

The Role of Paramedics and Pharmacists in Optimizing Pre-Hospital Medication Administration: A Qualitative Study''

Asma A. Alzahrani¹, Nawaf F. Alharbi², Mohammed S. Alanazi³,
Hajer A. Bader⁴, Abdullah M. Alquaid⁵, Maha Y. Qattan⁶,
Thamer F. Alanazi⁷

Health Affairs at the Ministry of National Guard

Abstract

This study explores the collaboration between paramedics and pharmacists in optimizing pre-hospital medication administration within a tertiary hospital setting. A mixed-methods approach was used to assess current practices, identify barriers and facilitators, and evaluate the impact of pharmacist involvement. Quantitative findings indicated increased confidence in medication administration and perceived benefits of pharmacist involvement. Qualitative findings highlighted the benefits of improved medication safety, enhanced training, and reduced medication errors. However, challenges such as communication barriers and logistical constraints were identified. The study concludes that pharmacist-paramedic collaboration has the potential to significantly enhance medication safety and efficacy, provided that communication and resource challenges are addressed.

Keywords: Pre-Hospital Care, Paramedics, Pharmacists, Medication Administration, Interdisciplinary Collaboration, Patient Safety.

Introduction

The delivery of effective pre-hospital care is critical for improving patient outcomes, especially in emergency situations where timely medication administration can make the difference between life and death. Paramedics play a crucial role in this setting, being the first point of contact for many patients and administering necessary drugs under challenging and unpredictable conditions. However, the complexity of pre-hospital medication management, coupled with the dynamic environment, often increases the risk of medication errors, adverse reactions, and suboptimal patient outcomes (England et al., 2020).

Pharmacists, with their expertise in pharmacotherapy, can contribute significantly to optimizing medication safety and efficacy in pre-hospital care. Collaborative efforts between paramedics and pharmacists can enhance medication protocols, improve the accuracy of drug administration, and ultimately reduce the occurrence of adverse events. Previous studies have suggested that pharmacist-led interventions, such as training paramedics on drug selection, dosing, and potential interactions, can significantly improve patient safety in emergency care (Roman et al., 2021). Despite this potential, the collaboration between paramedics and pharmacists in pre-hospital care remains an underexplored area.

The aim of this study is to investigate how paramedics and pharmacists can work together to optimize pre-hospital medication administration. By exploring the existing dynamics, challenges, and potential benefits of this collaboration, this study seeks to identify practical strategies to enhance medication safety and efficacy during the critical pre-hospital phase. Furthermore, the findings may serve as a basis for developing protocols and training programs that improve the overall quality of emergency medical services (EMS).

Literature Review

The importance of effective pre-hospital medication administration has been widely recognized in the literature. Pre-hospital care is a crucial component of the healthcare continuum, providing life-saving interventions before patients reach the hospital. However, the complexity of this setting often leads to challenges in ensuring the safety and efficacy of medication administration. Medication errors are common, and factors such as high-pressure environments, the need for rapid decision-making, and the limited availability of drug information contribute to these errors (Harjola et al., 2020).

Collaboration between healthcare professionals has been identified as a key strategy to improve patient outcomes. Pharmacists, as medication experts, have been shown to play an essential role in enhancing medication safety across various healthcare settings. Studies have demonstrated that pharmacist involvement in emergency departments and hospital wards can lead to significant reductions in medication errors and adverse drug events (Morgan et al., 2018). Extending this expertise to the pre-hospital environment has the potential to address many of the medication-related challenges faced by paramedics.

Several studies have highlighted the benefits of pharmacist-led training programs for paramedics. A study by Mostafa et al. (2020) found that paramedics who received training from pharmacists on drug selection, dosing, and potential interactions were more confident in their decision-making and demonstrated fewer medication errors during simulations. This finding underscores the value of interdisciplinary collaboration in enhancing the quality of pre-hospital care.

In addition to training, pharmacists can contribute to the development of standardized medication protocols for use in pre-hospital settings. Standardization has been shown to reduce variability in care and minimize errors. A study by Wilson et al. (2015) reported that the implementation of standardized medication protocols, developed in collaboration with pharmacists, led to improved adherence to guidelines and reduced adverse events in pre-hospital care. These findings support the notion that pharmacists can play a pivotal role in optimizing medication administration by providing expertise in protocol development and ensuring that paramedics have access to evidence-based guidance.

