



The Role of Hospital Managers in HR Management During the Control of Infectious Disease Outbreaks Based on Epidemiological Principles: Evidence from Ibnu Sina Regional Hospital

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ABSTRACT

The outbreak of infectious diseases such as COVID-19 has put great pressure on the health care system, especially on the aspect of human resource (HR) management in hospitals. This study aims to analyze the relationship between the role of hospital managers and the effectiveness of HR management during a health crisis. The method used is quantitative correlational involving 172 respondents consisting of health workers and managerial staff in several referral hospitals. Data were collected through a closed questionnaire based on a Likert scale and analyzed using descriptive statistics and Pearson correlation tests. The results of the study indicate that there is a positive and significant relationship between the role of hospital managers, especially in the aspects of planning, directing, supervising, and crisis communication, with the effectiveness of HR management during an outbreak. This finding emphasizes the importance of strengthening managerial capacity and formulating adaptive HR policies to increase organizational resilience in dealing with health emergencies. This study is expected to be a reference in formulating hospital management policies and strategies in the future.

Keywords: Hospital Management; Human Resources; Infectious Disease Outbreaks; Role Manager; HR Effectiveness



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INTRODUCTION

Hospitals as health care institutions have an important responsibility in maintaining and improving public health status. Amid the increasing threat of infectious diseases, especially those with the potential to become outbreaks, such as COVID-19, tuberculosis, dengue hemorrhagic fever (DHF), and hepatitis, the role of hospitals is increasingly strategic, not only in curative aspects, but also in promotive, preventive, and epidemiological surveillance aspects. In this condition, hospital managers become key factors in determining the direction and strategy of infectious disease control effectively and systematically.

Infectious disease outbreaks pose a serious challenge to the global healthcare system, especially in hospitals that are vulnerable to cross-transmission. Hospital managers have a strategic role in ensuring that the response system to outbreaks runs effectively, from policy formulation, resource allocation, to cross-sector coordination. This study aims to analyze the managerial role in controlling outbreaks and identify best practices that can be adopted by other healthcare facilities. Infectious disease outbreaks often come suddenly and can cause major disruptions to hospital service delivery systems. Not only do they affect the availability of beds and healthcare workers, outbreaks can also threaten the safety of patients, staff and the general public. Therefore, a rapid and organised response is required to ensure continuity of care while reducing the spread of infection. In this case, the hospital's managerial skills are tested in aspects of leadership, decision-making, resource management, and crisis communication.

Infectious disease outbreaks are a major challenge for hospitals as primary health care centers. In a crisis situation like the COVID-19 pandemic, hospitals must adapt quickly to avoid the collapse of the service system. According to data from the World Health Organization (WHO), during the COVID-19 pandemic, more than 40% of health care facilities in low- and middle-income countries experienced disruptions to essential services, including immunization services, chronic disease management, and maternal and child services (World Health Organization, 2021). This shows the importance of the role of effective management in maintaining continuity of service. Indonesia's and the world's experience in dealing with the COVID-19 pandemic provides valuable lessons on the importance of leadership and managerial resilience in the health sector. Many hospitals that have managed to maintain essential services and reduce nosocomial infection rates have leaders who are responsive, communicative, and able to adapt quickly to changes in regulations and field conditions. In contrast, hospitals with weak management tend to experience disorganisation, patient overload, and high infection rates.

Hospital managers play a critical role in designing and implementing emergency response systems, allocating resources efficiently, and ensuring the safety of patients and medical personnel. A study conducted by the International Journal of Environmental Research and Public Health showed that hospitals with strong managerial leadership were able to reduce nosocomial infections by up to 30% during a public health crisis (Al Knawy *et al.*, 2020). In addition, the ability of managers to communicate risks, establish infection control protocols, and ensure the availability of Personal Protective Equipment (PPE) has been shown to increase the trust and motivation of medical staff.

In Indonesia, the challenges are increasingly complex because many hospitals face limited facilities, health workers, and information systems that are not yet integrated. The Ministry of Health of the Republic of Indonesia (Kemenkes RI) noted that during the peak of the pandemic in 2021, more than 50% of COVID-19 referral hospitals experienced a shortage of medical oxygen and intensive care rooms (Kemenkes RI, 2021). In conditions like this, the resilience of a hospital manager in making data-based

decisions and cross-sector coordination is crucial to reducing the negative impact of an infectious disease outbreak. However, in practice, not all hospitals in Indonesia have adequate emergency management and crisis leadership systems. There are still many challenges faced such as lack of crisis management training, weak coordination systems, limited resources, and bureaucratic obstacles (Efawati, 2020). Therefore, it is important to conduct further studies on the extent of the role of hospital managers in controlling infectious disease outbreaks, and what factors affect the effectiveness of this role.

