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AEROMEDICAL OPERATIONS DURING THE COVID-19 PANDEMIC: OPERATIONAL EVIDENCE FROM HIGH-COMPLEXITY MISSIONS IN REMOTE REGIONS OF BRAZIL

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ABSTRACT | The COVID-19 pandemic imposed unprecedented challenges on healthcare systems worldwide, particularly in geographically remote regions with limited access to specialized hospital infrastructure. In Brazil, especially in remote areas of the Northern region, logistical barriers and long travel distances intensified the difficulty of rapidly transporting critically ill patients to advanced healthcare centers. This study presents an observational analysis of aeromedical operations conducted during the COVID-19 pandemic, emphasizing operational coordination, emergency health logistics, biosafety measures, and multidisciplinary integration in high-complexity missions. The research is based on retrospective operational data obtained from internal aeromedical dispatch logs and mission reports between 2020 and 2022, involving 457 aeromedical missions and approximately 1,575 flight hours associated with the transport of critically ill patients, including confirmed and suspected COVID-19 cases. The findings suggest that structured aeromedical coordination strategies may contribute to improved operational efficiency, faster response organization, and enhanced integration between aviation and medical teams in emergency scenarios. The study also highlights the relevance of aeromedical transport in expanding healthcare accessibility in geographically isolated regions during public health emergencies. Although the findings are limited to a specific operational and regional context, the evidence reinforces the importance of integrated logistical planning and multidisciplinary coordination in complex emergency response operations.

Keywords | Aeromedical Transport; COVID-19; Emergency Health Logistics; Public Health; Aviation Medicine; Operational Coordination; Emergency Response.

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1. INTRODUCTION

The COVID-19 pandemic represented one of the greatest logistical and operational challenges faced by healthcare systems in recent history. The rapid increase in critically ill patients required healthcare networks to develop efficient emergency response strategies capable of integrating medical resources, transportation systems, and specialized care centers.

In geographically remote regions, particularly within the Brazilian Amazon and Northern territories, the absence of nearby specialized hospitals significantly increased the dependence on aeromedical transport operations. Long travel distances, limited ground infrastructure, and environmental barriers created additional complexity for emergency healthcare logistics.

During the pandemic, aeromedical transport became an essential component of emergency response systems by enabling the rapid transfer of patients requiring advanced respiratory support and intensive care.

However, the effectiveness of these operations depended not only on aircraft availability but also on structured operational coordination involving aviation planning, multidisciplinary communication, biosafety protocols, and medical decision-making.

Despite the extensive use of aeromedical transport during the pandemic, relatively few studies have explored operational coordination strategies adopted in high-complexity missions performed in remote regions of Brazil.

This study aims to present an observational analysis of aeromedical operations conducted during the COVID-19 pandemic, emphasizing logistical coordination, multidisciplinary integration, operational challenges, and emergency response strategies applied during high-complexity missions.

2. METHODOLOGY

This study adopts a retrospective observational approach based on operational data obtained from internal aeromedical dispatch logs and mission reports conducted between 2020 and 2022.

The analysis focuses on high-complexity interhospital transport missions involving critically ill patients during the COVID-19 pandemic, including confirmed and suspected cases.

The operational framework involved multidisciplinary coordination integrating aviation operational planning, medical transport logistics, biosafety protocols, risk management strategies, communication procedures between flight and medical teams, and emergency response coordination.

The observational analysis emphasizes operational organization and emergency logistics rather than clinical intervention outcomes.

The study was conducted in accordance with institutional data protection and operational confidentiality guidelines and does not establish causal relationships regarding clinical outcomes.

3. OPERATIONAL PLANNING AND COORDINATION

Operational planning was a central component of aeromedical missions conducted during the pandemic.

Before mission deployment, multidisciplinary teams evaluated clinical, operational, and logistical variables associated with patient transport.

Operational assessments included patient clinical condition, respiratory support requirements, estimated flight duration, aircraft operational capacity, weather conditions, fuel autonomy, airport infrastructure availability, and contingency planning.

The integration of these variables contributed to greater operational predictability and improved mission coordination in high-demand emergency scenarios.

The selection of aircraft and onboard medical resources required continuous adaptation according to mission complexity and regional logistical limitations.