Despite the potential benefits, there are several barriers to effective collaboration between paramedics and pharmacists. One of the primary challenges is the lack of established communication channels between these two groups. A study by Hayball et al. (2015) identified poor communication and a lack of understanding of each other's roles as significant barriers to effective collaboration in pre-hospital care. Addressing these barriers will require efforts to foster mutual understanding and establish formal mechanisms for communication and collaboration.

Furthermore, organizational and logistical challenges can hinder the involvement of pharmacists in pre-hospital care. Limited resources, such as time and funding, can make it difficult to implement pharmacist-led interventions in emergency medical services (EMS). However, evidence suggests that the long-term

benefits of such interventions, including improved patient outcomes and reduced healthcare costs, may outweigh the initial investment required (Dineen-Griffin et al., 2020).

In conclusion, the literature suggests that pharmacist-paramedic collaboration has the potential to significantly enhance medication safety and efficacy in pre-hospital care. Training programs, standardized protocols, and improved communication are key strategies that can facilitate this collaboration. However, overcoming barriers such as limited communication and logistical constraints will be essential to fully realize the benefits of this interdisciplinary approach.

Methodology

This study was conducted in a tertiary hospital with an established emergency medical services (EMS) system. The methodology involved both qualitative and quantitative approaches to gather comprehensive data on the collaboration between paramedics and pharmacists in pre-hospital medication administration.

Study Design

A mixed-methods design was used, consisting of both survey-based quantitative analysis and interview-based qualitative exploration. The study aimed to assess current practices, identify barriers and facilitators, and evaluate the impact of pharmacist involvement in pre-hospital care. The quantitative component involved administering structured questionnaires to paramedics and pharmacists, while the qualitative component involved in-depth interviews with selected participants to gain insights into their experiences and perspectives.

Participants

The participants included paramedics and pharmacists working within the EMS system of the tertiary hospital. A total of 50 paramedics and 20 pharmacists were recruited for the study. Participants were selected based on their experience in pre-hospital care and their willingness to participate. Inclusion criteria required that paramedics and pharmacists had at least one year of experience in their respective roles within the EMS system.

Data Collection

Data collection was carried out over a period of three months. For the quantitative component, structured questionnaires were distributed to the participants, which included questions related to medication administration practices, perceived challenges, and the perceived benefits of pharmacist involvement. The questionnaires were designed to capture both numerical data and participant perceptions on a Likert scale.

For the qualitative component, semi-structured interviews were conducted with a subset of 10 paramedics and 5 pharmacists. The interviews focused on exploring participants' experiences with medication administration, their views on pharmacist-paramedic collaboration, and the perceived impact of such collaboration on patient outcomes. Interviews were audio-recorded and transcribed verbatim for analysis.

Data Analysis

Quantitative data were analyzed using descriptive statistics to summarize the responses from the questionnaires. Mean scores, standard deviations, and frequency distributions were calculated to identify trends and patterns in the data. The qualitative data were analyzed using thematic analysis, which involved coding the interview transcripts and identifying key themes related to collaboration, communication, and medication safety.

Ethical Considerations

Ethical approval for the study was obtained from the ethics committee. All participants provided informed consent before taking part in the study. Confidentiality and anonymity were maintained throughout the study, and participants were assured that their responses would be used solely for research purposes.

Findings

Quantitative Findings

The quantitative analysis revealed several key findings regarding current medication administration practices and perceptions of pharmacist involvement in pre-hospital care.

Parameter	Mean Score	Standard Deviation
Confidence in Medication Administration	4.2	0.8
Perceived Benefits of Pharmacist Involvement	4.5	0.6
Challenges in Pre-Hospital Medication Safety	3.8	0.9

Table 1: Summary of Questionnaire Responses

Question	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
Pharmacist involvement improves safety	2	3	10	45	40
Training provided by pharmacists is helpful	1	5	8	50	36
Communication barriers exist in collaboration	10	15	20	30	25

Qualitative Findings

The qualitative data analysis identified three major themes with associated sub-themes, reflecting the experiences and perspectives of paramedics and pharmacists regarding their collaboration in pre-hospital care.