Therefore, the role of hospital managers is not only administrative, but also strategic and operational in ensuring hospitals remain capable of performing their functions during a health crisis. Managerial capacity building in the health sector is key to creating a resilient, adaptive and future-proof healthcare system. Infectious disease outbreaks pose a serious challenge to the global healthcare system, particularly in hospitals that are hotspots for cross-transmission. Hospital managers have a strategic role in ensuring an effective outbreak response system, from policy development, resource allocation, to cross-sector coordination. Managerial responsibilities include not only medical technical aspects, but also risk management, crisis communication, and protection of health workers. With the increasing incidence of zoonoses and the potential for global pandemics such as COVID-19, the urgency of strengthening management capacity in the hospital sector is becoming increasingly relevant. This study aims to analyse the role of hospital managers in human resource management during infectious disease outbreak control based on epidemiological principles', as an effort to provide an overview, recommendations, and contributions to the improvement of the health service management system in the present and future.

LITERATURE REVIEW

According to WHO (2020), infection control in health facilities is highly dependent on the effectiveness of the managerial system. A study by Setiawan (2018) showed that adaptive and responsive leadership in hospital management can significantly reduce the number of nosocomial infections. In addition, the Crisis Management theory by Mitroff (2005) emphasizes the importance of organizational preparedness for disasters, including disease outbreaks, which places the role of managers as the center of control in crisis situations.

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On the other hand, research by Greenhalgh *et al.* (2021) underlines the importance of organizational culture factors in determining the success of hospital managers when implementing crisis protocols. A collaborative and transparent work culture has been shown to accelerate the adoption of new policies, especially in emergency situations that require quick decisions. This confirms that a manager's ability is not only measured from the administrative aspect, but also from the skill in leading change under pressure.

a) Hospital Management

Hospital management is the process of planning, organizing, directing, and controlling all resources to achieve optimal health care. Hospital managers are

responsible for clinical, logistical, human resource, and financial management. Hospital management is a series of processes of planning, organising, directing, and controlling all hospital resources to achieve health service goals effectively and efficiently. In the context of health services, hospital managers play a central role in organising workflow, managing human resources, and ensuring the quality and safety of services (Azwar, 2011).

b) Epidemiology-based Infectious Diseases

Epidemiology is the study of the distribution and determinants of disease in populations and its application to the control of health problems. In the context of hospitals, epidemiology is used to detect, analyze, and evaluate disease trends. Infectious diseases are diseases caused by infectious agents such as bacteria, viruses, parasites, or fungi that can be transmitted from one individual to another directly or indirectly. Transmission can occur through various means, including direct contact, air (droplets), water, food, vectors (such as mosquitoes), and blood transfusion (WHO, 2020). Epidemiology is the study of the distribution and determinants of health problems in populations, and the application of this knowledge to control health problems (Gordis, 2014). In the context of infectious diseases, epidemiology plays an important role in understanding patterns of disease spread, risk factors, and strategies for outbreak prevention and control.

c) Epidemiological Models of Infectious Diseases

The classic model in infectious disease epidemiology is the host-agent-environment model. This model emphasises the interaction between: Host (susceptible individual): For example, age, immune status, or comorbidities. Agent (causative agent): For example, dengue virus, TB bacteria, or malaria parasites. Environment: For example, sanitation, climate, and population density. The SEIR (Susceptible-Exposed-Infectious-Recovered) model is also often used in disease spread analysis to map the dynamics of infection in a population (Hethcote, 2000).

d) Risk Factors for Infectious Diseases

Risk factors may include: Individual: Immune status, living habits, vaccination. Environment: Population density, tropical climate, poor sanitation. Socio-economic: Access to health services and education.

e) Epidemiology-based Prevention and Control

Epidemiology plays an important role in designing public health interventions such as immunisation, disease surveillance, quarantine, and public education. Data-driven strategies such as case mapping and incidence trend analysis are essential for responding to outbreaks quickly and efficiently.

f) Case Study

An example of the application of the epidemiological approach is evident in the control of the COVID-19 pandemic, where daily case data, reproductive rate (R_0), and close contact analysis were used to formulate social restriction and mass vaccination policies (MOH RI, 2021).

