# Collaborative Roles of Pharmacists and Pharmacy Technicians in Managing Drug Shortages: A Qualitative Study on Sourcing Alternatives, Inventory Control, and Patient Communication

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**Abstract**

**Background**: Drug shortages are a growing challenge in healthcare, significantly impacting patient care and medication management. Both pharmacists and pharmacy technicians play essential roles in mitigating the effects of these shortages.

**Objective**: This study explores how pharmacists and pharmacy technicians collaborate in managing drug shortages in a tertiary hospital, focusing on their roles in sourcing alternatives, maintaining inventory, and communicating with patients and healthcare providers.

**Methods**: A qualitative study was conducted in a 150-bed tertiary hospital using semi-structured interviews with 10 pharmacists and 10 pharmacy technicians. Thematic analysis was used to identify key themes related to decision-making, inventory management, and communication.

**Results**: Three main themes emerged: collaborative decision-making, where pharmacists and technicians shared responsibilities in managing shortages; inventory management and sourcing alternatives, with technicians overseeing stock levels and pharmacists validating alternatives; and communication, where both roles worked together to inform patients and healthcare providers of changes in medication availability.

**Conclusion**: The findings highlight the critical collaboration between pharmacists and pharmacy technicians in managing drug shortages. Their combined efforts ensure efficient medication management and minimize the impact on patient care. Enhancing this collaboration can further optimize responses to drug shortages in healthcare settings.

**Keywords**: Drug shortages, pharmacists, pharmacy technicians, collaboration, inventory management, patient communication, healthcare

## Introduction

Drug shortages are a significant and growing concern for healthcare systems worldwide, affecting patient care and safety. These shortages often arise from a range of factors, including manufacturing issues, supply chain

disruptions, regulatory changes, and raw material shortages (Fox et al., 2014; American Society of Health-System Pharmacists, 2020). The impact on patients is profound, with potential delays in treatment, the need for suboptimal therapeutic alternatives, and an increased risk of medication errors (Ventola, 2011).

Pharmacists play a critical role in addressing these shortages by identifying alternative therapies, coordinating with healthcare providers, and ensuring continuity of care. Their clinical expertise allows them to assess the safety and efficacy of substitute medications, while their communication skills help manage expectations with both patients and healthcare teams (Caulder et al., 2015). However, managing drug shortages requires more than just pharmacists' involvement—it is a team effort. Pharmacy technicians, who are often responsible for monitoring stock levels, preparing orders, and managing inventory, provide essential operational support (Desselle & Holmes, 2017).

The collaboration between pharmacists and pharmacy technicians is particularly crucial during drug shortages, as it ensures that patient care is not compromised. Pharmacy technicians' ability to handle logistical tasks, such as sourcing medications from alternative suppliers and maintaining up-to-date inventory records, allows pharmacists to focus on clinical decision-making and patient communication. This collaboration not only enhances efficiency but also reduces the risk of errors and improves patient outcomes (Pedersen et al., 2021).

Despite the growing recognition of pharmacy technicians' expanding roles, little research has focused on their specific contributions during drug shortages. This study aims to explore how pharmacists and pharmacy technicians collaborate to manage drug shortages, with particular attention to their roles in sourcing alternatives, maintaining inventory, and communicating with patients and healthcare providers. Understanding the dynamics of this collaboration will help identify strategies to improve the management of drug shortages in healthcare settings.

## Literature Review

### 1. Overview of Drug Shortages

Drug shortages have become a significant issue in healthcare, with shortages affecting all aspects of patient care, including delayed treatment, substitution with less effective medications, and increased risks of medication errors (Ventola, 2011). The causes of drug shortages are multifaceted and often involve manufacturing problems, quality issues, supply chain disruptions, and regulatory factors (Fox et al., 2014). In recent years, the prevalence and severity of shortages have escalated, particularly during times of public health crises such as the COVID-19 pandemic, further straining healthcare systems (ASHP, 2020). This growing crisis has created an urgent need for effective strategies to manage shortages and mitigate their impact on patient outcomes.

### 2. Pharmacists' Role in Managing Drug Shortages

Pharmacists are at the forefront of managing drug shortages in both clinical and hospital settings. Their responsibilities include identifying and assessing alternative medications, ensuring that substitute drugs meet safety and efficacy standards, and working closely with healthcare teams to adjust treatment plans accordingly (Caulder et al., 2015). Pharmacists must also stay informed about current shortages and available substitutes, often relying on communication with drug manufacturers, wholesalers, and regulatory bodies. In many cases, they also play a critical role in patient education, explaining changes in medication regimens and the reasons behind those changes to ensure adherence and understanding (Fox et al., 2014).