Theme 1: Benefits of Collaboration

- Sub-theme 1.1: Improved Medication Safety

- Participant 3 (Paramedic): "Having a pharmacist involved helps us feel more confident that we are giving the right medication at the right dose. It definitely reduces our stress in critical situations."

- Participant 7 (Pharmacist): "Our role in pre-hospital care can really enhance medication safety by ensuring paramedics have the support they need."

- Sub-theme 1.2: Enhanced Training and Confidence

- Participant 2 (Paramedic): "The training sessions led by pharmacists have improved my understanding of drug interactions and made me more comfortable making decisions."

- Participant 4 (Pharmacist): "Providing hands-on training to paramedics has been rewarding, as I see their confidence grow over time."

Theme2: Challenges in Collaboration

- Sub-theme 2.1: Communication Barriers

- Participant 5 (Paramedic): "Sometimes it's hard to get in touch with a pharmacist when we are out in the field, which makes it challenging to consult on certain medications."

- Participant 1 (Pharmacist): "There needs to be a more direct line of communication, perhaps through technology, to make collaboration easier during emergencies."

- Sub-theme 2.2: Logistical Constraints

- Participant 6 (Paramedic): "Limited time and resources make it difficult to implement some of the recommendations from pharmacists."

- Participant 9 (Pharmacist): "We often face challenges with resource allocation, which limits our ability to be present in pre-hospital care settings."

Theme 3: Perceived Impact on Patient Outcomes

- Sub-theme 3.1: Reduction in Medication Errors

- Participant 8 (Paramedic): "Since pharmacists started providing input, I've noticed a decrease in medication errors, especially during high-stress calls."

- Participant 10 (Pharmacist): "Our involvement has contributed to fewer adverse events, which ultimately benefits the patients we serve."

Discussion

The findings of this study indicate that collaboration between paramedics and pharmacists has the potential to significantly enhance the safety and effectiveness of medication administration in pre-hospital settings. The quantitative findings demonstrate that paramedics feel more confident in their medication administration practices and perceive pharmacist involvement as beneficial to patient safety. The high mean scores for confidence and perceived benefits of pharmacist involvement suggest that paramedics value the expertise pharmacists bring to pre-hospital care. Furthermore, the qualitative findings support these results by highlighting the specific benefits of collaboration, such as improved medication safety and enhanced training for paramedics.

The training provided by pharmacists emerged as a critical factor in enhancing paramedics' confidence and reducing medication errors. This aligns with previous research indicating that pharmacist-led educational interventions can lead to improved decision-making and reduced adverse events (Mostafa et al., 2020). The training sessions not only improved paramedics' knowledge of drug interactions and dosing but also empowered them to make more informed decisions during emergency situations. These findings underscore

the importance of ongoing education and training initiatives led by pharmacists to enhance pre-hospital care quality.

Despite the evident benefits, several challenges to effective pharmacist-paramedic collaboration were identified. Communication barriers were a significant issue, with both paramedics and pharmacists highlighting difficulties in establishing timely and effective communication during emergencies. This is consistent with findings from Hayball et al. (2015), who identified poor communication as a major barrier to collaboration. Addressing this challenge will require the development of more streamlined communication channels, potentially through technological solutions such as real-time communication apps or dedicated hotlines that facilitate direct contact between paramedics and pharmacists in the field.

Logistical constraints, including limited resources and time pressures, also hindered effective collaboration. Both paramedics and pharmacists expressed concerns about the feasibility of implementing recommendations in the fast-paced pre-hospital environment. This finding suggests that while pharmacist involvement is beneficial, there is a need for structural changes within EMS systems to support this collaboration. Allocating dedicated resources and time for pharmacist-led initiatives could help overcome these barriers and ensure that the benefits of collaboration are fully realized.

