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Impact of Advanced Medical Technology on Operational Efficiency and Patient Satisfaction in Dr. Jose G. Tamayo Medical Center

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Abstract

This study employed a descriptive correlational design and simple random sampling to survey 50 outpatients (30 from hemodialysis and 20 from the heart and vascular institute) at Dr. Jose G. Tamayo Medical Center in Laguna, examining correlations between advanced medical technology (information technology and diagnostic/treatment capabilities), operational efficiency (duration of examination and turnaround time of results), and patient satisfaction. Findings revealed high levels across all variables (WM=3.09 for technology, WM=3.02 for efficiency, WM=3.13 for satisfaction), with significant correlations between diagnostic/treatment capabilities and both duration of examination (p=0.029) and turnaround time (p=0.006), as well as between information technology and patient satisfaction (p=0.015); however, operational efficiency showed no significant relationship with satisfaction (p=0.198; p=0.530). The hospital leverages electronic health records, high-resolution CT scanners, and MRI machines for accurate diagnostics, secure information, and patient comfort, alongside efficient scheduling, clear results, courteous staff, and well-maintained facilities. Conclusions affirm that higher diagnostic/treatment advancements enhance efficiency in examination duration and results turnaround, while superior information technology boosts satisfaction, though operational efficiency does not influence it; an action plan was developed for timely treatment processes, staff training, and development.

Keywords: Advanced Medical Technology, Operational Efficiency, Patient Satisfaction

1. Introduction

The healthcare industry faces constant pressure to adopt new technologies for compliance, security, and better service delivery. Research highlights how these tools improve public health outcomes, reduce costs, and reshape patient care in meaningful ways (Avgar & Vorgus, 2021; Yerraguntla, 2023). For instance, patients now access full health information through simpler digital processes (McDonough, 2023), and 2023 saw major gains in care quality from tech like telemedicine and data analytics (Wood, 2023). These changes create widespread benefits, from higher patient satisfaction to smoother operations for staff (CrelioHealth, 2023; Rauv, 2023). Overall, technology drives efficiency and elevates standards across the sector.

Despite these gains, issues like heavy reliance on paper records, inaccurate data entry, outdated electronic health systems, and communication delays continue to hinder progress. Patient experience strengthens trust, sets providers apart, boosts loyalty, cuts inefficiencies, and supports regulatory needs (Wright, 2023). Looking ahead, tools such as artificial intelligence and machine learning hold great potential for regulatory

science, but they require tests for strength, consistency, and trustworthiness before wide use (Anklam et al., 2021). In the Philippines, research lacks few local studies explore technology adoption levels, operational efficiency, or patient satisfaction together, even as international work touches on tech and satisfaction alone.

This study addresses that gap by investigating the relationships between medical technology advances in terms of information technology and diagnostic and treatment capabilities, operational efficiency in terms of duration of the examination and turn-around time of result, and patient satisfaction at Dr. Jose G. Tamayo Medical Center in Binan City. This study is anchored on Technological Determinism Theory, which explains how technological advancements influence organizational processes and user experiences. Its goals include measuring current technology use, efficiency metrics like resource allocation and wait times, and satisfaction via patient surveys. Methods involve quantitative analysis of hospital data and statistical tests to uncover correlations. Key findings show positive relationships that help hospitals manage demands for quality care. This research provides actionable value for Philippine healthcare by promoting tech-driven improvements in efficiency and patient focus. The article continues with a literature review, detailed methodology, results, discussion, and recommendations. This study is significant as it provides valuable insights for patients, hospital administrators, other medical institutions, the researcher, and future researchers regarding the impact of advanced medical technology on diagnoses, decision-making, operational efficiency, and patient satisfaction.

2. Methods

This study utilized a descriptive-correlational research design to investigate the correlation between the level of medical technology advancement, level of operational efficiency, and level of patient satisfaction. The primary source of data for this study came from the out-patients who were in the hemodialysis and heart and vascular institute departments in Dr. Jose G. Tamayo Medical Center. A total of fifty (50) in-patients were included in the actual sample, who were receiving ongoing care and treatment for conditions related to their kidneys and cardiovascular system.

