Assessing Challenges Facing Health Information Management Systems (HIMS) In the Performance of Monitoring and Evaluation (M&E) In Public Teaching and Referral Hospitals in Nairobi County, Kenya

JOSEPH KIMANZI KAVUWA[1], DR HELLEN KAMWELE WAFULA[2]
[1]*Masters Student, Maseno University, Nairobi.*
[2]*Dean-School School Of Planning and Architecture, Department of Urban Planning, Maseno University, Kisumu*

Abstract- ***Monitoring and Evaluation (M&E) in health care delivery cannot be done effectively without the help of the Health Information Management Systems (HIMS). Nevertheless, they face a lot of challenges ranging between poor infrastructure, lack of training and reluctance to change, which enhances their performance in the public teaching and referral hospitals within Nairobi County, Kenya. This paper examines these challenges by carrying out a cross sectional descriptive research study, which targeted 336 health care workers but 273 (or 81.25 percent) responded to the questionnaire. The details were gathered by means of the use of the structured questionnaires and three focus groups and analyzed with SPSS. The reliability calculated using Cronbach alpha was 0.78 with a statistical significant level of 0.00. The Pearson correlation coefficients were strong and had the same direction i.e. positive close to 0.85, 0.83, 0.84, and 0.87 respectively between human resource (r = 0.85), technological (r = 0.83), institutional (r = 0.84), and the factors related to strategy (r = 0.87) in researching the factors that influence the performance of M&E. The research points out that technological problems in the form of regular system crashes and bad interaction between systems create a major setback in M&E efficiency. The problem is enhanced by human resource issues such as poor staff training and poor staff turnover. Weak leadership and confusion in policies are other institutional barriers, which decrease effectiveness of HIMS. A conceptual framework and Technology Acceptance Model (TAM) informed the study, placing great emphasis on the user perceptions of the system adoption. The hospitals participating in this studied were Mathari National Teaching Referral Hospital, Mbagathi County Hospital, and Pumwani Maternity Hospital. The research suggests specific measures to challenge these adversities, such as enhanced leadership, well-built training, technological advancement, and transparent operation policies. By alleviating these mutually reinforcing obstacles, one will be able to fully realise the potential of HIMS to improve health outcomes and facilitate meeting Sustainable Development Goal.***

I. INTRODUCTION

Health Information Management Systems (HIMS) form part and parcel of the contemporary healthcare setting as the core component of data collection, storage, and analysis. They assist in quality management of patients, clinical decision making, and efficiencies in operations. In Kenya, the Ministry of Health is given prime importance to implement HIMS in government hospitals in order to help empower the healthcare delivery and promote health reforms in the country wherever possible (Ministry of Health, 2022). This initiative starts with the teaching and referral hospitals that are publicly owned, and such hospitals are the providers of specialized care as well as the training facility of future medical workers. Although HIMS have an immense potential, implementation in the public teaching and referral hospitals cannot be successful due to various obstacles that affect their successful Monitoring and Evaluation (M&E) initiatives. Poor ICT infrastructure, lack of training of healthcare personnel, and resistance to change are the most common ones (Mwangi et al., 2021; Were et al., 2020). Such difficulties impact the quality of data negatively, undermine the quality of M&E functions,

and eventually reduce the efficiency of patient care services and provisions of healthcare services. Empirical studies note that it is critical to eliminate such barriers to ensure effective deployment of HIMS. Take the case of Njagi and Wanjiku (2023), which discovered that the hospitals that do not have a good level of IT support and trained professionals have problems with the accuracy of the data and regular reporting. Along with this, Kamau (2021) emphasized how the weak leadership of institutional bodies and inadequate funding limits the HIMS initiatives in aspects of sustainability and scalability. The study aims at identifying practical insights and recommendations able to guide specific interventions toward the enhancement of the performance of M&E in Nairobi County by evaluating the nature of the issues related to HIMS that negatively affect the working of M&E in the county.