The perceived impact of pharmacist involvement on patient outcomes was another key finding of this study. Participants reported a noticeable reduction in medication errors and adverse events when pharmacists were involved in the decision-making process. This aligns with the literature, which has consistently shown that pharmacist involvement in medication management leads to better patient outcomes (Morgan et al., 2018). The qualitative insights provided by both paramedics and pharmacists highlight the direct impact of collaboration on improving patient safety, particularly during high-stress calls where the risk of errors is elevated.

In conclusion, this study provides evidence that pharmacist-paramedic collaboration in pre-hospital settings can significantly enhance medication safety and efficacy. The benefits of pharmacist-led training, improved confidence among paramedics, and the reduction in medication errors all point to the value of this interdisciplinary approach. However, addressing communication barriers and logistical challenges will be crucial for maximizing the potential of this collaboration. Future research should focus on developing and evaluating specific interventions aimed at improving communication and resource allocation within EMS systems to facilitate pharmacist involvement in pre-hospital care.

References

1. England, E., Deakin, C. D., Nolan, J. P., Lall, R., Quinn, T., Gates, S., ... & Perkins, G. D. (2020). Patient safety incidents and medication errors during a clinical trial: experience from a pre-hospital randomized controlled trial of emergency medication administration. *European journal of clinical pharmacology*, 76, 1355-1362.
2. Roman, C., Cloud, G., Dooley, M., & Mitra, B. (2021). Involvement of emergency medicine pharmacists in stroke thrombolysis: A cohort study. *Journal of Clinical Pharmacy and Therapeutics*, 46(4), 1095-1102.

3. Harjola, P., Miró, Ò., Martín-Sánchez, F. J., Escalada, X., Freund, Y., Penaloza, A., ... & EMS-AHF Study Group. (2020). Pre-hospital management protocols and perceived difficulty in diagnosing acute heart failure. *ESC heart failure*, 7(1), 290-297.
4. Morgan, S. R., Acquisto, N. M., Coralic, Z., Basalyga, V., Campbell, M., Kelly, J. J., ... & Phelan, M. (2018). Clinical pharmacy services in the emergency department. *The American journal of emergency medicine*, 36(10), 1727-1732.
5. Mostafa, L. S., Sabri, N. A., El-Anwar, A. M., & Shaheen, S. M. (2020). Evaluation of pharmacist-led educational interventions to reduce medication errors in emergency hospitals: a new insight into patient care. *Journal of Public Health*, 42(1), 169-174.
6. Wilson, M. H., Habig, K., Wright, C., Hughes, A., Davies, G., & Imray, C. H. (2015). Pre-hospital emergency medicine. *The Lancet*, 386(10012), 2526-2534.
7. Hayball, P. J., Elliott, R. J., & Morris, S. (2015). Ambulance pharmacist—why haven't we thought of this role earlier?. *Journal of Pharmacy Practice and Research*, 45(3), 318-321.
8. Dineen-Griffin, S., Vargas, C., Williams, K. A., Benrimoj, S. I., & Garcia-Cardenas, V. (2020). Cost utility of a pharmacist-led minor ailment service compared with usual pharmacist care. *Cost Effectiveness and Resource Allocation*, 18, 1-13.

ملخص:

تستكشف هذه الدراسة التعاون بين المسعفين الطبيين والصيادلة في تحسين إدارة الدواء قبل المستشفى داخل بيئة المستشفى الثالث. تم استخدام نهج مختلط الأساليب لتقييم الممارسات الحالية، وتحديد العوائق والميسرين، وتقييم تأثير مشاركة الصيدلي. أشارت النتائج الكمية إلى زيادة الثقة في إدارة الدواء والفوائد المتصورة لمشاركة الصيدلي. وسلطت النتائج النوعية الضوء على فوائد تحسين سلامة الدواء، وتعزيز التدريب، وتقليل الأخطاء الدوائية. ومع ذلك، تم تحديد تحديات مثل عوائق الاتصال والقيود اللوجستية. وخلصت الدراسة إلى أن التعاون بين الصيدلي والمسعف لديه القدرة على تعزيز سلامة الدواء وفعاليتها بشكل كبير، بشرط معالجة تحديات التواصل والموارد.

الكلمات المفتاحية: الرعاية قبل المستشفى، المسعفون الطبيون، الصيادلة، إدارة الدواء، التعاون متعدد التخصصات، سلامة المرضى