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# Assessing Human Resource Competencies in Port Quarantine Supervision: An Analysis from Gorontalo, Indonesia

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ABSTRACT

This study analyzes the resource advantages in health quarantine supervision at the Class II Gorontalo Port Health Office (KKP). Employing a descriptive qualitative approach, it investigates the fundamental contributions of officer knowledge, skills, and attitudes toward achieving operational success, maintaining public trust, and ensuring compliance with quarantine procedures. The findings reveal that KKP officers possess significant resource advantages. The officers' medical and epidemiological knowledge was found to be excellent, providing a critical foundation for the early detection of and response to potential infectious diseases. Furthermore, their technical and managerial skills proved highly competent in conducting health inspections, managing quarantine protocols, and effectively coordinating emergency responses. Moreover, the officers' professional, empathetic, and communicative attitudes were deemed optimal, playing a vital role in creating a positive experience for travelers, strengthening team collaboration, and enhancing community engagement. The study concludes that these resource advantages constitute a strategic asset for ensuring public health and safety within the port environment. Therefore, sustained investment in human resources through targeted training programs and supportive policy development is identified as key to maintaining and enhancing the long-term effectiveness of quarantine supervision.

## INTRODUCTION

In the era of globalization, the movement of people and goods across countries has significantly increased, thus amplifying the potential for infectious diseases to spread across borders (Oppong, 2019). Health quarantine surveillance at ports plays a crucial role in maintaining public health, preventing the spread of contagious diseases, and safeguarding national economic stability (Baker et al., 2022; Bloom & Cadarette, 2019). As stated by Nurhariza et al., (2025) the primary goal of health quarantine surveillance is to prevent the spread of infectious diseases by early identification and isolation of potential cases. Without an effective surveillance system, the consequences can include mass absenteeism in the workplace, decreased economic productivity, and substantial financial losses.

However, there is a gap in research specifically addressing how resource advantages impact the effectiveness of health quarantine surveillance, especially in regions with limited resources like the Class II Gorontalo Port Health Office. This indicates a research gap that needs to be filled to enrich the literature, both in the local context of Indonesia and its contribution to the global health system. This study also offers novelty by introducing the use of Operational Resource Assessment (OSA), which has not been widely applied in port health quarantine studies.

On an international level, health quarantine surveillance is critical in supporting the global disease alert system. Sivitz et al., (2006) note that surveillance extends beyond human health to include imported goods such as food and water, ensuring the safety of products entering the country. An effective quarantine system enhances international cooperation and supports health diplomacy, in line with World Health Organization (WHO) standards and the International Health Regulations (IHR).

The main challenge in health quarantine surveillance at the Class II Gorontalo Port Health Office lies in the limited human resources, both in terms of numbers and specialized competencies. Currently, the workforce consists of 56% civil servants (ASN), 42% non-civil servant government employees (PPNPN), and only 2% contractual government employees (PPPK), with an uneven distribution across work areas. The lack of professional staff, such as doctors, epidemiologists, and laboratory technicians, directly impacts service capacity. This issue becomes even more apparent during specific activities like the Hajj Embarkation (EHA), which requires additional personnel from other health offices.

Health quarantine surveillance at ports plays a critical role in preventing the spread of infectious diseases across borders, and a number of international studies have highlighted its importance. Heymann & Rodier (2001) in *The Lancet Infectious Diseases* discuss the significance of the International Health Regulations (IHR) as a global framework for managing public health risks at ports. Their research emphasizes the necessity of aligning national quarantine protocols with global standards, such as those set by the World Health Organization (WHO), to ensure adequate disease prevention. Neumann et al., (2024) conducted a systematic review published in *the Journal of Travel Medicine*, which evaluated the role of port health authorities in preventing disease transmission through international travel. Their study underscores the challenges faced by port health services, including a limited workforce, inadequate infrastructure, and funding, which directly impact the effectiveness of disease prevention measures.

In Global Health Action, Brown et al., (2022) explored how ports function as key players in global public health security. They highlighted the increasing use of digital health tracking and automated disease detection systems in ports worldwide, demonstrating how technological advancements can enhance early detection and response to health threats. This trend aligns with the growing global emphasis on integrating advanced

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technologies in health surveillance systems at ports. Additionally, Sarkar et al., (2023) conducted a case study in *the Asian Pacific Journal of Public Health*, focusing on port health surveillance systems in Asia, including countries like China, India, and Indonesia. Their research identified common challenges faced in resource-constrained regions, such as inadequate human resources and insufficient coordination between health and port authorities, which also resonates with the situation at Gorontalo Port.