II. PROBLEM STATEMENT

Although Health Information Management Systems (HIMS) have experienced large investments, large barriers still exist in regard to the realization of such systems in the public teaching and referral hospitals in Nairobi County. Data collection, entry, and reporting activities are heavily disrupted by technological limits, including poor ICT infrastructure, internet connection, and critical outages, which are frequent (Were et al., 2020). Such requirements do not only make operations slow, but also reduce accuracy, and reliability of information to be used in decision-making in the field of health care. Besides, the human resource shortages such as the lack of instruction on how to use the system and the inability among certain healthcare workers to embrace and accept change also impede the use of HIMS (Mwangi et al., 2021). These are the key determinants of a working Monitoring and Evaluation (M&E) as it is an essential component of policy guidance, resource management, and service enhancement. On the institutional level, the lack of leadership support, little technical oversight, and a low level of funds hinder the scalability and sustainability of HIMS initiatives further (Kamau, 2021). A combination of these technological, human, and institutional barriers poses a complex problem of realizing the benefits envied by HIMS. The possibilities of HIMS to transform the health outcomes will stay mostly unexplored unless tailor-made strategies are employed to attend to the issues. This is an obstacle to the development of Kenya in terms of achieving Sustainable Development Goal 3, which has a goal of ensuring healthy lives and promoting the well-being of all people of all ages.

III. GENERAL OBJECTIVE OF THE STUDY

To identify the challenges associated with Health Information Management Systems (HIMS) that hinder the effective performance of Monitoring and Evaluation (M&E) systems in public teaching and referral hospitals in Nairobi County, Kenya.

3.1 Specific Objectives

1.To examine technological challenges in Health Information Management Systems (HIMS) affecting the performance of the Monitoring and Evaluation system.

2.To examine human resource challenges in HIMS affecting the performance of the Monitoring and Evaluation system.

3.To examine institutional challenges in HIMS affecting the performance of the Monitoring and Evaluation system.

4.To examine strategies for addressing technological, human resource, and institutional challenges in HIMS to enhance the performance of the Monitoring and Evaluation system.

3.2 Research Questions

1.What technological challenges in HIMS affect the performance of the Monitoring and Evaluation system?

2.What human resource challenges in HIMS affect the performance of the Monitoring and Evaluation system?

3.What institutional challenges in HIMS affect the performance of the Monitoring and Evaluation system?

4.What strategies can be implemented to address HIMS challenges and improve the performance of the Monitoring and Evaluation system?

IV. LITERATURE REVIEW

Health Information Management Systems (HIMS) are key factors to enhance the effectiveness of Monitoring and Evaluation (M&E) systems in the public hospitals. Nonetheless, their successful implementation is constricted by a variety of challenges such as technological, human resource, and institutional factors. This literature review investigates all these three dimensions and also notes the unique contribution that the present study makes to filling these gaps.

4.1 Technological Challenges

Technological issues represent a major barrier to the effective implementation of HIMS, which will eventually influence the performance of the M&E systems. Research has recorded that most public hospitals in Kenya are using restricted ICT infrastructure, a situation that causes issues of system arrests and inefficiencies in the data entry and access procedures (Were et al., 2020). Moreover, due to insufficient interoperability among various systems, data duplication, fragmentation, and inconsistent reporting problems exacerbate the establishment of the data-based determination at the local level, which, in turn, can be eliminated by adopting regional and feasible initiatives, including broadband expansion, hosting up-to-date server systems, and establishing periodic technical assistance (Njagi & Wanjiku, 2023). It also presents a schedule to maintain the system by having a system that will ensure that technical hitches will be reduced and the continuity and validity of health data used in M&E are enhanced.

4.2 Human Resource Challenges

The challenges that are related to human resource have a huge influence on the use of HIMS. Mwangi et al. (2021) note that the reason behind the failure to use health information systems is that healthcare workers lack the appropriate training, which makes them less competent and less confident when working with the systems and leads to the underutilization of the systems and frequent typing errors. Another crucial gap in the literature that the research addresses is the barrier of resistance to change, especially during situations when the staff regards the systems as too complex or when the probability of work overloads is perceived (Agyemang et al., 2019). It promotes unrelenting capacity-building and mentoring programs based on different groups of users and, therefore, fostering culture of innovation and versatility in the personnel. The integrated approach is contrasted to the one-time training activities that were focused on in previous research.