Research has shown that pharmacists' expertise in clinical decision-making is crucial in mitigating the effects of drug shortages, particularly in acute care settings (Hughes et al., 2015). Pharmacists have developed innovative strategies to address shortages, such as drug conservation protocols and compounding of alternative medications. However, the growing complexity of shortages has highlighted the need for an integrated approach that includes pharmacy technicians' contributions (Pedersen et al., 2021).

3. Pharmacy Technicians' Role in Managing Drug Shortages

While much of the literature focuses on the role of pharmacists in managing drug shortages, pharmacy technicians also play a critical, though often underappreciated, role. Technicians are responsible for many operational tasks that allow pharmacists to focus on clinical decision-making. These tasks include monitoring stock levels, placing orders, handling backorders, and sourcing medications from alternative suppliers (Desselle & Holmes, 2017). Pharmacy technicians often serve as the first line of defense in identifying potential shortages and taking action to prevent stockouts by maintaining accurate inventory records and ensuring timely replenishment.

In addition, technicians play a vital role in managing communication between pharmacy teams, suppliers, and healthcare providers. They often collaborate with pharmacists to ensure that information regarding alternative therapies and inventory status is effectively communicated to other members of the healthcare team. This support reduces the administrative burden on pharmacists and improves overall efficiency in addressing shortages (Lebovitz and Eddington, 2019).

4. Collaboration Between Pharmacists and Pharmacy Technicians

Effective management of drug shortages requires close collaboration between pharmacists and pharmacy technicians. Several studies have highlighted how pharmacists rely on technicians for their operational support, allowing for a more streamlined process in addressing shortages (Pedersen et al., 2021). The division of tasks—where technicians handle inventory management and logistical coordination, while pharmacists focus on clinical decision-making—enables a more efficient response to shortages and ensures that patient care remains uninterrupted (Desselle & Holmes, 2017).

This collaboration is particularly critical during periods of high demand, such as flu season or during public health emergencies. In these situations, both pharmacists and technicians must work together to ensure that alternative medications are sourced quickly, inventory is properly managed, and communication is clear and consistent with both patients and healthcare providers (Lebovitz and Eddington, 2019).

5. Gaps in Research

While there is substantial literature on drug shortages and pharmacists' roles in managing them, less attention has been paid to the specific contributions of pharmacy technicians. Existing studies tend to focus on the clinical aspects of drug shortage management, with little emphasis on the operational and logistical challenges that technicians help address. There is a clear need for more research exploring how technicians support pharmacists in managing shortages and the impact of this collaboration on patient care outcomes.

Furthermore, while studies have documented the importance of pharmacists ’clinical expertise during shortages, there is limited research on how pharmacy teams—comprising both pharmacists and technicians—can work together to develop innovative strategies for managing shortages. This study aims to address this gap by exploring the roles and collaboration between pharmacists and pharmacy technicians in managing drug

shortages, with a focus on how these roles complement each other in sourcing alternatives, maintaining inventory, and communicating with patients and healthcare providers.

## Methodology

1. Study Design

This study employed a qualitative research design to explore the roles and collaboration between pharmacists and pharmacy technicians in managing drug shortages in a tertiary hospital. A qualitative approach was chosen to gain in-depth insights into the experiences, perceptions, and strategies used by pharmacists and pharmacy technicians during drug shortages. Semi-structured interviews were conducted to collect detailed information on their roles in sourcing alternatives, maintaining inventory, and communicating with patients and healthcare providers.

2. Setting

The study was conducted at a tertiary care hospital with a fully operational pharmacy department that includes both inpatient and outpatient services. The hospital's pharmacy team plays a critical role in managing drug shortages due to the large number of patients treated, particularly during high-demand periods such as flu season. The pharmacy team is responsible for ensuring continuity of care for patients by sourcing alternative medications, managing stock levels, and keeping patients and prescribers informed of changes in medication availability.

3. Participants

A purposive sampling method was used to select participants. The sample included 10 pharmacists and 10 pharmacy technicians, all of whom had been actively involved in managing drug shortages within the hospital for at least one year. Pharmacists were selected based on their involvement in clinical decision-making and patient care during shortages, while pharmacy technicians were selected based on their operational roles in inventory management and supply chain coordination.

