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Medical Equipment Availability and Healthcare Worker Performance: Evidence from an Indonesian Hospital

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Abstract

Medical equipment availability is an important component of hospital resource management, particularly in emergency healthcare services that require timely and accurate interventions. This study aimed to examine the association between medical equipment availability and healthcare worker performance at Multazam Hospital, Gorontalo, Indonesia. A quantitative analytical approach with a cross-sectional design was employed, involving 53 personnel from emergency healthcare services and supporting units selected through total sampling. Data were collected using structured questionnaires measuring equipment completeness, conformity with service standards, readiness for use, work capability, service responsiveness, and procedural accuracy. Descriptive analysis and Fisher's exact test were applied to examine the relationship between the variables. The findings revealed that 86.8% of respondents rated medical equipment availability as good, while 88.7% reported good healthcare worker performance. Among respondents reporting good equipment availability, 95.7% also reported good performance, compared with 42.9% among those reporting adequate equipment availability. Fisher's exact test demonstrated a statistically significant association between medical equipment availability and healthcare worker performance (p = 0.002). These findings highlight the importance of maintaining functional and accessible medical equipment as part of hospital resource management. Strengthening equipment maintenance, readiness monitoring, and timely replacement procedures may support effective healthcare service delivery.

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Keywords: Equipment Availability; Healthcare Worker Performance; Emergency Department; Hospital Resource Management; Healthcare Service Quality.

INTRODUCTION

The quality of healthcare services has become an increasingly important concern in hospital management, particularly in ensuring operational efficiency, patient safety, and the effectiveness of healthcare delivery. Hospitals are expected to provide reliable medical services through the integration of competent healthcare personnel, adequate medical facilities, and effective organizational resource management. Among these essential resources, medical equipment plays a strategic role in supporting diagnostic procedures, clinical interventions, and emergency treatment. The availability of appropriate and functional medical equipment enables healthcare professionals to perform their responsibilities more effectively, while limitations in equipment readiness may create operational barriers that disrupt service delivery. Manurung et al. (2025) emphasized that adequate maintenance and management of medical equipment are important for supporting healthcare service effectiveness and diagnostic accuracy. Therefore, medical equipment availability should be recognized not merely as an infrastructural requirement but as an integral component of hospital resource management and organizational performance.

The significance of medical equipment availability becomes particularly evident in emergency departments, where healthcare professionals are required to deliver immediate, accurate, and appropriate interventions to patients experiencing critical medical conditions. Emergency healthcare delivery involves complex interactions among clinical competence, operational procedures, equipment readiness, and organizational coordination. Sako and Lababa (2022), in their investigation of standard operating procedures for patient care at Dr. M.M. Dunda Limboto Hospital in Gorontalo, revealed that only four of seven assessed procedural indicators had been implemented appropriately. Their findings demonstrated that emergency service effectiveness depends on the consistent implementation of established operational procedures, including the preparation of medical equipment before clinical examination. Furthermore, Irma et al. (2025) identified a statistically significant relationship involving nurses' knowledge, equipment and medication availability, and response time in emergency healthcare services. These findings reinforce the importance of examining medical equipment availability as an operational condition associated with emergency service performance.

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Medical equipment availability, however, extends beyond the physical presence or numerical adequacy of medical devices. From a hospital management perspective, effective availability encompasses equipment completeness, conformity with established service standards, and readiness for immediate clinical use. These dimensions reflect the capacity of hospital management to coordinate equipment planning, procurement, maintenance, and operational distribution according to service requirements. Yulika and Nasution (2024) identified several challenges in medical equipment maintenance management, including delayed administrative processes, inadequate maintenance awareness, and limitations in technical resources. Similarly, Manurung et al. (2025) highlighted the importance of systematic maintenance practices in sustaining equipment functionality and supporting healthcare operations. Such evidence indicates that equipment availability should be understood as a multidimensional organizational resource rather than a simple inventory measurement. Even when equipment is physically available, inadequate maintenance or limited accessibility may reduce its usefulness during emergency medical procedures.

