6,7</sup> The response focuses on addressing the situation and maintaining core operations, often requiring planned and ad hoc actions.<sup>7</sup> Crisis management's effectiveness is associated with corresponding plans, teams and stakeholder collaboration.<sup>6,7,9–11</sup> Such plans provide instructions during urgent and uncertain situations, while teams, stakeholder collaboration and increased communication enable construction of a comprehensive situation picture, leading to accurate and timely actions. Finally, the focus of crisis management shifts to recovery and learning during the post-crisis stage.<sup>6</sup> Organisations evaluate their responses, identify improvement areas and manage their reputations. Because of crises' scale and suddenness, as well as the number of decisions and actions taken in response, no organisation responds to a crisis in a way that is completely effective or ineffective.<sup>7</sup>

Previous research related to community pharmacies during the COVID-19 pandemic has considered all three stages of crisis management with a predominant focus on the response stage.<sup>4,5,12–19</sup> Studies have investigated various aspects, including the presence of crisis plans,<sup>12,13</sup> training,<sup>4,12,13</sup> infection prevention and control practices,<sup>4,5,12,14–18</sup> changes in employee management,<sup>16,17</sup> strategies to manage product shortages<sup>4,5,12,16,18</sup> and lessons learned from the pandemic.<sup>19</sup> However, no previous study has employed crisis management process theory in the context of community pharmacies. The current study aimed to fill this gap by utilising this theory for two purposes: (1) to provide a holistic picture of the crisis management process among Finnish community pharmacies and (2) to explore whether crisis management efforts can protect staff resilience, pharmacy owners' resilience, organisational cohesion ('team spirit'), pharmacies' resources or pharmacies' finances during the pandemic. Furthermore, the study sought to identify development areas in which community pharmacies' future preparedness could be improved.

## 2. Context

Community pharmacies are an important part of the Finnish healthcare system, providing counselling and services that promote health and support successful medication therapy.<sup>20</sup> At the end of 2019, 602 community pharmacy owners operated in Finland.<sup>21</sup> Pharmacy owners hold a master's degree in pharmacy and a community pharmacy licence from the Finnish Medicines Agency (Fimea).<sup>22</sup> In addition to entrepreneur pharmacy owners, two universities own a pharmacy: the University of Helsinki and the University of Eastern Finland. In case of disruptions to the pharmaceutical supply chain, community pharmacies are mandated to maintain a minimum two-week supply of essential medicines, medical equipment, supplies and bandages to meet their regular clientele's needs.

The first wave of the COVID-19 pandemic occurred in Finland in mid-March 2020, and the response involved several physical distancing measures.<sup>23</sup> Finland's actions were aimed at slowing the spread of the virus and protecting at-risk groups. The Emergency Powers Act was invoked for the first time since the Second World War, centralising power with the government and enabling measures to protect the pharmaceutical supply. During the summer of 2020, Finland transitioned from extensive restriction measures to the targeted management of the pandemic. The second wave arrived in Finland in October 2020, and COVID-19 infections continued to increase until the end of that year.<sup>24</sup>

## 3. Methods

### 3.1. Data collection

A questionnaire was selected as the data collection method to prevent infections and save time for respondents (see [Appendix 1: Questionnaire](#)). This method also provided a novel approach to investigating crisis management process theory, as previous studies drawing on this model were primarily based on interviews, documents or media data.<sup>11</sup> Crisis management process theory<sup>6,7</sup> provided a theoretical framework for survey development. Existing publications on pandemic preparedness and response in community pharmacies were explored to contextualise community-pharmacy-specific questions. The questionnaire was developed by the research group, whose members had both content-based and methodological expertise, and evaluated by two experts from the Association of Finnish Pharmacies. Finally, the questionnaire was sent for a face validity assessment to a pilot group ( $n = 2$ ), resulting in three minor modifications for clarity. The pilot group's members were pharmacy owners with research experience who provided content expertise from large and average-size pharmacies. The definition of a 'crisis', in the context of this study, was explained to the respondents in an information letter accompanied the questionnaire: the term signifies the global COVID-19 pandemic crisis, which affected the Finnish pharmaceutical supply chain.

The questionnaire was divided into three parts: the pre-crisis, crisis response and post-crisis stages. The questions in the first part focused on preparedness, such as pharmacy owners' perception of risks and crisis plans. The second part focused on responses and the continuity of operations, for example, with questions about crisis management teams, operational changes, collaboration with stakeholders and information sources. Finally, the third part focused on self-evaluation and lessons learned. The rationale for including questions about the post-crisis stage even though the pandemic was still ongoing was to gain data from the cross-sectional timepoint which could complement the lessons learned after the pandemic. The final questionnaire comprised 31 questions, which mainly applied a structured format with 'Yes/No' or Likert-scale options. Some open fields were included to gather additional narrative information for clarification. The online version of the questionnaire was created using the Microsoft 365 Forms web application (Microsoft Corporation, Redmond, WA, USA), and the link was disseminated to members of the Association of Finnish Pharmacies (entrepreneur pharmacy owners,  $n = 600$ ) and university pharmacies' chief pharmacists ( $n = 2$ ) via email by one of the authors. A follow-up reminder was sent two weeks later.