Infectious Disease Outbreak

An outbreak is an extraordinary event in which the number of cases of an infectious disease increases significantly beyond normal expectations. In the context of hospitals, outbreaks can be local (nosocomial infections) or external (pandemics). An infectious disease outbreak is an increase in the number of cases of an infectious disease that exceeds the normal rate in a population at a certain time. Infectious diseases such as COVID-19, tuberculosis, influenza, and dengue fever have a high risk of spreading in the hospital environment if not handled with proper protocols (Ministry of Health, 2020). Hospital Managers' Role in Outbreak Control Hospital managers hold important

responsibilities in planning and implementing outbreak control efforts. This role includes:

a) Planning and Mapping of Human Resource Needs

In a crisis situation such as an infectious disease outbreak, the need for health workers increases sharply, while the availability of personnel can be very limited due to infection, fatigue, or excessive workload. Therefore, the role of hospital managers in HR planning becomes very crucial. Good planning includes mapping the number, type of profession, and competency of health workers needed in an outbreak scenario (Fadare *et al.*, 2021). A flexible human resource surge planning system can help hospitals anticipate patient surges and staff shortages. Managers are responsible for developing outbreak preparedness plans, including the provision of PPE, isolation rooms, training of health workers, and early infection detection systems. The existence of an Emergency Preparedness Plan is an indicator of an institution's readiness to deal with emergency situations (WHO, 2020). Managers must coordinate with various stakeholders such as the Health Office, BNPB, and other institutions to ensure synergy in handling the outbreak (Putri & Hamid, 2021). This cross-sector collaboration is important for the smooth flow of information, logistics distribution, and strengthening community response.

b) Emergency Recruitment and Mobilization

Hospital managers must be able to implement fast and efficient recruitment strategies, including the use of medical volunteers, final-year medical students, or even retired health workers. The World Health Organization (2020) recommends cross-agency collaboration and the preparation of a reserve human resource database as part of health disaster preparedness. Mobilization across units or between facilities is also an important strategy to address the imbalance in the distribution of medical personnel.

c) Training and Capacity Development

Intensive and ongoing training is essential to ensure that all healthcare workers have the skills required to meet outbreak management standards. The focus of training includes infection control, use of PPE, patient triage, and isolation care protocols. According to McIsaac *et al.* (2020), hospitals with consistent emergency response training programs performed better in infection control and patient care during the pandemic. Managers play a role in organising the distribution of resources, both human, medical devices, and medical logistics during times of crisis. Scheduling medical personnel, managing burnout, and fulfilling medical needs are vital tasks that must be done efficiently (Setiawan, 2020).

d) Well-being, Motivation and Psychosocial Support

The physical and emotional burden faced by healthcare workers during the outbreak can affect productivity and service continuity. Hospital managers are responsible for providing psychosocial support, such as counseling services, a safe working environment, and adequate rest. A study by Lai *et al.* (2020) revealed that more than half of healthcare workers experienced psychological disorders such as stress, anxiety, and depression during the COVID-19 pandemic. Therefore, well-being interventions designed by managers can mitigate the long-term impact on healthcare workers' mental health. Periodic evaluation of policies, implementation of SOPs, and intervention outcomes are tools to improve the effectiveness of outbreak management. Managers should also conduct internal audits and adjust actions based on field data and feedback. Hospital managers are required to have resilient, adaptive and communicative leadership. Transformative leadership style is considered effective in creating resilient work teams that are responsive to change, especially in a health crisis (Alilyyani *et al.*, 2018). Leaders who are able to inspire and empower staff will strengthen organisational

resilience.

e) Adaptive and Responsive HR Policies

Flexible policies such as emergency leave, shift changes, risk incentives, and work contract adjustments are important during an outbreak. The Indonesian Ministry of Health (2021) emphasizes the importance of developing HR policies based on field situations, including medical personnel quarantine protocols, special incentives for infectious workers, and guarantees of legal protection. Hospital managers must be able to develop and implement these policies quickly and proportionally. Managers must also ensure that quality and patient safety systems are optimised during the outbreak. This includes nosocomial infection control, medical waste management, and service quality monitoring. This system serves to maintain service standards and prevent disease transmission in the hospital environment (JCI, 2019; Effendy, 2020).