4.3 Institutional Challenges

HIMS also suffers due to the institutional weaknesses, including the unsupportive leadership that is compounded by inappropriate funding. According to Kamau (2021), HIMS rarely become a strategic priority due to poor coordination and unsustainable implementation in a case where the organization lacks organizational commitment. Were et al. (2020) further state that poor accountability in the use of the system and role confusion is enhanced by the existence of weak institutional policies.

The present research presents an original suggestion, which is the formation of a task force of hospital-based HIMS that should be involved in oversight, coordination, and advocacy. It also suggests formulation of uniform institutional policies and accountability mechanisms, to guarantee the commitment of the leadership and mobilization of the resources. This method of organization enhances institutional ownership, and sustainability of HIMS in the long run.

4.4 Strategies for Addressing HIMS Challenges

The solution to HIMS issues must have a comprehensive approach to include the investment of the infrastructure, capacity building, and institutional reforms. Njagi & Wanjiku (2023) state that technology upgrades are necessary, whereas other researchers

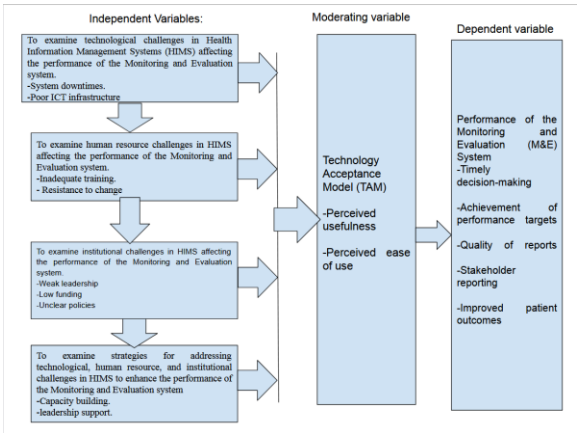
regard additional support through training and policies. In this research, the quality of technological, human, and institutional responses is rationalized in a single action plan. Contrary to the earlier specific way of doing it in fragments, it offers a single stakeholder engagement framework comprising of healthcare workers, ICT workers, policymakers, and hospital management. The paper emphasizes that the appropriate cooperation is essential to the solving of systemic HIMS problems and the realization of Monitoring and Evaluation objectives, especially in line with Sustainable Development Goal 3 (SDG 3): Ensure healthy lives and promote well-being at all ages.

IV. THEORETICAL FRAMEWORK

5.1 Technology Acceptance Model (Tam)

Davis developed Technology Acceptance Model (TAM) in 1989 and it provides a theoretical exposition of people adopting and utilizing the new technologies. According to it, it has two primary dimensions that ascertain the intention of a person to adopt a certain technology namely the subjective usefulness and the subjective ease of use. The concept of perceived usefulness to the issue of Health Information Management Systems (HIMS) is the extent to which medical practitioners believe HIMS to be useful in practice, e.g., it can enhance data entry, monitoring, reporting and overall healthcare delivery. Perceived ease of use on the other side is the stage where they perceive the use of HIMS as being easy or non-complicated. The paper will rely on TAM to identify the influence of the perceptions towards adoption and proper utilization of HIMS in the teaching and referral hospitals found in Nairobi County. After understanding the behavioral and psychological causes, which are connected with the use of the system, the study strives to state the ways of work improvement concerning the use of systems and development of the Monitoring and Evaluation (M&E). Therefore, the study is using TAM to provide a critical modeling on the relationship between human beings and technology in health care with the aid of which the well-being of people will be enhanced as per topic of good health and well-being in the UN Sustainable Development Goals.