### 3.2. Data analysis

Descriptive quantitative data analysis and qualitative data analysis for open-field responses were conducted using the Microsoft 365 Excel software (version 2311, Microsoft Corporation, Redmond, WA, USA). Open-field responses were analysed qualitatively using deductive content analysis.<sup>25</sup> An analysis matrix was developed; the data were gathered by content and grouped based on similarities. The answers to questionnaire questions 28 and 29 (Q28 and Q29) were analysed together because they were both related to lessons learned regarding the pharmaceutical supply chain. Meanwhile, the responses to Q30 and Q31 were analysed together because of their focus on lessons learned from organisational crisis management.

Inferential statistics were calculated to explore whether (1) pre-existing crisis plans, (2) teams, (3) shared decision-making in crisis management or (4) collaboration and communication with external stakeholders can protect staff resilience, pharmacy owners' resilience, organisational cohesion ('team spirit'), and pharmacies' resources or finances. The following questions were studied.

1. Did pharmacies whose pre-existing crisis plans had been utilised in response to the pandemic (Q5) experience fewer negative pandemic impacts than those whose plans had not (Q22–27)?
2. Did pharmacies with crisis teams (Q9) experience fewer negative pandemic impacts than those without such teams (Q22–27)?
3. Did pharmacies where decisions were made collectively with other employees (Q9b) experience fewer negative pandemic impacts than those where decisions were made by pharmacy owners alone (Q22–27)?
- 4a Did pharmacies whose collaboration and communication with other pharmacies or pharmaceutical supply chain stakeholders increased or improved (Q15) experience fewer negative pandemic impacts than those whose collaboration was unchanged or decreased (Q22–27)?
- 4b Did pharmacies whose collaboration and communication with social and healthcare stakeholders increased or improved (Q16) experience fewer negative pandemic impacts than those whose collaboration was unchanged or decreased (Q22–27)?

Logistic regression was chosen as an analysis method to account for potential confounding factors and investigate potential associations' strength and direction. This analysis was performed using IBM SPSS Statistics for Windows (Statistical Package for the Social Sciences, version 29, Chicago, IL, USA). Crisis management efforts were included in the logistic regression model as independent variables: crisis plans (Q5), teams (Q9), shared decision-making (Q9b) and collaboration with external stakeholders (Q15–Q16). Collaboration with stakeholders was categorised as 'increased or improved' or 'decreased or unchanged'. 'Unchanged' was combined with 'decreased' under the assumption that, in these cases, collaboration was not used to solve pandemic-related issues. Self-evaluated pandemic impacts were included in the model as dependent variables (Q22–27). To simplify the analysis and interpretation, impacts were grouped into two categories: 'no impact–positive impact' (including no impact, positive and very positive impacts) and 'negative impact' (including negative and very negative impacts). 'No impact' was included in the positive category to isolate negative answers and reflect the statistical questions' phrasing. To account for potential confounding factors, the logistic regression analysis was adjusted for the following variables: years of experience as a pharmacy owner, pharmacy location and number of employees. The logistic regression results are presented using odds ratios (ORs) with 95 % confidence intervals (CIs); p-values of less than 0.05 were considered statistically significant.

### 3.3. Research ethics

An ethical pre-evaluation of the study protocol was conducted by the University of Helsinki Ethical Review Board in Humanities and Social and Behavioural Sciences (reference number: 42/2020). The survey was answered anonymously. Data were collected, stored, and handled according to the data protection instructions of the University of Helsinki. The participants were provided with a data protection notice before data collection.

## 4. Results

A total of 221 pharmacy owners and chief pharmacists responded to the survey, yielding a response rate of 36.7 %. Table 1 presents the respondents' demographics in detail.

### 4.1. Pre-crisis stage

The first part of the questionnaire explored pharmacy owners' perceptions of risks and preparedness efforts. Fig. 1 presents the perceptions of the likelihood of a crisis related to the pharmaceutical supply chain both before and after the onset of the COVID-19 pandemic. Before the pandemic, 31.3 % of the respondents considered a crisis likely or very

**Table 1**  
Demographic characteristics of pharmacy owners and chief pharmacists.

Characteristic	Description	n (%)
Job title	Pharmacy owner/chief pharmacist	221 (100.0)
Years of experience as owner of the pharmacy/in current position	0–5	56 (25.3)
	5–10	63 (28.5)
	10–15	46 (20.8)
	15–20	35 (15.8)
	>20	21 (9.5)
Work experience after graduation, years	10–15	1 (0.5)
	15–20	24 (10.9)
	>20	196 (88.7)
		46 (20.8)
Pharmacy location (collaborative area for healthcare and social welfare)	Northern Finland	46 (20.8)
	Eastern Finland	25 (11.3)
	Inner Finland	42 (19.0)
	Western Finland	48 (21.7)
	Southern Finland	60 (27.1)
Number of employees	<10	96 (43.4)
	10–25	113 (51.1)
	>25	12 (5.4)

likely. Following the onset of the pandemic, the corresponding percentage rose to 86.0 %.