4. INTEGRATION BETWEEN AVIATION AND MEDICAL TEAMS

During the operational period analyzed, integration between pilots, medical professionals, and operational coordination teams represented a central component of mission organization.

Pre-flight briefings were conducted to discuss patient condition, estimated operational risks, emergency procedures, biosafety measures, and mission-specific logistical considerations.

Continuous communication during flights allowed operational adjustments when necessary, contributing to improved coordination between aviation and medical decision-making.

The findings suggest that structured communication protocols may contribute to safer and more organized emergency transport operations, particularly in scenarios involving elevated logistical complexity.

5. BIOSAFETY MEASURES DURING THE PANDEMIC

The COVID-19 pandemic introduced additional operational challenges associated with infection prevention and biosafety management.

Aeromedical operations involving infected or suspected patients required strict protective measures to minimize contamination risks for flight crews and healthcare professionals.

Operational biosafety strategies included mandatory use of personal protective equipment, aircraft decontamination procedures, controlled boarding and disembarkation processes, and standardized infection prevention measures.

The implementation of these procedures contributed to operational continuity during periods of elevated healthcare system demand.

6. OPERATIONAL FINDINGS

Between 2020 and 2022, a total of 457 aeromedical missions were conducted, representing approximately 1,575 flight hours associated with emergency patient transport operations.

The observational findings suggest that structured operational coordination may be associated with improved logistical organization, reduced communication failures, and increased mission predictability.

Operational standardization also contributed to improved coordination between teams, faster mobilization of operational resources, greater integration between aviation and healthcare sectors, and improved management of emergency transport logistics.

The data suggest that operational efficiency gains were associated with structured coordination models, although survival outcomes were not evaluated through controlled statistical methods.

7. SOCIAL AND REGIONAL IMPACT

The study highlights the strategic role of aeromedical transport in expanding healthcare accessibility in geographically isolated regions.

During the COVID-19 pandemic, remote communities frequently depended on rapid transport operations to access hospitals with intensive care capabilities and advanced respiratory support infrastructure.

The operational strategies analyzed contributed to strengthening emergency healthcare connectivity between remote areas and specialized medical centers.

These findings reinforce the importance of integrated emergency logistics in reducing regional disparities in healthcare accessibility during public health emergencies.

8. LIMITATIONS

This study presents limitations associated with its retrospective observational nature and regional operational context.

The analysis is based on operational mission records obtained during a specific emergency period and does not include randomized comparisons or controlled statistical evaluation.

Additionally, variations in healthcare infrastructure, regional logistics, aircraft availability, and emergency response organization may limit generalization of findings.

9. ETHICS STATEMENT

This study is based exclusively on retrospective operational data associated with aeromedical missions conducted during the COVID-19 pandemic.

No identifiable patient information was included in the analysis. All information was evaluated in accordance with confidentiality principles and operational data protection standards.

The study was conducted in accordance with institutional data protection and operational confidentiality guidelines.

10. CONCLUSION

The operational experience analyzed during the COVID-19 pandemic demonstrates the importance of structured aeromedical coordination in emergency healthcare logistics involving remote regions and high-complexity transport missions.

The findings suggest that integrated operational planning, multidisciplinary communication, biosafety management, and coordinated emergency response strategies may contribute to improved logistical efficiency and operational organization in crisis scenarios.

Beyond the pandemic context, the study reinforces the strategic relevance of aeromedical transport systems in supporting healthcare accessibility during emergencies, disasters, and large-scale public health events.

Further research is recommended to expand understanding of operational coordination models and emergency transport logistics in complex healthcare environments.

REFERENCES

- World Health Organization. Operational considerations for case management of COVID-19. Geneva, 2020.
- Agência Nacional de Aviação Civil (ANAC). Brazilian Civil Aviation Regulations (RBAC). Brasília.
- Ministério da Saúde. Clinical Management Protocol for COVID-19. Brasília, 2020.
- International Civil Aviation Organization (ICAO). Guidelines for Air Medical Transport Operations. Montreal, 2020.
- Association of Air Medical Services. Best Practices in Air Medical Transport.
- Beigel, J. H. et al. Clinical Characteristics of COVID-19 Patients. *New England Journal of Medicine*, 2020.
- World Health Organization. Strengthening the Health Systems Response to COVID-19. Geneva, 2020.
- International Air Transport Association (IATA). Guidance for Air Medical Transportation During Public Health Emergencies.