5.2 Conceptual Framework



The study conceptual framework looks at the influence of four independent variables, which are technological, human resource, institutional issues and approaches to overcome them in determining performance of Monitoring and Evaluation (M&E) systems in public hospitals. There are technological obstacles that include poor ICT infrastructure and system crashes among others which hinders data flow. The human resource problems entail poor training and unresponsiveness to change whereas institutional problems are low level of leadership, less financing, and not-well-defined policies. Strategies such as capacity building and leadership support are some of the ways of presenting solutions to such barriers. These will determine the performance of the M&E system, which is evaluated by the aspects of timely decision-making, performance targets achievement, report quality, stakeholder reporting, and better results among the patients. The framework also takes into consideration the Technology Acceptance Model (TAM) which highlights that the mechanism in which the usefulness and ease of use of Health Information Management Systems (HIMS) promotes the user adoption and success of the system, which eventually affects the data driven enhancement in healthcare by the M&E system.

VI. METHODOLOGY

6.1 Research Design

In this research the descriptive cross-sectional research design was used to carry out the study systematically in order to be analyzed on the presented challenges of Health Information Management Systems (HIMS) in the public hospitals. Such design served to collect data at one point, providing a take on HIMS implementation and the barriers accompanying the concept. It also provided a good choice to determine and measure particular variables that influence the outcome of Monitoring and Evaluation (M&E) systems in the public teaching and referral hospitals in Nairobi.

6.2 Target Population

Those that participated in the activities of HIMS within the seven public teaching and referral hospitals in Nairobi County were the target population. This level 5 and level 6 hospitals offer medical services and training. The overall size of the population of interest consisted of 2,231 individuals that involved M&E officers, nurses, health records officers, medical social workers, laboratory staff, administrative employees and pharmacists. This varied cohort guaranteed that results matched the wide spectrum of stakeholders and HIMS users in the domain of public health practice.

6.3 Sample Size And Sampling Technique

6.3.1 Sample Size

Yamane's formula (1970) was used to determine the appropriate sample size, based on the total population (N = 2,231) and a 5% margin of error. The resulting sample size was approximately 339 respondents, which was considered statistically sufficient for accurate generalization of results.

6.3.2 Sampling Techniques

A methodological combination of sampling also took place in order to guarantee representativeness, Cluster Sampling: Hospital groups were listed into two clusters including three-Level 5 hospitals and four-Level 6 hospitals. Within each cluster systematic methods were used to select facilities and participants.

Stratified Sample by Cadre: Stratifying of respondents was by the professional group (e.g., nurses, doctors, M&E staff, social workers, billing officers, pharmacists) and proportional representation, gave diversity and balance in the sample.

6.4 Data Collection Tools

To maximize on the validity and reliability of the findings, there were several data collection tools; Structured Questionnaires: there were ice-structured questionnaires and others based on open-ended and closed questions on the technological, human resource and institutional challenges encountered concerning HIMS. The questions had been matched with study objectives and pilot-tested to enhance communication. Focus Group Discussions (FGDs): FGDs were also organized by inviting a set of healthcare workers to provide qualitative data on factors impeding the system being used and user experience with HIMS. Improving HIMS- Checklists: In the case of Direct investigation on the operations of HIMS, use of checklists was adopted. Using this approach, this offered an understanding of real time contextual issues like work flow problems, usability to the system and data entry methods.

6.5 Data Analysis

A quantitative analysis of the questionnaires data was performed with the SPSS. Demographic data as well as important variables were summarized using descriptive statistics (frequencies, means, percentages). The measure of associations was done via Pearson correlation coefficients between independent variables (technological, human resource, institutional and strategic response factors) and the dependent variable, which is M&E system performance. The amount of predictive power afforded by these challenges in analytics-shaping system performance was found through regression analysis. FGD qualitative data and observation notes were thematically analyzed to allow uncovering of repetitive patterns and contextual explanations of quantitative data. Having used multiple data collection

sources, it became possible to conduct the factor affecting HIMS implementation and M&E performance in the public hospitals in Nairobi in a comprehensive, triangulated way.