4. Data Collection

Data were collected through semi-structured interviews conducted over a period of two months. Interviews were held in a private room within the hospital to ensure confidentiality and encourage open discussion. Each interview lasted between 30 to 60 minutes, and participants were asked a series of open-ended questions designed to elicit their experiences and perspectives on managing drug shortages.

The interview guide included questions on the following topics:

- The role of pharmacists and pharmacy technicians in sourcing alternative medications.
- Strategies used by pharmacy technicians to monitor inventory and handle backorders.
- Communication practices between pharmacists, pharmacy technicians, and other healthcare professionals during shortages.
- The challenges faced by both pharmacists and pharmacy technicians during high-demand periods.
- The impact of collaboration on the efficiency of managing drug shortages and patient care outcomes.

All interviews were audio-recorded with the consent of the participants and later transcribed verbatim for analysis. Additional notes were taken during the interviews to capture non-verbal cues and other observations.

5. Data Analysis

Data were analyzed using thematic analysis, following the six-phase process described by Braun and Clarke (2006). The analysis was conducted in the following steps:

1. Familiarization with the Data: The interview transcripts were read multiple times to gain an in-depth understanding of the content. Notes and initial impressions were made during this stage.
2. Generating Initial Codes: The transcripts were systematically coded by identifying significant phrases, words, or patterns related to the participants' roles, experiences, and collaboration in managing drug shortages.
3. Searching for Themes: The codes were grouped into broader themes based on their similarities. The themes were related to the key areas of inquiry, such as sourcing alternatives, inventory management, communication, and collaboration.
4. Reviewing Themes: The themes were reviewed to ensure they accurately represented the data and were consistent with the research objectives.
5. Defining and Naming Themes: Each theme was clearly defined, and descriptive names were assigned to reflect the content within each theme.
6. Writing the Report: The findings were organized into coherent narratives under each theme, with direct quotes from participants used to illustrate key points.

6. Ethical Considerations

Ethical approval for the study was obtained from the ethics committee prior to data collection. All participants provided informed consent before taking part in the study. They were informed of their right to withdraw from the study at any time, and their confidentiality was maintained throughout the research process. Audio recordings were stored securely, and all identifying information was removed during transcription to ensure participant anonymity.

7. Trustworthiness and Rigor

To ensure the credibility and trustworthiness of the research, several measures were taken:

- Triangulation: Data from both pharmacists and pharmacy technicians were collected to provide multiple perspectives on the topic, ensuring a more comprehensive understanding of the roles and collaboration in managing drug shortages.
- Member Checking: After the analysis was completed, participants were given the opportunity to review the findings and provide feedback to ensure that their views were accurately represented.
- Peer Debriefing: The analysis was discussed with a panel of experts in pharmacy practice to verify the validity of the findings and interpretations.
- Reflexivity: The researcher maintained a reflective journal throughout the study to document any biases, assumptions, or influences that could affect the interpretation of the data.

8. Limitations

This study was limited by its setting in a single tertiary hospital, which may reduce the generalizability of the findings to other healthcare institutions. Additionally, as this was a qualitative study, the sample size was relatively small, and the results should be interpreted with caution. Future research could expand the scope to include multiple hospital settings and a larger sample size.

**Findings**

The analysis of the interviews revealed several key themes and sub-themes regarding the roles of pharmacists and pharmacy technicians in managing drug shortages. The thematic analysis uncovered three main themes: collaborative decision-making, inventory management and sourcing alternatives, and communication with

patients and healthcare providers. Each theme is supported by sub-themes and illustrated with direct quotes from participants.

1. Collaborative Decision-Making

One of the most prominent themes that emerged from the interviews was the importance of collaboration between pharmacists and pharmacy technicians in addressing drug shortages.

a) Shared Responsibility

Both pharmacists and pharmacy technicians acknowledged that managing drug shortages was a shared responsibility. Pharmacists relied on technicians to manage inventory and keep them informed of potential shortages, while technicians relied on pharmacists for clinical decisions regarding alternatives.

- Pharmacist 1: “We can’t do this alone. The technicians play a crucial role in keeping us updated on the stock levels. When we know what’s running low, we can start looking into alternative therapies early.”
- Technician 3: “Once we notice something is going out of stock, we immediately alert the pharmacists. They are the ones who decide what substitute medication to use.”

b) Collaborative Problem-Solving

Pharmacists and pharmacy technicians often engaged in collaborative problem-solving to find solutions during shortages. Technicians provided pharmacists with real-time inventory data, and together they discussed the best alternatives to ensure patient safety.