In addition to equipment availability, healthcare worker performance represents a fundamental determinant of effective emergency healthcare operations. Healthcare worker performance reflects the ability of personnel to undertake professional responsibilities, respond promptly to patients' needs, and implement appropriate medical procedures according to established clinical standards. These dimensions are particularly relevant in emergency departments because clinical decisions and interventions must often be undertaken under considerable time pressure. Asriadi et al. (2024) investigated the relationships between workload, occupational stress, professional competence, length of service, and emergency nurse performance. Their findings did not demonstrate statistically significant relationships between these factors and performance in the population examined, suggesting that the determinants of healthcare worker performance may vary across organizational settings. Meanwhile, Irma et al. (2025) demonstrated the relevance of equipment and medication availability to emergency service responsiveness. Taken together, these studies provide a basis for investigating whether the availability of medical equipment is associated with healthcare personnel's work capability, service responsiveness, and procedural accuracy.

From a broader organizational perspective, effective hospital resource management is closely related to the quality and sustainability of healthcare service delivery. Hospital management must coordinate operational resources and professional performance to meet institutional service objectives and maintain public confidence. Akmar et al. (2026), in their investigation at Multazam Hospital in

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Gorontalo, examined the relationships among service quality, hospital image, patient satisfaction, and patient loyalty. Their research highlighted the role of patient satisfaction in explaining the relationship between perceived service quality and patient loyalty. Although the study primarily addressed patient evaluations rather than internal operational performance, its findings demonstrate the managerial significance of maintaining healthcare service quality within the same institutional context. Building upon this perspective, the present study directs attention to an organizational resource associated with healthcare delivery, namely the availability of medical equipment and its relationship with the performance of healthcare personnel in emergency services.

The relevance of this issue is reflected in the operational conditions observed at Multazam Hospital, a private healthcare institution in Gorontalo, Indonesia. Preliminary information obtained from the emergency department supervisor indicated several challenges concerning the readiness and accessibility of medical equipment. Tourniquets used in clinical procedures were reported to experience recurring damage, while an incident involving a bag-valve-mask device left in an ambulance after patient transportation temporarily disrupted its availability for emergency treatment. Although these observations do not establish the overall extent of equipment shortages within the hospital, they illustrate how equipment functionality and accessibility may create practical difficulties during healthcare delivery. Such circumstances indicate the importance of examining whether the perceived availability of essential medical equipment is associated with healthcare workers' ability to deliver timely and appropriate emergency services. Understanding this relationship is particularly relevant for hospital managers responsible for ensuring that operational resources remain functional, accessible, and aligned with clinical service requirements.

Previous studies have provided important evidence regarding medical equipment management, healthcare worker performance, and emergency service quality. Sako and Lababa (2022) examined the implementation of operational procedures in emergency patient care, while Irma et al. (2025) investigated factors associated with emergency response time, including the availability of equipment and medications. Yulika and Nasution (2024) and Manurung et al. (2025) focused on equipment maintenance and operational functionality, whereas Asriadi et al. (2024) investigated individual and occupational factors associated with emergency nurse performance. Furthermore, Akmar et al. (2026) examined healthcare service quality from the perspective of patient satisfaction and loyalty. Although these investigations contribute to understanding hospital service operations, their analytical emphasis differs from an integrated assessment of medical equipment availability and overall

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healthcare worker performance. In particular, the available literature reviewed in this study provides limited context-specific evidence concerning the association between equipment completeness, conformity with service standards, readiness for use, and healthcare worker performance within a regional private hospital. This distinction establishes an empirical research gap that warrants further investigation.

To address this gap, the present study examines medical equipment availability and healthcare worker performance within an integrated hospital resource management perspective. Medical equipment availability is operationalized through three dimensions: equipment completeness, conformity with service standards, and readiness for use. Healthcare worker performance is examined through work capability, service responsiveness, and procedural accuracy. By examining these dimensions together, the study seeks to extend the existing evidence concerning the relationship between organizational resource readiness and employee performance in emergency healthcare operations. Its principal contribution is the provision of context-specific empirical evidence from a private hospital in Gorontalo, rather than the development of a new causal theory. Accordingly, this study aims to analyze the association between medical equipment availability and healthcare worker performance among personnel involved in emergency department services at Multazam Hospital, Gorontalo, Indonesia. The findings are expected to contribute to discussions on hospital resource management and provide practical insights for strengthening equipment maintenance, operational readiness, and healthcare service performance.

LITERATURE REVIEW

Medical Equipment Availability

Medical equipment availability is an important component of hospital management because it supports the effectiveness and continuity of healthcare services. Adequate medical equipment enables healthcare workers to perform clinical procedures appropriately, particularly in emergency departments where timely intervention is essential. Manurung et al. (2025) emphasized that proper maintenance of medical equipment contributes to effective healthcare services and supports diagnostic accuracy. Similarly, Yulika and Nasution (2024) highlighted the importance of equipment maintenance in maintaining the functionality and readiness of medical devices.