VII. FINDINGS AND RESULTS

7.1 Introduction to the Chapter

This chapter provides findings and results in accordance with the four specific objectives of the study, which intends to investigate influence of Health Information Management Systems (HIMS) on Monitoring and Evaluation (M&E) performance in Nairobi County and in the public teaching and referral hospitals of the County. The result of each goal is highlighted in terms of descriptive statistics, inferential statistical, and qualitative facts gathered after undertaking Focus Group Discussions (FGDs). Specific Objectives are; technological challenges, human resource challenges, institutional challenges and strategies of overcoming the three challenges to improve M&E performance.

7.2 Response Rate

In the survey, 336 health practitioners were surveyed at the public teaching and referral hospitals within the Nairobi County. Of these, 273 respondents completed the questionnaire successfully returned and gave a total response rate of 81.25 per every hundred. The high response rate confirms to reliability and generalizability of the study outcome. There were also 3 FGD

7.3 Demographic Information

The respondents were selected across the well reputed professionals such as M&E officers, ICT experts, health records officers and hospital administrators. Most of them had an experience longer than five years at the professional level, and most of them work in high-capacity referral facilities in Level 5 and Level 6 hospitals. This demographic profile guaranteed that the answers portrayed well informed choices concerning the implementation and performance of HIMS

7.4 Findings for Objective 1: Technological Challenges in HIMS

With regard to describing the most commonly reported technological barriers, issues with the system downtimes (means = 4.01), outdated software (means = 3.92), poor system interoperability (means = 3.88), and complicated user interfaces (means = 3.71) presented the most frequent responses. Such aspects in technology were always perceived as barriers towards effective M&E activities in terms of data reporting efficiency, timeliness as well as effectiveness.

It was revealed that Pearson correlation using inferential analysis established that there is a strong positive dependence between handling technological challenges with M&E system performance ($r = 0.83$), carrying with it the coefficient of determination of 68.89%. This implies that the efforts to surpass the technological thresholds can be considered to lead to the almost 69 percent gain in M&E performance.

These findings were supported by qualitative data results of FGDs. According to one of the participants, our capability to keep track of the data and report was greatly enhanced after the system was upgraded and we got a better connectivity. This affirmatively establishes that technological improvement of the environment will be of help in improved functionality of HIMS.

7.5 Findings for Objective 2: Human Resource Challenges in HIMS.

The descriptive results obtained indicated that one of the key human resource problems was failure to offer sustained training (mean = 3.94), presence of enough ICT skilled staff (mean = 3.83) and turnover of staff (mean = 3.66). They were regarded as the barriers to successful application of HIMS in health data collection and analysis.

Inferential statistics resulted in the conclusion that the correlation with the handling of complexities with humanity and M&E performance were positive ($r = 0.85$) and the value of the coefficient of determination indicated was 72.25 per cent. It implies that the improvement of human resource capability introduces immense change in health information management.

FGDs reaffirmed the idea that the staff development was needed. According to what a health records officer stated, the refresher training sessions were quite empowering. We are operating the system in a more safer and accurate way." This demonstrates the usefulness of a continued training on improved practices of data management.

7.6 Findings for Objective 3: Institutional Challenges in HIMS

Descriptive statistics showed that deficiency of institutional support (mean = 3.79), ambiguous data policies (mean = 3.63) and poor leadership interactions (mean = 3.57) were biggest institutional problems. Respondents indicated that sufficient commitment to the organization and disparity in policies lacked cohesiveness leading to inconsistency in operations of HIMS.

Inferential test analysis revealed a high degree of positive association (r = 0.84) between addressing institutional issues and performance of the M&E system with a value of 70.56% coefficient of determination. The above findings point out the significant role of leadership, accountability, and policy support in motivating the HIMS effectiveness.

As one of the hospital administrators stated when conducting FGD: "As long as the management demonstrates interest in data processes and enforces compliance, everything goes much smoother." This shows that leadership is an important role in improvement of the performance of the systems.

.

.

.

7.7 Findings for Objective 4: Strategies to Overcome HIMS Challenges.

Tactics that would be beneficial in solving the challenges raised above have been tested in the study. Descriptive statistics have demonstrated a high level of agreement concerning effective leadership practices and finance (mean = 4.21), regular training at the workplace (mean = 3.98), streamlining of the system (mean = 3.74), where the clear policy (mean = 3.61), and technical advancements (mean = 3.49) have been concerned.