- Pharmacist 4: “The technicians will often suggest suppliers or wholesalers who may have the drug in stock. It’s a team effort to figure out how to get what we need.”
- Technician 5: “We try to source alternatives, but if that’s not possible, we talk with the pharmacist to see if there are other options we haven’t explored.”

2. Inventory Management and Sourcing Alternatives

This theme focused on the operational aspects of managing drug shortages, with a clear division of responsibilities between pharmacists and pharmacy technicians.

a) Technicians' Role in Monitoring and Managing Inventory

Pharmacy technicians played a central role in monitoring inventory and managing backorders. Their proactive approach in tracking stock levels helped prevent last-minute shortages, ensuring the pharmacy remained functional during critical periods.

- Technician 1: “It’s our job to make sure the shelves are stocked and to keep a close eye on any medications that are getting low. We do daily checks and update the pharmacists.”
- Technician 2: “We monitor the inventory management system closely. If something is on backorder, we try to anticipate when it will be available and notify the pharmacists immediately.”

b) Pharmacists' Role in Sourcing and Validating Alternatives

While technicians handled the logistical side of inventory management, pharmacists took the lead in sourcing and validating alternative medications. They needed to ensure that substitute drugs were clinically appropriate and met safety standards.

- Pharmacist 2: "When a drug is in short supply, it's on us to find an alternative that works. Sometimes we have to make clinical judgments about whether the substitute is as effective or safe for certain patients."
- Pharmacist 3: "Technicians provide us with the options, but ultimately, we need to verify that the alternatives won't lead to adverse effects or negatively impact patient outcomes."

3. Communication with Patients and Healthcare Providers

Effective communication was essential to managing drug shortages, especially when explaining changes in medication to patients and healthcare providers.

a) Technicians 'Role in Patient Communication

Technicians often served as the first point of contact for patients, answering their questions about drug availability and informing them about potential changes in their medication.

- Technician 4: "We're often the ones telling patients that their medication isn't available. It's important that we explain the situation clearly and reassure them that an alternative is just as effective."
- Technician 6: "Patients tend to ask us why their medication isn't available. We have to be clear and honest with them, but we also refer them to the pharmacist for detailed questions about their therapy."

b) Pharmacists 'Role in Detailed Patient Counseling

While technicians initiated the conversation about drug shortages, pharmacists provided more detailed counseling, especially regarding the clinical implications of switching medications.

- Pharmacist 5: "If a patient is concerned about the effectiveness or safety of an alternative, I take the time to sit down with them and explain the rationale behind the switch."
- Pharmacist 6: "Patients need to know that we're doing everything to ensure their safety. I often explain the clinical equivalence of the alternative drug to ease their concerns."

c) Collaboration in Communicating with Healthcare Providers

Both pharmacists and pharmacy technicians collaborated in maintaining open lines of communication with other healthcare providers, such as physicians and nurses. Pharmacy technicians often relayed inventory information, while pharmacists discussed the clinical implications of medication shortages and alternatives.

- Pharmacist 7: "We have regular discussions with the healthcare team, and when shortages occur, it's vital that we explain how this will affect the treatment plans. Technicians help by giving us updated stock information."
- Technician 7: "I keep the pharmacists informed about what's available, and they relay that to the doctors and nurses. It's a constant cycle of communication."

**Discussion**

The findings of this study demonstrate the critical and complementary roles that pharmacists and pharmacy technicians play in managing drug shortages within a tertiary care hospital. Their collaboration is essential for ensuring the timely sourcing of alternative medications, maintaining inventory, and communicating effectively with patients and healthcare providers. The three major themes that emerged—collaborative decision-making, inventory management and sourcing alternatives, and communication with patients and healthcare providers—highlight the interdependent relationship between pharmacists and pharmacy technicians in mitigating the impact of drug shortages on patient care.

1. Collaborative Decision-Making

The theme of collaborative decision-making underscores the importance of teamwork between pharmacists and pharmacy technicians in addressing drug shortages. Pharmacists relied heavily on technicians to provide real-time inventory data, allowing them to make informed decisions about sourcing alternatives. This finding aligns with previous research, which highlights the value of interdisciplinary collaboration in healthcare settings, particularly when addressing complex issues such as drug shortages (Pedersen et al., 2021).