Moreover, Hernandez et al., (2022) in *Global Health & Security* investigated the relationship between resource availability ranging from human resources to infrastructure—and the effectiveness of health surveillance systems at high-risk international ports. Their findings suggest that ports with better resource availability are more successful in controlling outbreaks, reinforcing the importance of proper resource management in enhancing port health security. These studies collectively emphasize the importance of having well-trained personnel, adequate infrastructure, and effective coordination to ensure the success of port health surveillance systems. They provide a strong international context for understanding the challenges and opportunities in implementing effective quarantine measures, directly supporting the relevance of the present research on the Class II Gorontalo Port Health Office, especially in terms of assessing resource availability and its impact on disease prevention.

The novelty of this study lies in two main aspects. First, it introduces an operational resource assessment (OSA) approach to evaluate resource strengths in port health quarantine oversight. This approach includes a comprehensive analysis of human resources, medical equipment, infrastructure, and technology, which has not been widely applied in port quarantine studies. Second, this study focuses on the limited human resources at the Class II Gorontalo Port Health Office (KKP), which impacts the effectiveness of oversight services, particularly during major events such as the Intermediate Hajj Embarkation (EHA). This study also fills a gap in the literature by connecting local issues in Indonesia with challenges in the global health system and cross-border health cooperation.

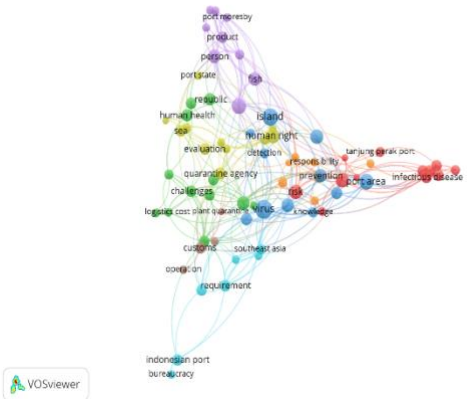


**Figure 1. Bibliometric visualization using VOSViewer**
**Source: Processed by Vosviewer Application (2025)**

Based on the bibliometric visualization presented, it can be concluded that the issue of infectious disease control in port and island areas is a multidimensional topic involving various aspects. Topics such as contagious diseases, port areas, viruses, prevention, and institutional responsibilities are the focus of attention in many publications. Furthermore, factors such as quarantine policies, logistics, human rights, and institutional challenges also play a significant role in the discussion of this issue. The interconnectedness of these topics indicates that managing health risks in ports is not merely a technical issue but is also heavily influenced by inter-institutional coordination, policy evaluation, and the geographic and social context of regions such as archipelagic countries and Southeast Asia. Therefore, an interdisciplinary and cross-sectoral approach is crucial for formulating effective and sustainable disease control strategies in areas with high vulnerability to disease spread through maritime routes.

Therefore, this study aims to evaluate the resource advantages in health quarantine surveillance at the Class II Gorontalo Port Health Office and propose strategies for improving capacity through an operational resource assessment. The findings of this research are expected to contribute to policy development and resource planning for health quarantine systems at the national level, as well as in the context of international health collaboration. This research is vital to ensure that port quarantine systems can respond swiftly and effectively to health threats, while also contributing to global health resilience.

## METHOD

This study employs a qualitative descriptive research design using a case study approach. This method was chosen for its capacity to provide an in-depth and holistic understanding of the complex phenomenon of human resource competence within a specific organizational context—namely, the Port Health Office (Kantor Kesehatan Pelabuhan/KPP) Class II Gorontalo (Silalahi, 2018). The case study approach enables a detailed investigation of the nature of resource advantage that contributes to the effectiveness of health quarantine supervision, with a particular focus on understanding the "how" and "why" behind operational success.

The subjects of this study are the human resources at KKP Class II Gorontalo, including Civil Servants (ASN), Government Employees with Work Agreements (PPPK), and Non-Civil Servant Government Employees (PPNPN). Data collection employed a combination of methods. Secondary data were obtained from scholarly publications such as books, journals, and relevant policy documents to establish a theoretical foundation (Sugiyono, 2017). Meanwhile, primary data were collected through the analysis of internal institutional documents—such as employee composition reports and professional qualifications—and supported by a field review conducted by the researcher to capture the current operational conditions.

Data analysis was guided by Resource-Advantage Theory Hunt (2012), with a specific emphasis on operant resources—namely knowledge, skills, and attitudes—as the primary analytical framework. The analytical process followed the interactive model developed by Miles & Saldaña (2014) which involves three concurrent and iterative stages: data reduction, where raw data from field notes and documents are selected and simplified; data display, in which information is organized to reveal emerging patterns; and conclusion drawing and verification, where final interpretations are developed and validated against the data to ensure the credibility and trustworthiness of the findings.