And the inferential statistics confirmed that such strategies were correlating with M&E performance very strongly. There was Pearson correlation of five main indicators of M&E effectiveness which are = 0.82, = 0.91 and mean coefficient of = 0.87. The average coefficient of determination was 75.69 percent, so it means that it is possible to explain the difference between the performance of the M&E system by the successful implementation of these strategies more than three-quarters.

FGD insight ensured these findings. One of the participants said there were better chances to report and it was easier and more precise because the management was supportive all the time and the latest tools were used. This shows the utility of institutional and technological support strategies in the use and influence of HIMS advancement. Altogether, the research developed the significance of the three factor challenges that are technological, human resource and institutional in significantly interfering with the performance of HIMS in as far as M&E functions are involved. However, all these challenges can be easily hurdled through appropriate planning which assumes that there are leadership participation, explaining the policies, regular capacity building, and investment in technology. The high positive qualitative suggestion and a negative correlation of low strength further increases the relevancy of the role that these interventions have on the promotion of the data management system of the public health care facilities in the Nairobi County

VIII. DISCUSSION OF RESULTS

8.1 Introduction

In this chapter, the author reviews findings provided in Chapter Seven concerning the research to the targets of the research and the literature. The discussion is on how the findings intersect, widen, or otherwise the existing body of knowledge on the issue of Health information Management Systems (HIMS) and its impact on Monitoring and Evaluation (M&E) systems in the Nairobi County, public teaching and referral hospitals. The discussion will follow the four areas of the specific objectives of the study.

8.2 Technological Challenges in HIMS and M&E Performance

The findings revealed that technological problems such as system failure, outdated systems, incompatibility of systems and complex interfaces are key hindrance towards successful M&E. This concurs with the findings of Oluoch et al. (2020) who concluded that failure to report and evaluate the data because of the absence of digital infrastructure and systems that cannot be utilized by the stakeholders adversely affects the situation with healthcare in Africa. The achievement of technological barriers positively correlates with an improvement in M&E results and the correlation is rather strong ($r = 0.83$). This element favors the relevancy of the high-quality type of digital infrastructure. The benefits of upgraded systems were considered to be the decrease in delays and reporting accuracies of the data which preparedness of the ICT infrastructure in the field of the public health data systems was important to be reported..

8.3 Human Resource Challenges in HIMS and M&E Performance

Gaps in the ongoing training, the shortage of ICT skilled staff and the human resource turnover were found as the primary Human resource issues. This agrees with the findings of Wanyoike and Njihia (2019), that highlighted capacity building requirements in data systems. A positive correlation, which was observed to be high at 0.85, between the use of HR challenges and M&E effectiveness confirms the assumption that qualified people are essential when it comes to ensuring quality data capture and utilization. Staff that is trained, will also become more confident and also become more compliant with the standard of reporting, thus leading to a better result in M&E.

8.4 Institutional Challenges in HIMS and M&E Performance

Weak leadership, lack of clear data policy and inadequacy of support systems were institutionally-related factors which were also found to greatly impede HIMS implementation process. The findings tally with the arguments made by Mutale et al. (2018) who notated that data systems cannot operate at their best without proper governance. This positive correlation ($r = 0.84$) indicates that HIMS performance can be improved significantly by engaging in a set of institutional frameworks to include more direct guidance on policies and a more effective leadership. The results support the role played by organizational culture in inducing data-driven decision-making among public hospitals.

8.5 Strategies to Overcome HIMS Challenges and Improve M&E

The analysis results indicated that, among other strategies like leadership involvement, employee training, user-friendly system interfaces, transparent policies, and technological upgrading are of great value as far as enhanced M&E performance is concerned. The evidence suggests the presence of a strong, very high in correlation ($r = 0.87$), and a coefficient of determination averaging at 75.69 percent showing that strategic interventions are not only supportive to the implementation of HIMS but rather formative. These data coincide with the investigations of Ngugi et al. (2022), who also underlined that the efficiency of health data systems is empowered by leadership, policy transparency, and the orientation toward users in the system structure. No less important, the opinions recorded during the FGDs clearly show that when the staff perceives that they are supported by the leadership and given the necessary tools, the overall performance of M&E greatly improves. It can be concluded that solving the

technological issues, the human resource issues, and the institutional issues leads to excellent results in terms of the performance of the HIMS and, therefore, of the M&E systems. The concise statistical connections and the encouraging qualitative evidence prove that strategic and well-coordinated responsiveness specifics are instrumental to boost data-driven decision-making in the field of health in Kenya.