Pharmacies established crisis plans or related standard operating procedures either before or during the pandemic. These plans addressed various scenarios, including infectious diseases, data connection system failures (including cyber threats), robberies or threatening situations, fire emergencies, power outages and sudden illness or the pharmacy owner's death. Crisis plans were educated either to the entire staff (n = 158, 71.5 %), only to managing pharmacists (n = 27, 12.2 %), only to the pharmaceutical staff (n = 14, 6.3 %), or solely to the pharmacy owner (n = 14, 6.3 %). Eight (3.6 %) responses were in a pre-specified category 'other'.

Of the pharmacies, 79.6 % (n = 176) reported their ability to use pre-existing crisis plans to address the COVID-19 pandemic. Almost all pharmacies (91.4 %, n = 202) created a new plan to minimise the harm caused by the pandemic. Pharmacies without a new plan either relied on guidelines provided by the Association of Finnish Pharmacies or operated without a formalised crisis plan.

### 4.2. Crisis response

The second part of the questionnaire focused on pandemic responses and the continuity of pharmacy operations. Most pharmacies (84.2 %, n = 186) took initial action to minimise the harm inflicted by the COVID-19 pandemic in March 2020. A small fraction of these pharmacies (6.8 %, n = 15) initiated earlier actions, while others (9.0 %, n = 20) implemented their first measures later. These actions included adding safety glass to service points, initiating the use of personal protective equipment and improving hygiene and cleaning.

Pandemic crisis teams were appointed at 78 pharmacies (35.3 %). These teams' responsibilities included monitoring the situation, communicating, creating and maintaining plans and guidelines, and implementing new measures. At pharmacies without such teams, decisions were made by two or more individuals (41.6 %, n = 92) or solely by the pharmacy owner (22.6 %, n = 50). Fig. 2 illustrates the usefulness of different information sources used to support decision-making in crisis management. The most useful sources included the Association of Finnish Pharmacies and Finnish health authorities.

A significant majority of the pharmacies (68.3 %, n = 151) reported changes in medicine supply operations, such as setting up telephone order services, home deliveries and drive-in services. Internal communication and management changed at 116 (52.5 %) pharmacies, mostly by increasing communication or moving to a virtual setting. Ninety-four pharmacies (42.5 %) reported changes in their procurement operations,

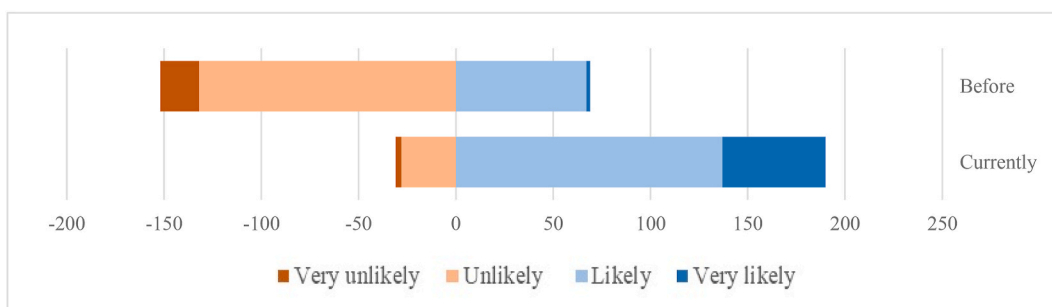


Fig. 1. Pharmacy owners' perception of the risk of a crisis concerning the pharmaceutical supply chain before and during the COVID-19 pandemic (evaluated on a Likert-scale, n = 221).