Pharmacy technicians' role in suggesting potential suppliers and assisting in problem-solving during shortages further emphasizes their contribution to the decision-making process. This study extends previous research by providing a detailed account of how technicians are not just passive participants but active contributors in resolving shortages. The shared responsibility between pharmacists and technicians enhances efficiency, allowing the pharmacy team to respond more quickly to shortages and reduce disruptions in patient care.

2. Inventory Management and Sourcing Alternatives

The findings also reveal the distinct yet complementary roles of pharmacists and pharmacy technicians in managing inventory and sourcing alternative medications. Pharmacy technicians were found to play a pivotal role in monitoring stock levels, placing orders, and managing backorders. This supports previous studies that highlight the expanding responsibilities of pharmacy technicians in inventory management (Desselle & Holmes, 2017). By handling the logistical aspects of inventory control, technicians free up pharmacists to focus on the clinical implications of drug shortages, such as validating the safety and efficacy of alternative medications.

Pharmacists, on the other hand, were responsible for making clinical decisions about the appropriateness of alternative therapies. This division of labor allows both pharmacists and technicians to work within their areas of expertise, optimizing the management of drug shortages. Similar findings were reported by Hughes et al. (2015) who noted that pharmacists' clinical decision-making is crucial during drug shortages, particularly in identifying safe substitutes. This study contributes to the literature by highlighting how the combined efforts of pharmacists and pharmacy technicians enhance the pharmacy department’s ability to manage shortages effectively.

3. Communication with Patients and Healthcare Providers

Effective communication with both patients and healthcare providers was another key theme that emerged from the findings. Pharmacy technicians often served as the first point of contact for patients, providing initial explanations about the unavailability of certain medications. While they were responsible for relaying logistical information, pharmacists provided more in-depth counseling to address patients' concerns about the safety and efficacy of alternative medications. This division of communication roles mirrors the findings of

Lebovitz and Eddington (2019), who emphasized the importance of clear and consistent communication in managing patient expectations during drug shortages.

In terms of communication with healthcare providers, both pharmacists and pharmacy technicians were actively involved. Technicians provided updates on inventory status, while pharmacists discussed the clinical implications of shortages with physicians and nurses. This collaborative approach ensured that all members of the healthcare team were informed and prepared to adjust treatment plans accordingly. The study reinforces the idea that open communication channels between pharmacy staff and other healthcare providers are essential for minimizing the impact of drug shortages on patient care.

4. Implications for Practice

The findings of this study have several important implications for practice. First, the collaborative model of decision-making between pharmacists and pharmacy technicians should be encouraged and formalized within healthcare institutions. Training programs that focus on enhancing communication and teamwork between pharmacists and technicians could improve the efficiency of drug shortage management. Additionally, pharmacy technicians should be empowered to take a more active role in managing inventory and sourcing alternatives, allowing pharmacists to focus on clinical decision-making.

Second, healthcare institutions should invest in inventory management technologies that allow both pharmacists and pharmacy technicians to access real-time data on drug availability. This would facilitate quicker decision-making during shortages and reduce the risk of stockouts. Finally, clear protocols should be established for communicating with patients and healthcare providers during drug shortages. Both pharmacists and technicians should be trained in patient communication strategies to ensure that patients feel informed and reassured about any changes in their medication regimens.

5. Limitations and Future Research

While this study provides valuable insights into the roles of pharmacists and pharmacy technicians in managing drug shortages, it is important to acknowledge its limitations. The study was conducted in a single tertiary hospital, which may limit the generalizability of the findings to other healthcare settings. Future research should explore how these roles vary across different hospital types and sizes, as well as in community pharmacies.

Additionally, the qualitative nature of this study may not capture the full extent of the impact that pharmacist-technician collaboration has on patient outcomes. Future studies could use quantitative methods to measure the effectiveness of different collaboration strategies and their impact on medication safety and patient satisfaction during drug shortages. Furthermore, research into the role of pharmacy technicians in managing other critical pharmacy functions, such as medication safety and workflow optimization, would provide a more comprehensive understanding of their contributions to healthcare.

## Conclusion

This study highlights the essential roles that both pharmacists and pharmacy technicians play in managing drug shortages. Their collaboration in decision-making, inventory management, and communication with patients and healthcare providers is key to ensuring that drug shortages do not compromise patient care. By leveraging the complementary skills of pharmacists and technicians, healthcare institutions can improve the efficiency of their response to shortages and minimize disruptions to medication availability.

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