CONCLUSION

The analysis of the issues preventing useful application of Health Information Management Systems (HIMS) in Monitoring and Evaluation (M&E) processes in the public teaching and referral hospitals in Nairobi County offers a complex experience that affects the delivery of healthcare in most aspects. Through research, it has been revealed that the challenges of human resource capacity including opposition to change, insufficient training opportunities, ineffective communication and supervision lag those fostering adoption and practical use of HIMS. Such obstacles undermine the data quality and efficiency, and it also reduces the confidence level of the users. Challenges in technology such as regular downtimes in the system, system interoperability and ICT backup add to the problem, slowing down data flow and making the system unable to facilitate timely reporting. Moreover, institutional and organizational challenges such as lack of funds, poor leadership, and policy ambiguity degrade the expediency of HIMS and weaken the chances of this usage to enhance healthcare outcomes. Tackling them can be approached by implementing specific measures addressing each of these issues with matching effectiveness, e.g., by securing more adequate leadership support, frequent training sessions, the decrease in the complexity of system usage, and clear policies on their use. The results conform to the Technology Acceptance Model (TAM), which proposes the significant role of perceived usefulness and ease of operations in shifting towards technological systems. The respondents were vehement with the perceptions that strategic interventions have positive implication on data accuracy, completeness and timeliness as well as stakeholder engagement. Thus, addressing these issues with the help of the coordinated investments in the ICT infrastructure, training, and leadership development, healthcare facilities in Nairobi County have a great potential to improve performance of HIMS and increase evidence-based decision-making, accountability, and the quality of healthcare services provided.

RECOMMENDATIONS

10.1 Addressing Human Resource Capacity Challenges

It is suggested that comprehensive, specific role as well as more practical training be adopted at the public teaching and referral hospitals to resolve the human resource-related issues. Such programs ought to make users more confident and competent in the application of HIMS. Moreover, well-planned change management activities are to be worked out including the use of clear communication plans clarifying the advantages of HIMS and promotion of detailed discussions of user resistance. It is also important to enhance supervisory bodies. Regular check-in, mentorship and accountability by the supervisor is desired to facilitate proper data management and use of the system.

10.2 Improving Technological Challenges

In order to overcome technological challenges, the priority of the public hospitals must be to enhance ICT infrastructure update (both software and hardware). Thus, ensuring that the infrastructure results in minimal downtimes and improves performance. In order to ensure that the system is always running, as well as providing instant support to the users it is necessary to create a responsive and well-equipped IT support team. Improved HIMS with other internal systems should be done in terms of standard data protocols so that information flows without hindrance and lacks duplication in transmission of data.

10.3 Strengthening Institutional and Organizational Support

The institutional challenges should be dealt with through strong leaderships that should support and prioritize HIMS initiatives. The leaders of a hospital

ought to put enough provisions, make strategic policies as well as seeking uniform application in every department. It is important to develop proper and standardized HIMS working routines so that uniformity, quality of data and accountability are ensured. They should also have some long-term financing schemes in place that will make the HIMS operations sustainable. This involves specific budgets that are allocated to digital health innovations, capacity building of the staff members, and updates of systems at periodic intervals.

10.4 Implementing Strategies to Overcome HIMS Challenges

The effective implementation of the HIMS strategies requires participatory and structured approach. It is recommended that an interdepartmental review meeting is organized on a regular basis so as to assess the performance of the system and share best practices as well as collude to solve incoming challenges. They should formalize feedback influences and learn the experiences of the users of the system and use them to improve the system iteratively. Before a full implementation of a new or updated feature in a system, the test involving pilots should be carried out so that to detect the problems of usability and achieve the successful adaptation of the users. All new implementations should be followed up by training sessions.