Medical equipment availability can be assessed through three indicators: equipment completeness, conformity with service standards, and readiness for use. Equipment completeness refers to the adequacy of medical devices needed for healthcare services. Conformity with standards concerns the suitability of equipment

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for clinical procedures, while readiness for use reflects the condition and accessibility of medical devices when needed. Irma et al. (2025) reported a significant relationship involving medical equipment and medication availability and emergency response time. These findings indicate that equipment availability is relevant to the effectiveness of emergency healthcare operations.

Healthcare Worker Performance

Healthcare worker performance refers to the ability of healthcare personnel to carry out their responsibilities effectively and in accordance with established service standards. In emergency departments, performance is particularly important because healthcare workers must provide timely, accurate, and appropriate medical interventions. Asriadi et al. (2024) examined several factors associated with emergency nurse performance, including workload, occupational stress, professional competence, and work experience. Their findings suggest that the relationships between these factors and performance may vary across healthcare settings.

Healthcare worker performance in this study is assessed through three indicators: work capability, service responsiveness, and procedural accuracy. Work capability reflects the ability to perform assigned duties, service responsiveness refers to the promptness of healthcare delivery, and procedural accuracy concerns compliance with appropriate clinical procedures. Sako and Lababa (2022) highlighted the importance of implementing standard operating procedures in emergency patient care. Their findings indicate that effective healthcare performance requires both professional competence and organizational support.

Relationship Between Medical Equipment Availability and Healthcare Worker Performance

Medical equipment availability is considered an organizational factor associated with healthcare worker performance. Complete, functional, and accessible equipment can support healthcare personnel in providing timely and appropriate medical services. Conversely, inadequate or malfunctioning equipment may create operational difficulties and delay clinical procedures. Irma et al. (2025) identified a significant relationship involving equipment availability and emergency response time, while Manurung et al. (2025) emphasized the importance of equipment maintenance in supporting healthcare service effectiveness.

Furthermore, Akmar et al. (2026), in their study at Multazam Hospital Gorontalo, highlighted the importance of service quality in shaping patient satisfaction and loyalty. Although their research focused on patient perceptions rather than employee performance, it provides a relevant perspective on hospital

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service management. Accordingly, the present study examines the association between medical equipment availability and healthcare worker performance, particularly in relation to work capability, service responsiveness, and procedural accuracy.

Conceptual Framework and Hypothesis

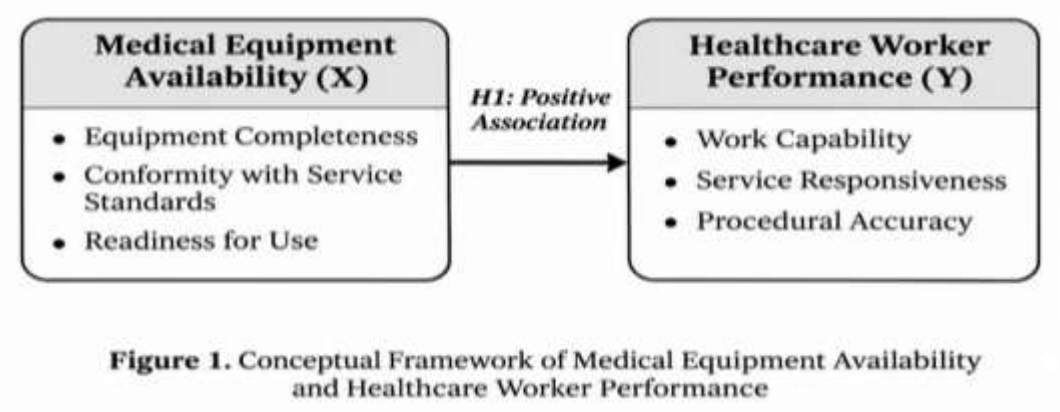


Figure 1. Conceptual Framework of Medical Equipment Availability and Healthcare Worker Performance

The conceptual framework of this study describes the proposed relationship between medical equipment availability as the independent variable (X) and healthcare worker performance as the dependent variable (Y). Medical equipment availability includes equipment completeness, conformity with service standards, and readiness for use. Healthcare worker performance includes work capability, service responsiveness, and procedural accuracy. Based on previous research, better medical equipment availability is expected to be associated with better healthcare worker performance.

