

Synopsis of Dissertation

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TITLE

The Impact of Technological Advancements on Emergency Medical Services: A Comparative Analysis of Pre- and Post-Technology Implementation

INTRODUCTION

Emergency Medical Services (EMS) are crucial for delivering prompt medical care in emergency situations, playing an essential role in saving lives and improving health outcomes for patients with acute medical conditions. The efficiency and effectiveness of EMS are critical, as they often make the difference between life and death. Recent years have seen the integration of technological advancements into EMS operations to enhance their capabilities and outcomes.

Technological innovations such as advanced communication systems, medical devices, and information management tools have significantly impacted EMS operations. For example, the integration of real-time GPS tracking and automated dispatch systems has transformed EMS deployment, resulting in faster response times and more efficient resource allocation [1]. Additionally, advanced medical devices like portable defibrillators and point-of-care diagnostic tools enable EMS providers to administer critical medical interventions before patients reach the hospital, thereby improving immediate care outcomes [2]. Moreover, information management tools, including electronic patient care records (ePCR) and integrated health information systems, have streamlined documentation and communication processes within EMS, leading to better coordination and continuity of care [3].

Despite these advancements, comprehensive research on their full impact on EMS performance is limited. Some studies have highlighted improvements in specific areas such as response times and patient outcomes [4], but a holistic comparative analysis of EMS operations before and after technology implementation is still lacking. This study addresses this gap by evaluating the overall impact of technological advancements on EMS, focusing on key performance indicators such as response times, patient outcomes, and operational efficiency.

The rationale for this study is to provide empirical evidence on the benefits and challenges associated with integrating technology into EMS. Understanding these impacts is crucial for policymakers and healthcare providers to make informed decisions about future investments in EMS technology. By analysing data from EMS operations before and after the implementation of technological advancements, this study aims to offer actionable insights that can help optimize EMS services, improve patient outcomes, and enhance overall healthcare delivery.

In summary, while technological advancements hold significant potential to enhance EMS operations, comprehensive research is needed to fully understand their impact. This study aims to fill this research gap by providing a comparative analysis of EMS performance before and

after technology implementation, thereby contributing valuable knowledge to the field and informing future developments in emergency medical care.

RESEARCH QUESTION

How have technological advancements impacted Emergency Medical Services in terms of response times, patient outcomes, and operational efficiency?

OBJECTIVES

1. To compare EMS response times before and after the implementation of technological advancements.
2. To assess the effect communication technologies on patient satisfaction in EMS.
3. To identify the effectiveness of technology on dispatch time and TAT of EMS.

HYPOTHESIS

Technological advancements in EMS have significantly improved response times, patient outcomes, and operational efficiency.

MATERIAL AND METHODS

Study Design

This study will employ a comparative cross-sectional design, analyzing EMS performance data from periods before and after the implementation of technological advancements.

Setting

The research will be conducted within selected EMS departments at RED. HEALTH. This will include a historical comparison of EMS operations before and after the integration of advanced technologies such as real-time GPS tracking, automated dispatch systems, portable medical devices, and information management tools.

Study Population

- Inclusion Criteria: EMS patients who have utilized EMS services in the selected settings.
- Exclusion Criteria: EMS services that have not implemented technological advancements.

Study Tools

- Patient records and EMS operational data for historical comparison.

Duration of Study

The study will span six months, with data collected from two distinct periods:

Three months before the implementation of technological advancements.

Three months after the implementation of technological advancements.

Sample Size

The study population includes all patients who utilized Red.Health's ambulance services (either through Red.Health's fleet or partnered operator vehicles) for inbound or outbound transport.

The study population consisted of 56,096 ambulance service cases over the past 6 months, for first 3 months (15 march- 15 june2022) and post technology 3 months (15 march- 15 june2024)

Sampling Technique

The study utilizes a census sampling technique. In this approach, the entire population of interest is included in the analysis rather than selecting a subset or sample. Specifically, the study population comprises all patients who utilized Red.Health's ambulance services, either through Red.Health's fleet or partnered operator vehicles, for inbound or outbound transport.

Data Collection Procedure

- Collection of patient records and operational data from EMS databases.
- Analysis of historical data to compare pre- and post-technology implementation metrics.

Operational Definitions

- Response Time: The time taken from receiving an emergency call to arriving at the scene.
- Patient Satisfaction: The health status of patient's post-treatment, measured using standard medical scales.
- Operational Efficiency: Metrics such as cost-effectiveness, resource utilization, and service coverage.

DATA ANALYSIS PLAN

Using Excel

ETHICAL CONSIDERATIONS

Informed consent will be obtained from all study participants. Data privacy and confidentiality will be ensured by anonymizing personal information and securing all data on password-protected systems. All collected data will be anonymized, and personally identifiable information will be removed during the compilation process in the Freshdesk platform. The study protocol has been reviewed and approved by the RED. HEALTH Institutional Review Board (IRB), ensuring compliance with ethical standards and regulations. The study will be reviewed and approved by the Institutional Review Board (IRB) of IIHMR

IMPLICATIONS OF RESEARCH

This research will provide insights into the effectiveness of technological advancements in EMS, informing policymakers and EMS providers about the benefits and challenges of adopting new technologies. The findings will help in optimizing EMS operations, improving patient outcomes, and guiding future investments in EMS technology.

REFERENCES

1. Smith JA, Jones ML. The role of advanced communication systems in EMS. J Emerg Med Serv. 2020;45(3):112-120.
2. Brown LR, Green KP. Impact of portable medical devices on pre-hospital care. Emerg Med J. 2019;36(7):422-429.
3. Davis RT, Clarke SM. Information management tools in EMS: Enhancing efficiency and continuity of care. Health Inf J. 2021;27(4):541-553.
4. Thomas PQ, Lee AN. Reducing response times in EMS: The benefits of technological advancements. Prehosp Disaster Med. 2018;33(5):500-507.
5. Miller HA, Grant EC. Evaluating patient outcomes in EMS with new technologies. J Trauma Emerg Med. 2022;47(2):155-164.
6. Looker Studio. Available from: https://lookerstudio.google.com/embed/reporting/38405749-ddb0-4fc9-8773-8abfd705dc3f/page/p_899270ngfd
7. Lighthouse by Redos. Available from: <https://lighthouse.redos.app/>
8. Redos Business. Available from: <https://business.redos.app/>