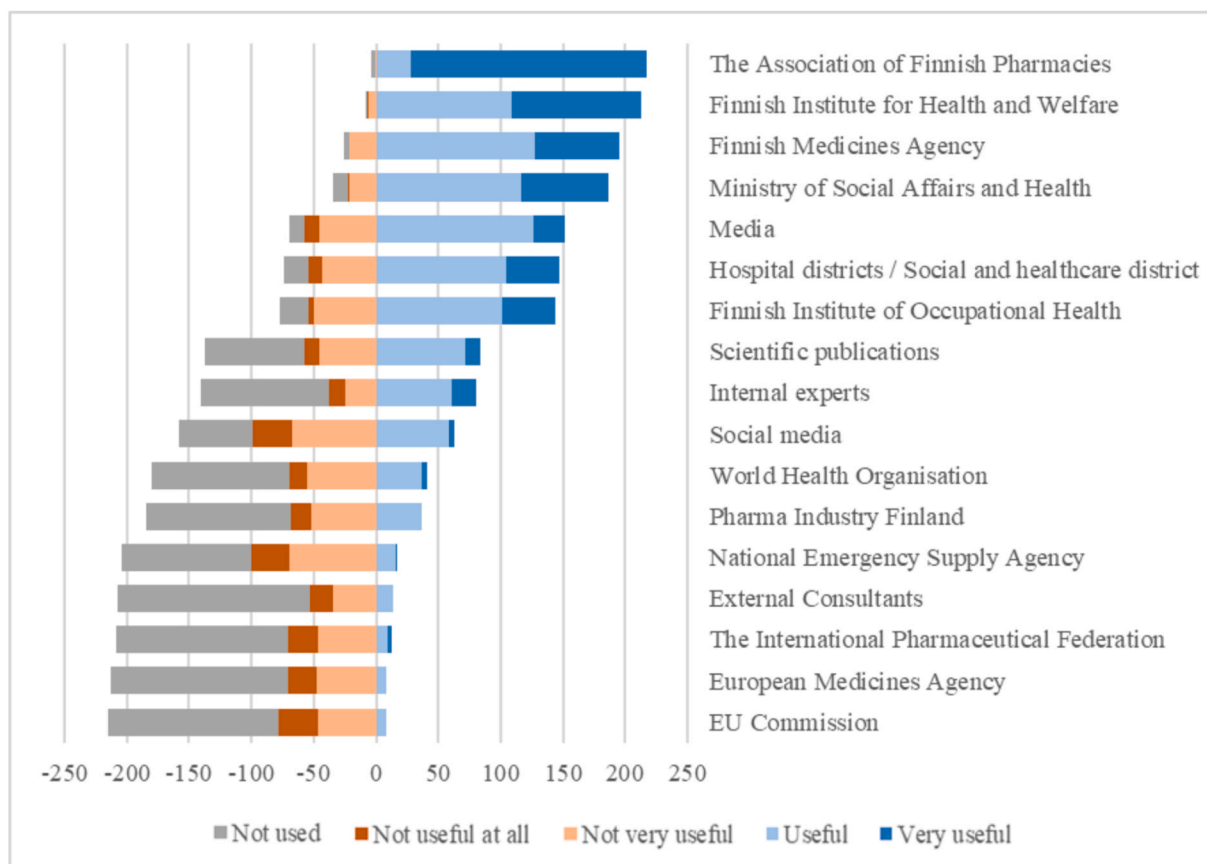


Fig. 2. Usefulness of different information sources used to support crisis management during the COVID-19 pandemic (estimated on a Likert-scale, n = 221).

such as increased order volumes and the use of new suppliers. Eleven pharmacies (5.0 %) reported pharmaceutical production adjustments. Notably, 34 pharmacies (15.4 %) maintained their operations without any alterations during the pandemic. Measures to ensure staff resilience during the pandemic were taken at 136 (61.5 %) pharmacies. Seventy-four pharmacies (33.5 %) reported implementing supplementary measures beyond those mandated by authorities to ensure medicines' availability during the pandemic, mainly by increasing their stock levels. Seventy-one pharmacies (32.1 %) reported redirecting, increasing or reducing human or other resources. Furthermore, 15.8 % of the participating pharmacies (n = 35) took specific measures to ensure medicines' quality or safety during the pandemic, such as improving patient counselling.

Pharmacists listened to patients' concerns about the pandemic (91.0 %, n = 201) and corrected incorrect information related to the pandemic or related medications (79.6 %, n = 176). Additionally, pharmacists

instructed patients to apply for testing at 63.8 % of the participating pharmacies (n = 141). A minority of the surveyed pharmacists, 4.5 % (n = 10), conducted arrival assessments (triage) for clients.

Several infection prevention measures were implemented at community pharmacies (Fig. 3). All of the participating pharmacies reported improving hygiene and cleaning efficiency. Notably, one-third of the pharmacies established their own hand sanitiser production.

Additionally, 99 respondents (44.8 %) reported changes in their collaboration and communication with other pharmacies or pharmaceutical supply chain stakeholders. According to 74 respondents (74.5 % of the subsample), collaboration and communication increased or improved, while 10 respondents (10.1 % of the subsample) noted a decrease in collaboration. Fifteen open field responses were either empty or responses were unrelated to crisis management. Changes in collaboration and communication with social and healthcare stakeholders were reported by 78 (35.3 %) respondents. Sixty respondents