H1: Medical equipment availability is positively associated with healthcare worker performance in the Emergency Department of Multazam Hospital, Gorontalo.

H0: There is no statistically significant association between medical equipment availability and healthcare worker performance in the Emergency Department of Multazam Hospital, Gorontalo.

RESEARCH METHOD

This study employed a quantitative analytical approach with a cross-sectional design to examine the association between medical equipment availability and healthcare worker performance. The research was conducted at Multazam Hospital, Gorontalo, Indonesia, during the 2026 research period. A cross-sectional design was used because the study assessed the independent and dependent variables within a

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single observation period without longitudinal follow-up. This approach enabled the examination of statistical associations between perceived medical equipment availability and healthcare worker performance. The study population consisted of 53 personnel involved in emergency healthcare services and supporting units at Multazam Hospital. A total sampling technique was applied, involving all 53 members of the identified population as respondents. Primary data were collected using structured questionnaires, while observation and documentation were used as supporting data collection techniques. The questionnaire assessed two main variables: medical equipment availability as the independent variable (X) and healthcare worker performance as the dependent variable (Y).

Medical equipment availability was measured through three indicators: equipment completeness, conformity with service standards, and readiness for use. Healthcare worker performance was assessed through work capability, perceived service responsiveness, and procedural accuracy. Each variable was measured using 15 questionnaire statements with a four-point Likert scale ranging from strongly disagree (1) to strongly agree (4). The total score for each variable was converted into a percentage of the maximum possible score and classified into three categories: good (≥75%), adequate (56–74%), and poor (≤55%). These classifications followed the operational definitions established in the original study.

Data were analyzed using descriptive and bivariate statistical analyses. Descriptive analysis was conducted to summarize respondents' characteristics and the distribution of medical equipment availability and healthcare worker performance. The association between the two categorical variables was examined using contingency-table analysis. Fisher's exact test was used to evaluate statistical significance because the observed frequency distribution included a small expected cell count. The significance level was established at 0.05, with a p-value below 0.05 indicating a statistically significant association. Given the cross-sectional design, the analysis was interpreted as evidence of association rather than causation.

RESULTS

Respondent Characteristics

This study involved 53 personnel working in emergency healthcare services and supporting units at Multazam Hospital, Gorontalo. Most respondents were female (62.3%), while 37.7% were male. Based on working units, the largest proportion of respondents came from emergency and inpatient services (43.4%), followed by pharmacy (20.8%) and laboratory services (17.0%). Regarding professional positions, staff nurses accounted for the largest proportion (26.4%),

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followed by general practitioners (18.9%) and pharmaceutical technical personnel (17.0%). The distribution of respondents is presented in Table 1.

Table 1. Characteristics of Respondents (n = 53)

Characteristics	Frequency (n)	Percentage (%)
Gender		
Female	33	62.3
Male	20	37.7
Working Unit		
Emergency and Inpatient Services	23	43.4
Pharmacy	11	20.8
Laboratory	9	17.0
Medical Records	4	7.5
Patient Evacuation	4	7.5
Radiology	2	3.8
Professional Position		
Staff Nurse	14	26.4
General Practitioner	10	18.9
Pharmaceutical Technical Personnel	9	17.0
Medical Laboratory Analyst	7	13.2
Patient Evacuation Officer	4	7.5

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Characteristics	Frequency (n)	Percentage (%)
Medical Records Staff	3	5.7
Radiographer	2	3.8
Medical Records Supervisor	1	1.9
Pharmacist in Charge	1	1.9
Pharmacy Administrator	1	1.9
Nurse Supervisor	1	1.9

Source: Primary data, 2026

Medical Equipment Availability

The findings revealed that most respondents perceived medical equipment availability positively. Of the 53 respondents, 46 (86.8%) classified equipment availability as good, while seven (13.2%) classified it as adequate. No respondents were classified in the poor category. These findings indicate that medical equipment availability was generally perceived as favorable in terms of equipment completeness, conformity with service standards, and readiness for use.

Table 2. Medical Equipment Availability

Category	Frequency (n)	Percentage (%)
Good	46	86.8
Adequate	7	13.2
Poor	0	0.0
Total	**53**	**100.0**

Source: Primary data, 2026

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Healthcare Worker Performance

The assessment of healthcare worker performance showed that 47 respondents (88.7%) were classified in the good performance category, while six respondents (11.3%) were classified as adequate. No respondents were classified as having poor performance. These results demonstrate that most respondents reported favorable performance in terms of work capability, perceived service responsiveness, and procedural accuracy.