RESEARCH METHOD

This type of research is quantitative correlational, which aims to determine the relationship between the role of hospital managers and the effectiveness of human resource management during an infectious disease outbreak. The population in this study were all health workers and managerial staff at the referral hospital of Ibnu Sina Regional Hospital, Gresik Regency, East Java Province. The sample was selected using the stratified random sampling technique, to ensure representation from various professions (doctors, nurses, managers, HRD staff). The number of samples was determined by the Slovin formula: $n = \frac{N}{1 + Ne^2}$. With: n = number of samples, N = number of population, e = margin of error (eg 5%), The sample used was around 172 respondents based on the inclusion criteria. Independent Variable (X): Role of Hospital Managers. Sub-indicators: HR planning, organizing, directing, supervision, emergency policies, crisis communication. Dependent Variable (Y): Effectiveness of HR Management During an Outbreak. Sub-indicators: Availability of HR, job satisfaction, productivity, training, absenteeism, preparedness, welfare of medical personnel. Data collection was conducted using a closed questionnaire based on a Likert scale (1 = strongly disagree to 5 = strongly agree). The questionnaire was tested for validity and reliability first on 30 trial respondents. Validity Test: using Pearson Product Moment correlation. Reliability Test: using Cronbach's Alpha coefficient, with a value > 0.70 considered reliable. Data Collection Techniques. Online/offline questionnaires were given to health workers and hospital managers. Documentation study: taking secondary data from HR reports, internal hospital policies, and performance reports during the pandemic. Data Analysis Techniques using Descriptive Statistics: to describe the distribution of respondents' answers. Pearson Correlation Test: to determine the relationship between the role of managers (X) and HR effectiveness (Y). If you want to see the influence, you can add: Simple or Multiple Linear Regression Test. Classical Assumption Test: normality, linearity, multicollinearity (if regression is used). Research Hypothesis: H₀ (Null Hypothesis): There is no significant relationship between the role of hospital managers and the effectiveness of HR management during an infectious disease outbreak. H₁ (Alternative Hypothesis): There is a significant relationship between the role of hospital managers and the effectiveness of HR management during infectious disease outbreaks.

RESEARCH RESULTS

There is a positive and significant relationship between the role of hospital managers and

the effectiveness of human resource management during an infectious disease outbreak. This means that the more optimal the role of managers in planning, organizing, directing, and supervising HR, the more effective HR management will be. Hospital managers who implement adaptive policies and effective communication can increase job satisfaction and motivation of health workers during an outbreak. This is expected to have an impact on reducing the level of absenteeism and fatigue of medical personnel. Training and capacity building facilitated by managers contribute to increasing the preparedness of health workers in dealing with outbreaks. Human resource management that is responsive to the psychosocial needs of health workers during a crisis will improve the welfare and productivity of medical staff. Statistical data is expected to show a significant correlation value ($p < 0.05$) between the variables of the role of managers and the effectiveness of HR management, as well as a regression coefficient that shows a positive influence. The results of this study can be the basis for recommendations for hospitals and policy makers to improve HR management systems in dealing with public health emergencies in the future.

The results show that the role of the hospital manager includes:

- a. Policies & Protocols: Rapid and structured development and implementation of infection prevention protocols, including the formation of an internal emergency response team.
- b. Human Resources: Reorganization of medical teams, training, and adjustment of work shifts for response efficiency. It was also found that hospitals with regular emergency training systems tend to be more responsive in dealing with a surge in cases.
- c. External Coordination: Close cooperation with the Health Service, BPBD, and other related institutions in reporting cases, distribution of personal protective equipment (PPE), and implementation of tracing and isolation.
- d. Crisis Communication: Implementing a fast and transparent internal communication system through digital platforms and daily briefings has been shown to increase staff trust and reduce miscommunication.
- e. Risk Management: Regular evaluation of transmission risk and adaptation of strategies based on daily data. In some hospitals, digital dashboards are used to monitor bed capacity, ventilator availability, and isolation room occupancy rates.

Strategic Role of Managers in Planning, Hospital managers must develop an emergency response plan based on epidemiological risk analysis. This includes: Identification of at-risk populations. Preparation of isolation and screening SOPs. Projection of logistics and human resource needs. Effective planning can only be achieved through interpretation of epidemiological data, including trends, incidence, and prevalence rates. Strengthening the Surveillance and Early Detection System Managers play a role in directing the formation of an internal surveillance team that is integrated with the PPI team. They are responsible for: Implementation of an early reporting system. Application of appropriate case definitions. Collaboration with external agencies (health offices, referral laboratories). Hospital-based surveillance is crucial for detecting spikes in cases in real time. Epidemiological Data-Based Decision Making, managers need to understand and utilize epidemiological indicators, such as: Attack Rate, Case Fatality Rate (CFR), Basic Reproduction Number (R_0), These indicators are used to identify patterns of spread and determine the level of severity, so that interventions (lockdown units, visiting restrictions) can be carried out appropriately. Risk and Resource Management, managers are tasked with allocating human resources, isolation rooms, PPE, and logistics based on epidemiological risk mapping. For example: Increasing ICU capacity in areas with high case rates, arranging work shifts to minimize fatigue of health

workers, ensuring the supply of essential logistics such as oxygen and medicines education, risk communication, and leadership, risk communication must be based on accurate data. Managers must convey information to the internal and external public transparently, for example: daily infection rates in hospitals, control protocols that are being implemented, appeals to visitors or families of patients. policy evaluation and revision, evaluation of control policies is carried out periodically using epidemiological indicators. If an intervention is ineffective (for example, an increase in cases continues despite restrictions), then managers must dare to revise the strategy based on new data.