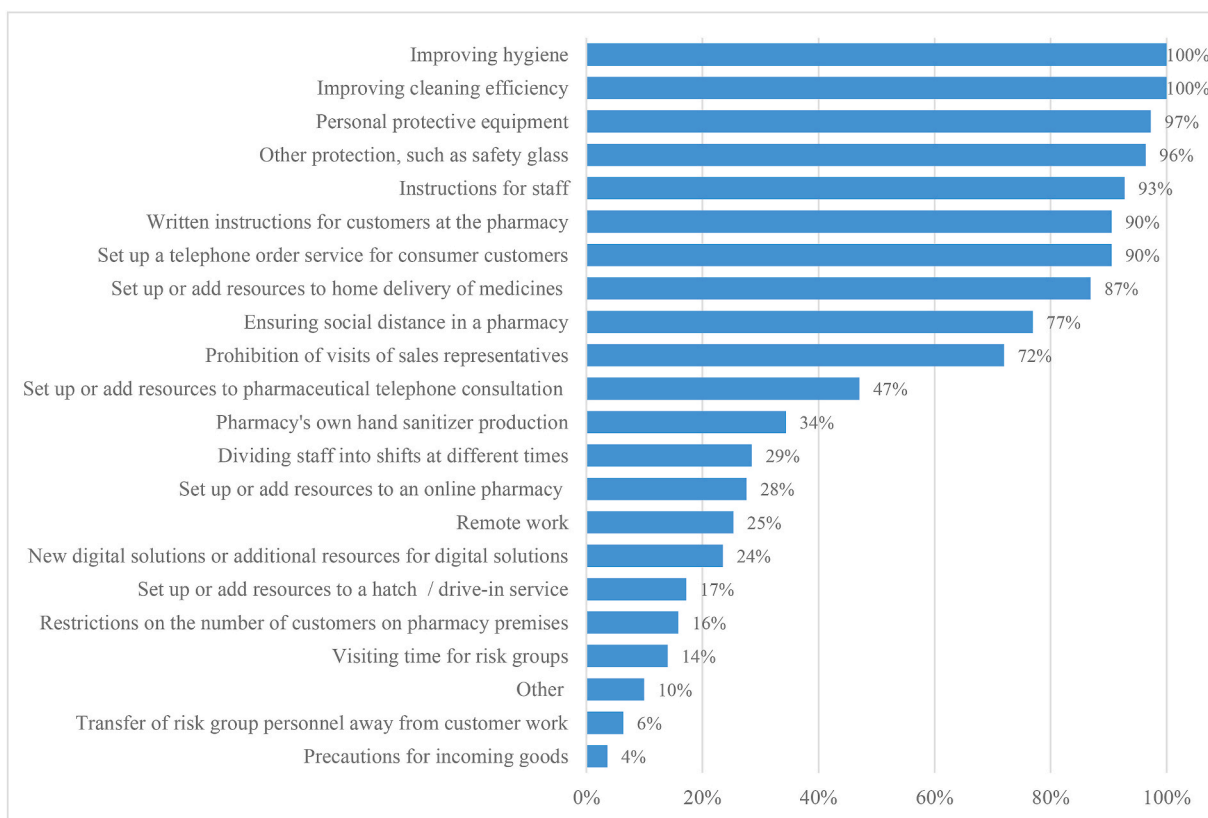


Fig. 3. Implementation of infection prevention measures in community pharmacies.

(76.9 % of the subsample) reported an increase or improvement in collaboration and communication, while nine respondents (11.5 % of the subsample) experienced a decrease in collaboration. Nine open field responses were empty. Moreover, 161 respondents (72.9 %) acknowledged a need to develop collaboration with pharmaceutical supply chain and healthcare stakeholders to prepare for future crises. Seventy respondents (43.4 % of the subsample) stressed the need to enhance the information exchange, such as by integrating pharmacies into information channels or improving reachability. Forty respondents (24.8 % of the subsample) expressed a desire to increase or improve collaboration overall – for example, with healthcare centres or wholesalers. Finally, 11 respondents (5.8 % of the subsample) emphasised the need to standardise collaboration and establish common collaboration protocols. One respondent stated, ‘There should be a national model for

collaboration. Now, everything depends too much on local guidelines and even individuals. It should not be like this; the same operational models should be in use throughout Finland. We lack almost entirely a collaboration model between social and healthcare operators and the pharmacy’ (Pharmacy owner 220).

4.3. Post-crisis stage

The third part of the questionnaire focused on evaluating the pandemic’s impacts and the lessons learned from both community pharmacy and pharmaceutical supply chain perspectives. Fig. 4 presents the respondents’ self-evaluated pandemic impacts on community pharmacies.