Table 3. Healthcare Worker Performance

Category	Frequency (n)	Percentage (%)
Good	47	88.7
Adequate	6	11.3
Poor	0	0.0
Total	**53**	**100.0**

Source: Primary data, 2026

Association Between Medical Equipment Availability and Healthcare Worker Performance

The bivariate analysis examined the association between medical equipment availability and healthcare worker performance. Among the 46 respondents who reported good equipment availability, 44 (95.7%) also reported good performance, while two (4.3%) reported adequate performance. In comparison, among the seven respondents who reported adequate equipment availability, three (42.9%) reported good performance and four (57.1%) reported adequate performance. These results indicate that good healthcare worker performance was more frequently reported among respondents who perceived medical equipment availability as good.

Table 4. Association Between Medical Equipment Availability and Healthcare Worker Performance

Medical Equipment Availability	Good Performance n (%)	Adequate Performance n (%)	Total (n)
Good	44 (95.7)	2 (4.3)	46

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Medical Equipment Availability	Good Performance n (%)	Adequate Performance n (%)	Total (n)
Adequate	3 (42.9)	4 (57.1)	7
Total	**47 (88.7)**	**6 (11.3)**	**53**

Source: Primary data and SPSS output, 2026

Fisher's exact test revealed a statistically significant association between medical equipment availability and healthcare worker performance ($p = 0.002$). Therefore, the null hypothesis of no association was rejected at the 0.05 significance level. The findings indicate that respondents reporting good medical equipment availability were more likely to report good performance than those reporting adequate equipment availability. Nevertheless, because the study employed a cross-sectional design and questionnaire-based measurements, the results establish a statistical association rather than a causal relationship.

DISCUSSION

Medical Equipment Availability and Healthcare Service Readiness

The findings indicate that medical equipment availability at Multazam Hospital, Gorontalo, was generally perceived as good, with 86.8% of respondents reporting favorable assessments. This suggests that the hospital has established a relatively supportive environment for healthcare service delivery. Nevertheless, the remaining respondents who assessed equipment availability as adequate indicate that certain aspects of equipment completeness, conformity with service standards, and readiness for use may still require managerial attention. In emergency healthcare services, the operational value of medical equipment depends not only on its physical presence but also on its functionality and immediate accessibility.

These findings are consistent with Manurung et al. (2025), who emphasized the importance of medical equipment maintenance in supporting healthcare service effectiveness. Similarly, Yulika and Nasution (2024) highlighted that effective maintenance management is necessary to ensure the functionality and readiness of medical devices. The findings can also be interpreted through Donabedian's (1988) Structure–Process–Outcome framework, which identifies healthcare resources and facilities as structural components supporting service delivery. Within this perspective, adequate medical equipment provides favorable conditions for clinical activities, although service effectiveness also depends on professional competence and operational management. Therefore, maintaining equipment availability requires

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continuous monitoring, preventive maintenance, and timely replacement of damaged medical devices.

Healthcare Worker Performance in Emergency Services

The study also revealed that 88.7% of respondents were classified as having good healthcare worker performance. This finding indicates that most respondents reported favorable work capability, service responsiveness, and procedural accuracy. These dimensions are particularly important in emergency healthcare services, where personnel must respond appropriately to patients' needs while maintaining compliance with established clinical procedures. However, questionnaire-based performance assessments should be interpreted as reported performance rather than direct measurements of clinical effectiveness.

The findings are relevant to Sako and Lababa (2022), who examined the implementation of standard operating procedures in emergency patient care at Dr. M.M. Dunda Limboto Hospital in Gorontalo. Their study demonstrated that procedural implementation remained inconsistent across several assessed indicators, emphasizing the importance of organizational support and compliance with service standards. Meanwhile, Asriadi et al. (2024) examined factors associated with emergency nurse performance, including workload, occupational stress, competence, and work experience. Their findings did not establish statistically significant associations for the examined factors, indicating that performance-related conditions may differ across healthcare settings. These studies suggest that favorable employee performance cannot be attributed to individual competence alone, but should be understood within the organizational conditions in which healthcare professionals undertake their responsibilities.