The researcher collected data using a closed questionnaire. The survey questionnaires were divided into three distinct parts: Scale 1 involves questions about medical technology advancement; Scale 2 includes questions about operational efficiency level; and Scale 3 contains questions about patient satisfaction.

The research instrument was subjected to reliability testing, with the following outcomes: Level of medical technology advancement 0.779, level of operational efficiency 0.911, and level of patient satisfaction 0.899.

After instrument validation, the researchers secured approval from the graduate school dean. With the research adviser's help, printed survey documents were prepared. Consent forms were distributed for personnel and patient approval, followed by the questionnaires. Collected data were organized, tallied, and analyzed statistically.

After respondents completed the survey, data was organized and analyzed. Weighted mean and ranking assessed the levels of medical technology advancement, operational efficiency, and patient satisfaction. Pearson-r correlation measured the relationship among these variables.

Results and Discussions

Table 1 The Relationship Between the Level of Medical Technology Advancement and the Level of Operational Efficiency

Medical Technology	**Operational**	**Efficiency**
Advancement	**Duration of Examination**	**Turnaround Time of Result**
Information Technology	r=0.243 Low Correlation p=0.089	r=0.271 Low Correlation p=0.057
Diagnostic and Treatment Capabilities	r=0.309* Low Correlation p=0.029	r=0.380** Low Correlation p=0.006
**Significant @ 0.001, *Significant @0.05		

As shown in table 8, it presents the relationship between the level of medical technology advancement and the level of operational efficiency. The computed pearson r-value with its quantitative description (QD) between information technology and duration of examination (r=0.243, QD=Low Correlation); between information technology and turnaround time of result (r=0.271, QD=Low Correlation) to the p-value of 0.089 and 0.057 respectively, are greater than the significance level of 0.05 which conclude that there is no significant relationship between information technology and duration of examination and turnaround time of results. This implies that information technology has no bearing on the duration of examination and turnaround time of results.

On the other hand, the computed pearson r-value with its quantitative description (QD) between diagnostic and treatment capabilities and duration of examination (r=0.309, QD=Low Correlation) and between diagnostic and treatment capabilities and turnaround time of result (r=0.380, QD=Low Correlation) with their p-value of 0.029 and 0.006 respectively, is less than the significance level of 0.05 which shows that there is a significant correlation between diagnostic and treatment capabilities and duration of examination and turnaround time of result. It signifies that the higher the level of technological advancement in terms of diagnostic and treatment capabilities, the higher the level of efficiency along duration of examination and turnaround time of result. The findings revealed that there is a low correlation between the level of medical technology advancement and the level of operational efficiency.

The results somewhat agree with the study of Rauv (2023) which asserts that the healthcare sector has undergone significant transformation due to technological advancements like online document storage, intranets, and AI-powered solutions, enhancing operational efficiency, patient care standards, and the overall patient experience. The healthcare industry is complex, involving state involvement, administrative bureaucracy, and rapid changes. According to Loio (2023), transitioning to digital technology requires considering patient safety, system stability, and data scalability. However, process simplification without compromising care quality can lead to lower costs and increased efficiency. Moreover, Farah et al. (2019) asserts that modern medical technologies help with enhancing the operational efficiency in the healthcare sector with the use of medical technologies, health issues can be accurately and quickly diagnosed, allowing for prompt action and better results.

Table 2 The Relationship Between Medical Technology Advancement and Patient Satisfaction

Medical Technology Advancement	Pearson r value	p-value	Interpretation
Information Technology	0.343* Low Correlation	0.015	Significant
Diagnostic and Treatment Capabilities	0.239 Low Correlation	0.095	Not Significant
*Significant @ 0.05			

Table 2 presents the relationship between medical technology advancement and patient satisfaction. The computed Pearson r value with its qualitative description (QD) between the information technology (r=0.343, QD=Low Correlation) to the level of patient satisfaction is proven to be statistically significant, given that the p-value is 0.015 which is less that the significance level of 0.05. Therefore, there is a significant relationship between information technology and patient satisfaction. This means that the higher the medical technology advancement in terms of information technology, the higher the level of patient satisfaction.