One hundred and sixteen respondents (52.5 %) did not identify

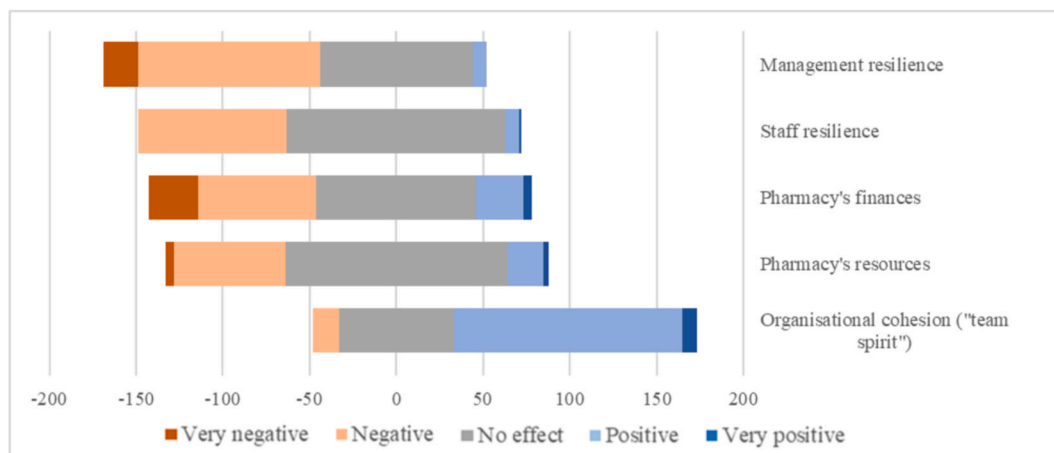


Fig. 4. Self-evaluated pandemic impacts (evaluated on a Likert-scale, n = 221).



anything they would have done differently after looking back on their own crisis management efforts. Fifty respondents (22.6 %) emphasised the need for improved internal communication. The respondents stressed the importance of clear and effective communication, precise instructions and regular updates to ensure that all staff members are informed about the evolving situation. Swift and decisive actions ( $n = 47$ , 21.3 %), as well as an updated crisis plan and established procedures ( $n = 37$ , 16.7 %), were identified as the crucial elements of effective crisis management. Some pharmacies implemented new operational procedures in anticipation of future challenges. Signal detection and timely responses emerged as areas of improvement. Additionally, 35 respondents (15.8 %) highlighted leadership qualities, such as a calm demeanour and firm leadership. Twenty respondents (9.0 %) emphasised the importance of paying attention to both personal and staff resilience, while 19 respondents (8.6 %) underscored the importance of organisational cohesion and shared responsibility. Involving and listening to staff members, as well as fostering a collaborative spirit, were identified.

Table 2 presents the challenges and success factors in the crisis management of the Finnish pharmaceutical supply chain as perceived by pharmacy owners and university pharmacies' chief pharmacists.

According to the respondents, as order volumes surged, wholesalers faced significant challenges in scaling delivery capabilities. Irregular delivery times and delays in product deliveries were notable issues. Moreover, insufficient information provided by wholesalers further compounded these challenges. Shortages of essential items – such as hand sanitiser, masks, gloves, alcohol and painkillers – were prevalent, particularly during the pandemic's initial stages. The respondents faced problems with external communication, such as unclear instructions, conflicting guidance from health authorities and a slow information flow. According to the respondents, issues with hoarding arose because of media reports on shortage issues, as well as the announcement of sales restrictions, which contributed to panic buying and led to a spike in demand.

'The role of the media in the emergence of hoarding was significant. For example, paracetamol and asthma medications. Could the pharmaceutical supply chain and media communicate better together to prevent unnecessary buying pressure and, consequently, disruptions in the pharmaceutical supply chain?' (Pharmacy owner 5)

The respondents emphasised, as the most significant success factor, how community pharmacies managed to maintain their core operations during the pandemic. The respondents highlighted that the prompt response and clear guidance by Finnish health authorities and the Association of Finnish Pharmacies were instrumental in effective crisis management. In particular, authorities' imposition of sales restrictions and additional powers granted to pharmacies were viewed as advantageous. Pharmacists were, for example, allowed to provide exceptional dispensations of medications in cases where a medication could not be supplied according to a prescription. Despite shortages in hand sanitisers, masks, gloves, alcohol and painkillers, the respondents expressed

**Table 2**  
Challenges and success factors in crisis management of the Finnish pharmaceutical supply chain.

Challenges	n (%)	Success factors	n (%)
Wholesale operations	92 (41.6)	Pharmacy operations	53 (24.0)
Shortage issues	62 (28.1)	Health authorities	37 (16.7)
External communication	27 (12.2)	Availability of medications	33 (14.9)
Hoarding and panic buying	26 (11.8)	The Association of Finnish Pharmacies	24 (10.9)
Lack of preparation	16 (7.2)	Effective communication	17 (7.7)

satisfaction with medicines' availability. Sales restrictions and pharmacy-specific order limits helped ensure medicines' consistent availability even during periods of heightened demand.