Association Between Medical Equipment Availability and Healthcare Worker Performance

The principal finding of this study was a statistically significant association between medical equipment availability and healthcare worker performance (Fisher's exact test, $p = 0.002$). Among respondents reporting good medical equipment availability, 95.7% also reported good performance, compared with 42.9% among those reporting adequate equipment availability. This difference indicates that favorable perceptions of equipment availability were associated with more favorable assessments of healthcare worker performance. The finding supports the proposed research hypothesis and highlights the potential relevance of medical equipment readiness to hospital operational performance.

This result is consistent with Irma et al. (2025), who reported a significant relationship involving the availability of medical equipment and medications and

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emergency response time. Although their study focused on response time rather than overall employee performance, it provides empirical support for considering equipment availability as an organizational condition associated with service responsiveness. The present findings extend this discussion by examining the relationship between equipment availability and a broader assessment of healthcare worker performance, including work capability, responsiveness, and procedural accuracy. However, this association should not be interpreted as evidence that equipment availability independently causes improvements in performance.

From a theoretical perspective, the findings are compatible with the Structure–Process–Outcome framework proposed by Donabedian (1988). Medical equipment availability represents part of the organizational structure supporting healthcare delivery, while healthcare worker performance reflects aspects of the service delivery process. The observed association suggests that favorable structural conditions may accompany favorable operational performance. This interpretation is also consistent with the resource-based perspective of Barney (1991), which recognizes organizational resources as important assets supporting institutional capabilities. Nevertheless, the present study did not evaluate patient outcomes or establish causal mechanisms linking equipment availability with employee performance. Its contribution therefore lies in providing empirical evidence of an association between resource readiness and reported performance within a specific hospital setting.

The findings have practical implications for hospital resource management. Equipment readiness should be managed as an ongoing operational responsibility rather than limited to procurement activities. Hospital managers should strengthen preventive maintenance, conduct regular equipment inspections, improve the monitoring of frequently used medical devices, and ensure that damaged equipment is replaced promptly. Particular attention should be given to equipment accessibility during patient transportation and emergency procedures. These measures are relevant to the operational challenges identified during the preliminary assessment at Multazam Hospital. Furthermore, Akmar et al. (2026) highlighted the importance of service quality in relation to patient satisfaction and loyalty within the same hospital. Although the present study did not measure patient satisfaction, its findings provide a complementary perspective by examining internal resource conditions associated with healthcare service performance.

Research Contribution and Limitations

This study contributes to hospital management research by examining the association between medical equipment availability and healthcare worker performance in a private hospital in Gorontalo, Indonesia. Its empirical contribution

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lies in integrating equipment completeness, conformity with service standards, and readiness for use with work capability, service responsiveness, and procedural accuracy. Unlike previous studies that focused primarily on equipment maintenance, emergency response time, or patient satisfaction, this research provides a broader assessment of perceived organizational resource availability and reported employee performance within one institutional setting.

Several limitations should be considered when interpreting the findings. First, the study involved 53 respondents from one hospital, limiting the generalizability of the results to other healthcare institutions. Second, the cross-sectional design prevents causal conclusions about the relationship between equipment availability and performance. Third, both variables were measured using questionnaires, creating potential risks of self-reporting and common-method bias. Moreover, respondents represented emergency services and supporting units with different professional responsibilities, while potential confounding factors such as workload, professional experience, and organizational supervision were not controlled statistically. Future research should incorporate larger multisite samples, direct observation of equipment readiness, objective performance indicators, and multivariable analysis to provide a more comprehensive understanding of the relationship between hospital resources and healthcare worker performance.

CONCLUSION

This study examined the association between medical equipment availability and healthcare worker performance at Multazam Hospital, Gorontalo, Indonesia. The findings revealed that 86.8% of respondents rated medical equipment availability as good, while 88.7% reported good healthcare worker performance. A statistically significant association was identified between the two variables (Fisher's exact test, $p = 0.002$). Respondents who perceived medical equipment availability as good were more likely to report good performance than those who perceived equipment availability as adequate. These findings suggest that medical equipment readiness is an important organizational condition associated with healthcare worker performance, although the cross-sectional design does not establish a causal relationship.

The study contributes context-specific empirical evidence to hospital resource management by linking equipment completeness, conformity with service standards, and readiness for use with work capability, service responsiveness, and procedural accuracy. The findings underscore the importance of strengthening preventive maintenance, conducting regular equipment inspections, ensuring timely replacement of damaged devices, and improving the monitoring of essential medical

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equipment. Future research should involve multiple hospitals and incorporate objective measures of equipment readiness and healthcare worker performance to provide more comprehensive evidence and address the limitations of questionnaire-based, cross-sectional assessments.

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