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## RESULTS AND DISCUSSION

This section elaborates on the findings regarding the human resource competencies at the Port Health Office (Kantor Kesehatan Pelabuhan/KPP) Class II Gorontalo, focusing on the application of Resource-Advantage Theory Hunt (2012) with particular attention to operant resources: knowledge, skills, and attitudes. These competencies are essential in supporting effective health quarantine supervision, especially in the context of increasing global health challenges and cross-border disease transmission. The results presented are based on a combination of document analysis, field observation, and literature synthesis.

### *1. Knowledge Resource Advantage*

Knowledge is a central component of the resource advantage framework. It includes the understanding of medical protocols, port health regulations, epidemiological patterns, and the nature of infectious diseases encountered in port settings. At KKP Class II Gorontalo, personnel were found to have a solid educational background, with the majority holding bachelor's degrees in relevant fields such as medicine, epidemiology, public health, and laboratory sciences. This educational foundation is critical for effective implementation of screening, isolation, and disease control measures.

The composition of human resources includes 37 civil servants (56%), 28 non-civil servant government employees (PPNPN) (42%), and 1 PPPK employee (2%). Professional roles cover a diverse range including general practitioners, epidemiologists, sanitarians, entomologists, nurses, pharmacists, and technical personnel. This variety ensures that multiple competencies are available to handle different scenarios in port health settings. According to Hunt (2012) such knowledge qualifies as operant resources that are not only foundational but also strategic, as they can be leveraged for competitive advantage in public health systems.

Furthermore, knowledge on global health regulations, such as the International Health Regulations (IHR) and World Health Organization (WHO) protocols, was found to be well-understood among senior officers. This enables the port health office to ensure compliance with international standards. Officers are able to engage in accurate health checks, detect symptoms of infectious diseases, and respond with appropriate actions. This aligns with findings from Jumani et al., (2022) & Soedjono (2016) who highlighted the importance of disease literacy among quarantine officers for ensuring swift and effective action during outbreaks.

In practice, this knowledge translates into operational efficiency. Officers are able to provide travelers with accurate health information, conduct screenings in accordance with regulations, and determine necessary follow-up actions. The role of knowledge in strengthening coordination with other agencies (such as immigration, customs, and port authorities) is also evident, as officers demonstrated awareness of institutional roles and communication protocols.

The study by Huerkamp & Pullium (2009) emphasized that knowledge combined with experience enhances performance. Similarly, this study observed that officers with longer tenures and relevant academic backgrounds showed greater initiative in managing complex quarantine scenarios. This reinforces the argument that knowledge is not merely an input but a catalytic asset in promoting organizational effectiveness in public health operations.

### *2. Skills Resource Advantage*

Skills refer to the ability to translate knowledge into practice. In the port health context, this includes technical, clinical, communicative, and managerial skills. The findings show that officers at KKP Class II Gorontalo demonstrate strong skills across these dimensions. Their capabilities have been honed through routine training (Diklat), on-the-job learning, and simulation exercises, which are regularly conducted in collaboration with national and regional health institutions.

Technical skills such as the use of thermal scanners, rapid diagnostic kits, and digital health reporting systems are critical in port quarantine. Officers demonstrated proficiency in operating these tools, which are essential for the timely detection of potential health threats. This confirms Syvyi et al., (2020) assertion that technological innovation enhances the precision of quarantine measures.

In terms of clinical competencies, officers were adept at conducting health assessments, recognizing signs of infection, and initiating isolation or referral procedures. This aligns with Djamaluddin (2022) who defined skills as the accurate and efficient execution of tasks. Officers also showed awareness of the need to adjust clinical procedures based on the latest epidemiological information—a skill that reflects both flexibility and responsiveness.

Communication skills are another key domain. Officers regularly interact with travelers, shipping personnel, and institutional partners. Their ability to communicate procedures clearly, calmly, and professionally plays a significant role in ensuring compliance and cooperation. These findings support Aneta & Wahab (2021) view that communication is a core operational skill, particularly in environments where multiple stakeholders are involved.

Organizational and coordination skills were also apparent. The KKP team demonstrated strong internal coordination in scheduling inspections, processing documentation, and reporting to central authorities. This is particularly important during high-traffic periods such as Hajj departures, where personnel shortages and increased workloads require high levels of efficiency. Overall, the study confirms that the skills possessed by KKP officers are not only adequate but also strategic in maintaining operational readiness. As suggested by Gultom, (2006) continuous professional development is essential, and the KKP's investment in regular training has proven effective in maintaining a high level of preparedness among its personnel.