'The medications were obtained successfully, even in March, despite almost doubling customer numbers. All essential prescription medications were consistently available, and the authorities' swift response effectively curbed both customer and pharmacy hoarding, as well as prescriptions dispensed for incorrect indications.' (Pharmacy owner 20)

#### 4.4. Effects of crisis management efforts

Logistic regression analysis was used to explore whether crisis management efforts protected staff or pharmacy owners' resilience, organisational cohesion ('team spirit'), and pharmacies' resources or finances during the pandemic (Table 3). The analysis showed statistically significant values for the adjusted results. Shared decision-making during crisis management protected pharmacy owners' resilience ( $p = 0.025$ ) and pharmacies' finances ( $p = 0.040$ ). Although having a crisis team did not exhibit statistically significant values in itself, when grouped with shared decision-making, pharmacy owners' resilience ( $p = 0.024$ ) suffered less compared with pharmacies where decisions were made solely by the pharmacy owner. Moreover, increasing or improving collaboration and communication with other pharmacies or pharmaceutical supply chain stakeholders protected pharmacy owners' resilience ( $p = 0.015$ ) compared to unchanged or reduced collaboration. Notably, use of pre-existing crisis plans during the pandemic reduced pharmacy resources ( $p = 0.006$ ). Furthermore, increasing or improving collaboration and communication with social and healthcare stakeholders was not associated with any pandemic impacts. For the study's full analysis results, see Appendix 2.

## 5. Discussion

The current study described crisis preparedness, response and lessons learned at Finnish community pharmacies reported by their owners during the second wave of the COVID-19 pandemic. The response rate of 36.7 % ( $n = 221$ ) was slightly better than the response rates of previous online-survey-based studies in Finland's community pharmacy context.<sup>26,27</sup> This rate is not high enough to allow for generalisable results, but it can be considered sufficient for indicative findings that must be interpreted with caution.

The current study adds a new context to the crisis management process research. Moreover, utilising the process model for survey development provided a novel approach to data collection.<sup>6,7,11</sup> Although a focus on a specific phase could have yielded more detailed findings, the process perspective revealed advantages in its holistic and structured approach. The post-crisis results provided data from the cross-sectional timepoint which complement the learnings acquired after the pandemic. In line with the literature, phases were found to have overlapped while preparedness was improved, and lessons were learned during the crisis response.<sup>28</sup> A relational model that views crisis management as a continuous discipline based on clusters and nonlinear elements could also serve as a useful framework in future research.

This study suggests that shared decision-making in crisis management protects pharmacies' finances and pharmacy owners' resilience during a pandemic. No previous studies regarding shared decision-making in the community pharmacy context were found from English literature, indicating a need for further research. Shared decision-making has been studied in the context of a crisis management team<sup>29,30</sup>; however, having such a team was not associated with pandemic impacts in the current study. The following beneficial team-related elements in previous studies may be related also to shared decision-making: varying perspectives and skills, generating more information, stimulating creativity and fostering consensus on important

**Table 3**

How (1) crisis plans, (3) shared decision-making and (4) collaboration and communication with external stakeholders associate with pandemic impacts on community pharmacies.

Factor	n (%)	n (%)	Unadjusted OR (CI)	P-value	Adjusted <sup>a</sup> OR (CI)	P-value
<b>RQ1: Crisis plans</b>						
<b>Pre-existing crisis plans were used</b>		<b>Pharmacies' resources</b>				
		Positive impact/No impact	Negative impact			
No	36 (80.0)	9 (20.0)				
Yes	116 (65.9)	60 (34.1)	2.07 (0.94–4.58)	0.073	3.85 (1.48–10.03)	0.006
<b>RQ3: Shared decision-making</b>						
<b>Decisions were made by</b>		<b>Pharmacy owners' resilience</b>				
		Positive impact/No impact	Negative impact			
Pharmacy owner alone	16 (32.0)	34 (68.0)				
Team	36 (46.2)	42 (53.8)	0.55 (0.26–1.15)	0.113	0.44 (0.18–1.05)	0.064
Multiple people	44 (47.8)	48 (52.2)	0.51 (0.25–1.06)	0.070	0.39 (0.17–0.89)	0.025
<b>Decisions were made by</b>		<b>Pharmacies' finances</b>				
		Positive impact/No impact	Negative impact			
Pharmacy owner alone	29 (58.0)	21 (42.0)				
Team	38 (48.7)	40 (51.3)	1.45 (0.71–2.97)	0.306	0.76 (0.31–1.87)	0.547
Multiple people	56 (60.9)	36 (39.1)	0.89 (0.44–1.79)	0.739	0.41 (0.17–0.96)	0.040
<b>RQ4: Collaboration and communication with external stakeholders (other pharmacies or operators of the pharmaceutical supply chain)</b>						
<b>Change in collaboration and communication</b>		<b>Pharmacy owners' resilience</b>				
		Positive impact/No impact	Negative impact			
Unchanged or less collaboration	52 (39.4)	80 (60.6)				
More or improved collaboration	38 (51.4)	36 (48.6)	0.62 (0.35–1.09)	0.098	0.46 (0.24–0.86)	0.015

OR = Odds ratio.

CI = Confidence interval.

<sup>a</sup> Adjusted for experience years as the owner of the pharmacy, pharmacy location and the number of employees.

decisions.<sup>7,9,31</sup> Crisis management studies that emphasise the importance of teams are conducted in industrial and public management contexts, focusing on large organisations.<sup>29,30</sup> Conversely, the current study indicates that a crisis team may not add value in the pharmacy context. Such a team can, however, provide an effective platform for shared decision-making in some pharmacies.