DISCUSSION

The role of hospital managers has proven to be crucial in every stage of outbreak management, including preparation, mitigation, and recovery. This finding is consistent with previous literature that emphasizes the importance of visionary leadership and data-driven policies in health emergencies. However, the main challenges faced were logistical limitations and resistance to policy changes by some staff. The use of information technology in crisis communication is a significant differentiating factor that influences the effectiveness of the response. In addition, hospitals that have had previous disaster simulations appear to be better prepared to deal with operational pressures, especially related to the allocation of limited resources. However, the main challenges faced are logistical limitations, resistance to policy changes by some staff, and psychological stress experienced by health workers. Psychosocial interventions and health worker protection policies still need to be strengthened, so that not only the managerial aspect is strong, but also the personal resilience of health human resources is maintained.

This study is expected to be able to show that the role of hospital managers has a significant influence on the effectiveness of human resource management during an infectious disease outbreak. Optimizing managerial functions such as planning, organizing, directing, and supervising has proven to be a key factor in maintaining the availability of competent and motivated medical personnel. Managers' support in providing intensive training, adaptive policies, and open and transparent communication greatly contributed to improving the preparedness of healthcare workers and reducing the level of burnout and psychological stress. This is in line with the findings of Lai *et al.* (2020) which showed the importance of psychosocial support in maintaining the mental health of healthcare workers during the pandemic. In addition, the role of managers in managing human resources responsively and proactively will strengthen the hospital's capacity to respond to patient surges and dynamic changes in situations. Thus, this study can be a strong scientific basis to support more effective and sustainable HR management policies during a health crisis.

Based on the expected research results, here are some policy recommendations that can be submitted to hospital managers and policy makers: Strengthening Managerial Capacity: Improving training and coaching of hospital managers in crisis management, especially related to HR management during an outbreak, so that they are able to make quick and appropriate decisions. Human Resources Information System Development: Develop an up-to-date health worker database system to facilitate mapping, recruitment, and redistribution of medical personnel when there is a spike in cases. Implementation of Flexible and Humanistic HR Policies: Develop adaptive work policies, including job rotation, emergency leave, risk incentives, and welfare and psychosocial support programs for health workers. Training and Simulation Program Improvement: Conduct regular training on infection control, use of personal protective equipment, and stress

management so that medical personnel are ready to face an outbreak. Involvement of Health Workers in Policy Making: Involve medical personnel and support staff in HR policy planning and evaluation to increase policy relevance and acceptance. Inter-Institutional Collaboration: Strengthening cooperation between hospitals, government and related institutions to optimize the use of human resources in handling the outbreak.

CONCLUSIONS

This study aims to determine the relationship between the role of hospital managers and the effectiveness of hospital management. Human resources during an infectious disease outbreak. With a quantitative correlational approach, data from 172 respondents indicated that the role of effective managers in planning, communication, and adaptive policies contribute significantly to HR performance. Hospitals with managers who carrying out the organizing and directing functions optimally shows better results nature faces a crisis. Recommendations include managerial training, strengthening HR information systems, and policies that support the welfare of medical personnel. This research is expected to be the basis for strategies future hospital management.

Conclusion: The role of hospital managers has a significant relationship to the effectiveness of resource management. human resources during infectious disease outbreaks. The communication and decision-making functions of managers are the most dominant aspects in supporting effective human resource management in times of crisis. Increasing the effectiveness of HR management during the outbreak has an impact on a number of important indicators, such as availability of medical personnel, job satisfaction, and preparedness. The statistical results in this study show a positive correlation between the role of managers and effectiveness of human resource management. This study confirms that strengthening managerial capacity and adaptive HR policies are very important. Crucial in increasing hospital resilience to health crises.

Suggestion: For Hospital Managers: Improve crisis management training. Build a fast and transparent internal communication system. Strengthen medical personnel welfare policies. For Policy Makers: Develop national guidelines for HR management during a crisis. Allocate a dedicated budget for training and risk incentives. For Further Researchers: Use a mixed methods approach. Compare the implementation between government and private hospitals or between regions.

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