10.5 Holistic Approach to HIMS Optimization

The procedure of HIMS optimization needs to be thinking and organizational. This involves reconciliation of work in human resource, technology and institutional design. The hospital and ICT department or units and the health care professionals will collaborate in an attempt to enhance the continuous growth of HIMS. The regular feedback loops, the involvement of the management and intentional investment in digital infrastructure and capacity may go a long way into creating an enabling environment that will have us gather, utilize and spew veritable data especially in Monitoring and Evaluation. It is a foreseeable case that Nairobi County as it incorporates these multi-layered proposals will stand a better reason to solve the plight of HIMS and enhance the input of the system to achieve improved M&E efficacy and effective service delivery of health care services.

REFERENCES

[1] Agyemang, F. G., Nartey, Y. A., & Annan, E. A. (2019). Barriers to implementation of electronic health records: A qualitative study of Ghanaian hospitals. *BMC Medical Informatics and Decision Making, 19*(1), 1–9. https://doi.org/10.1186/s12911-019-0930-1

[2] Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.

[3] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008

[4] Kamau, M. N. (2021). Institutional barriers to effective implementation of health information systems in Kenya's public hospitals. *African Journal of Health Systems Management, 4*(2), 55–64.

[5] Kusek, J. Z., & Rist, R. C. (2004). *Ten steps to a results-based monitoring and evaluation system*. World Bank.

[6] Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Sage Publications.

[7] Ministry of Health [Kenya]. (2017). *Kenya Health Sector Strategic Plan 2018–2023*. Nairobi: Government of Kenya. https://www.health.go.ke/

[8] Mutale, W., Ayles, H., Bond, V., Chilengi, R., Hamainza, B., & Siziya, S. (2018). Health systems governance and accountability in Zambia: A narrative review of the literature. *Health Policy and Planning, 33*(6), 759–775. https://doi.org/10.1093/heapol/czy058

[9] Mwangi, L., Odhiambo, R., & Kibet, L. (2021). Human resource capacity and adoption of hospital information systems in public health facilities in Kenya. *International Journal of Health Systems and Implementation Research, 5*(1), 33–41.

[10] Ngugi, E. W., Omollo, I. O., & Gichangi, P. (2022). Influence of leadership, policy clarity and user-centered design on efficiency of health information systems in low-income settings. *African Journal of Health Informatics, 14*(2), 27–36.

[11] Njagi, L., & Wanjiku, P. (2023). ICT infrastructure and health data quality in Kenyan county hospitals. *East African Journal of Health and Development, 6*(1), 42–51.

[12] Oluoch, T., Were, M. C., & Sereno, D. (2020). Understanding ICT infrastructure limitations in digital health interventions across Africa. *International Journal of Medical Informatics, 142*, 104257. https://doi.org/10.1016/j.ijmedinf.2020.104257

[13] Schober, P., Boer, C., & Schwarte, L. A. (2018). Correlation coefficients: Appropriate use and interpretation. *Anesthesia & Analgesia, 126*(5), 1763–1768. https://doi.org/10.1213/ANE.0000000000002864

[14] Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2*, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

[15] United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. https://sdgs.un.org/goals/goal3

[16] Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science, 46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

[17] Wanyoike, G., & Njihia, K. (2019). Capacity building in healthcare data systems: A Kenyan perspective. *Kenya Journal of Health & Informatics, 3*(1), 12–19.

[18] Were, M. C., Sutherland, J. M., Bwana, M., Ssali, J., & Shen, C. (2020). Health information technology and hospital performance in sub-Saharan Africa: A Kenyan perspective. *Journal of Global Health, 10*(2), 020301. https://doi.org/10.7189/jogh.10.020301

[19] World Health Organization. (2008). *Framework and standards for country health information systems*. Geneva: WHO.

[20] World Health Organization. (2016). *Global diffusion of eHealth: Making universal health coverage achievable*. Geneva: WHO