On the other hand, the computed pearson r-value with its QD between diagnostic and treatment capabilities (r=0.239, QD=Low Correlation), to the level of satisfaction are proven to be statistically not significant, since its computed P-value of 0.095 is less than 0.05 level of significance. Therefore, there is no significant relationship between the diagnostic and treatment capabilities and patient satisfaction. This means that medical technology advancement in terms of diagnostic and treatment capabilities has no bearing on the patient satisfaction level.

The findings agree with the study of Sutherland (2019) stating the healthcare industry is prioritizing patient satisfaction, and technology is crucial for enhancing it. Investing in virtual technology, analytics, and patient relationship management platforms can improve patient experiences, streamline processes, and enhance patient satisfaction. Additionally, a study by Leonardsen (2020) shows a review of patient experiences with technology-enabled care (TEC) in healthcare reveals that technological features and independence influence their experiences. Moreover, Durmus et al.'s (2020) study also emphasizes the need for healthcare institutions to adapt to technological and societal changes by providing high-quality, effective services, prioritizing patient satisfaction, and preparing for future healthcare needs

Table 3 The Relationship Between Operational Efficiency and Patient Satisfaction

Operational Efficiency	Pearson r value	p-value	Interpretation
Duration of Examination	0.185 Low Correlation	0.198	Not Significant
Turnaround Time of Result	0.091 Negligible Correlation	0.530	Not Significant
Significance level @ 0.05			

Table 3 shows the relationship between operational efficiency and patient satisfaction. The computed Pearson r value with its qualitative description (QD) between the duration of examination (r=0.185, QD=Low Correlation) and turnaround time of result (r=0.091, QD=Negligible Correlation) to the level of patient satisfaction are proven to be statistically not significant, since its respective computed P-values of

0.198 and 0.530, are greater than the 0.05 level of significance. Therefore, there is no significant relationship between the level of operational efficiency and the level of patient satisfaction. This implies that the operational efficiency in terms of the duration of examination and turnaround time of result has no bearing on the level of patient satisfaction.

The results contradicts the study of Ko et al. (2019) which concluded that operational efficiency has a detrimental effect on patient satisfaction. It also opposes the statement of Przybek (2023), that operational inefficiencies in the healthcare sector often result in delayed and inconsistent treatment, which usually leads to negative impacts on patient health outcomes, leading to poor patient satisfaction with their level of efficiency. Moreover, the results go against the study conducted by Durmus et al. (2020), medical centers must adapt to technological and societal changes by providing high-quality, effective, and efficient operational services to meet the patient's expectations and needs, which ultimately lead to patient satisfaction.

Conclusion and Recommendation

Based on the results of the study, it can be concluded that the hospital effectively utilizes advanced medical technology and well-trained staff to deliver efficient, accurate, and high-quality patient care. The use of electronic health records and modern diagnostic tools supports quick access to information, accurate diagnoses, and timely treatment planning, leading to reduced delays and higher patient satisfaction. The hospital also maintains strong data security, clear communication, and a clean, patient-friendly environment, which further enhances the overall patient experience. Greater technological advancement was found to improve efficiency, shorten examination time, and speed up results. In line with these findings, it is recommended that the hospital continue improving its diagnostic and treatment processes, expand treatment options, and stay updated with new medical technologies. Strengthening data security, ensuring timely care, and providing clear explanations of results are also encouraged to maintain patient trust and satisfaction. Future researchers are advised to expand the scope of the study by exploring additional variables, using different methods, and conducting similar studies in other settings to further validate the results. To all the persons who have directly and indirectly contributed to the success of this academic venture.

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