Previous research has shown that sharing information and resources, as well as problem-solving, coordination and trusting relationships with external stakeholders, increases the effectiveness of crisis management.<sup>7,10,11,32</sup> The current study complements previous findings, adding that increasing or improving collaboration and communication with external stakeholders also protects pharmacy owners' resilience during a pandemic. This finding is statistically significant for collaboration with other pharmacies and pharmaceutical supply chain stakeholders but not for social or healthcare stakeholders. Pharmacy owners and the supply chain share the responsibility for medicine availability, which enables common problem-solving and goals.<sup>32</sup> The interdependency between social and healthcare operators is lower, which may explain why collaboration with these professionals did not hinder pandemic impacts on pharmacies.

According to the crisis management literature, crisis plans save time during crises by preassigning tasks, collecting information in advance and serving as a reference source.<sup>5,11</sup> The current study found that using a pre-existing pandemic plan was associated with reduction of pharmacies' resources. Although pre-existing plans often serve as useful guidance, their adaptation to each crisis and changing circumstances is necessary. A crisis management plan should serve as a reference tool,

rather than a step-by-step guide.<sup>6</sup> Further research is needed on what type of pre-existing crisis plans would best serve community pharmacies. Additionally, the subgroup that reported negative impacts on organisational resources was small in sample size ( $n = 9$ ), which might have influenced the statistical outcomes, and which warrants a cautious interpretation of the study's findings. No common explanatory factors for this finding were found in this subgroup's open answer fields. However, participants' answers revealed that some pharmacies utilised a template provided by the Association of Finnish Pharmacies, while some pharmacies used their own templates, indicating that 'pre-existing plans' should have been defined more clearly in the questionnaire.

### 5.1. Practical implications

The current study suggests that developing shared decision-making at pharmacies may add value to pharmacies' finances and pharmacy owners' resilience during future crises. Additionally, active collaboration with peers and other operators in the pharmaceutical supply chain may improve pharmacy owners' resilience. Pharmacies are unlikely to be able to implement these practices during crises due to their urgent nature. Therefore, a shared decision-making culture and external networks should be developed during ordinary times.

### 5.2. Study limitations

The current study has limitations that should be considered when interpreting the results. The response rate was low, which affects the

findings' generalisability and limits the sample's representativeness. However, the response rate was similar to the response rates of previous survey-based studies in Finland's community pharmacy context.<sup>26,27</sup> Additionally, the current study's findings cover only the initial seven to eight months of the pandemic. This limited time frame does not capture the full spectrum of changes and adaptations that community pharmacies underwent as the pandemic evolved. Moreover, recall bias is important to acknowledge because the participants were asked to remember events and experiences from the beginning of the pandemic, possibly leading to hindsight bias, through which the participants may have inadvertently reshaped their memories to fit their current understanding of events. Such biases may have influenced their responses' accuracy and completeness. Another notable limitation is the study's primary focus on a management perspective. An employee perspective would add understanding how crisis management strategies and their effectiveness were perceived and experienced.

## 6. Conclusions

Community pharmacies played an important role in the healthcare system during the COVID-19 pandemic by ensuring the continuity of pharmaceutical services and care, as well as decreasing the burden on other healthcare providers. Pharmacies responded to the pandemic with several measures. They increased order volumes and identified new suppliers, implemented home deliveries and remote consultations, established hand sanitiser production, provided additional counselling and corrected incorrect information concerning the pandemic. Shared decision-making during crisis management with pharmacy colleagues, as well as collaboration and communication with peers and stakeholders in the pharmaceutical supply chain protected pharmacies' finances and their owners' resilience during the pandemic. The current study suggests that crisis teams may not add value in the community pharmacy context. Also, collaboration with social and healthcare operators was not associated with pandemic impacts, possibly due to a low interdependency in common problem-solving. Surprisingly, pre-existing crisis plans were associated with reduction of resources, underscoring the importance of adaptation in different pandemics. A nonlinear relational model could serve as a useful framework in future research. Moreover, longitudinal and qualitative research could deepen this study's findings concerning crisis management efforts in the community pharmacy context.

## CRedit authorship contribution statement

**S. Latonen:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization. **E. Neuvonen:** Writing – original draft, Visualization, Formal analysis, Conceptualization. **A.M. Juppo:** Writing – review & editing, Methodology, Investigation, Funding acquisition, Conceptualization. **H. Seeck:** Writing – review & editing, Methodology, Investigation, Funding acquisition, Conceptualization. **M. Airaksinen:** Writing – review & editing, Methodology, Investigation, Funding acquisition, Conceptualization.

## Declaration of competing interest

S. Latonen: Researcher has received funding from the Association of Finnish Pharmacies.

E. Neuvonen, A. M. Juppo, H. Seeck, M. Airaksinen: No conflicts of interest to declare.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.sapharm.2024.06.010>.

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