### *3. Attitude Resource Advantage*

Attitudes encompass the values, ethics, and emotional readiness of personnel to carry out their duties, especially in high-pressure and high-risk environments like international ports. The findings reveal that the officers at KKP Class II Gorontalo exhibit professional attitudes characterized by integrity, politeness, adherence to procedures, and a commitment to public service. These positive attitudes are shaped by both organizational culture and individual backgrounds. The office employs individuals from diverse regions of Indonesia, and yet officers share common values of mutual respect, discipline, and cooperation. This cultural cohesion has fostered a collaborative working environment that is essential in cross-sectoral coordination.

Professional attitudes are further reinforced by institutional norms. The KKP has standard operating procedures (SOPs) in place that guide officer conduct in various scenarios. Field

observations showed that officers consistently followed these SOPs during inspections, medical checks, and inter-agency communication. This institutional discipline enhances the predictability and reliability of services offered. Saputra et al., (2021) emphasize that professional attitude is essential in quarantine environments where officers often have to enforce restrictions that may be unpopular with travelers. The ability to enforce these measures with empathy and clarity was clearly observed among officers in Gorontalo. Their politeness and firmness helped avoid confrontations and ensured smooth operation.

Moreover, the officers displayed a strong sense of duty toward public health. This was reflected in their willingness to work beyond regular hours during emergencies and their responsiveness to urgent calls. Such attitudes are essential for building public trust and ensuring community compliance, as emphasized by Austrian et al., (2020) in terms of impact, attitudes play a mediating role between knowledge and skills. An officer may be well-trained and knowledgeable but ineffective without the right attitude. The findings affirm the research of Rahiman & Kodikal (2017) which showed that work attitude significantly influences employee performance. At KKP Class II Gorontalo, the alignment between positive attitudes and technical capabilities results in a robust human resource profile that is capable of facing current and future public health challenges.

### *Cross-Analysis and Theoretical Implications*

By applying Hunt's Resource-Advantage Theory, the study demonstrates how operant resources (knowledge, skills, and attitudes) directly contribute to the achievement of superior performance in public sector service delivery. Unlike tangible resources, these operant elements are dynamic and renewable through learning, experience, and organizational culture. This makes them a strategic asset in port health management. The synthesis of field data and theoretical perspectives also reinforces the value of a human-centered approach to quarantine management. It is not merely facilities or technology that ensure effectiveness, but the people who operate them. Therefore, the continuous development of human resources should be at the forefront of health policy at both national and organizational levels.

This study also complements existing literature by providing empirical evidence from a developing country context, which is often underrepresented in global health governance discourse. The findings highlight the adaptability and resilience of KKP Class II Gorontalo, suggesting that with appropriate investment in operant resources, public health institutions in similar contexts can achieve high levels of performance despite resource limitations. The operant resources of knowledge, skills, and attitudes among the officers at KKP Class II Gorontalo constitute a strong resource advantage that underpins the success of health quarantine operations. These findings affirm the central hypothesis of the study and contribute meaningfully to the academic and practical discourse on human resource development in public health. Continued investment in human capacity through education, training, and organizational support is essential for sustaining and enhancing this advantage in the future.

## CONCLUSION

Based on the analysis at the Class II Gorontalo Port Health Office (KKP), this study concludes that human resource competency—encompassing the knowledge, skills, and attitudes of its officers—constitutes a fundamental resource advantage. This advantage directly contributes to the operational success of quarantine supervision and serves as a foundation for maintaining public trust and procedural compliance. Specifically, superior epidemiological and medical knowledge enables the early detection of diseases. Technical and managerial skills ensure that protocols are effectively implemented , while professional and empathetic attitudes enhance collaboration and create a positive experience for travelers. Therefore, sustained investment in human resource development through targeted training programs and supportive policies is a strategic imperative for ensuring long-term health security in the port environment.

This study has limitations, primarily its nature as a qualitative case study at a single location, which means its findings cannot be generalized. Furthermore, its reliance on secondary data limits the in-depth understanding that could be gained from primary data collection. Consequently, future research is recommended to include quantitative studies to statistically measure the impact of these competencies and comparative analyses across different KKP classifications to enhance generalizability. Future studies could also broaden their scope by examining the interaction between officer competencies (Operant Resources) and the availability of facilities and technology (Operand Resources). Additionally, further investigation into the role of competency in fostering successful cross-sectoral collaboration, identified as a novelty of this research, would be a valuable contribution.

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