

East African Medical Journal Vol: 93 No. 7 July 2016

THE OPERATION CRITERIA OF A HEALTH MANAGEMENT INFORMATION SYSTEM

S. M. Omambia, BSc, MSc, HSM, HnD Epidemiology, Health Information Officer, National Spinal Injury Hospital and Senior Lecturer Kenya Medical Training College Nairobi

THE OPERATION CRITERIA OF A HEALTH MANAGEMENT INFORMATION SYSTEM

S. M. OMAMBIA

ABSTRACT

Background: An iterative process before implementing any health management information system is needed, in that changes identified during the process must be evaluated to determine their effect on completed analyses. In order to achieve maximum returns on an investment or intervention evaluation should be from the outset. The process must consider system life cycle management and the organization's policy and budget as important integral factors.

Objective: To evaluate the operation phase of the implemented Health Management Information System at Kenyatta National Hospital.

Design: A descriptive cross-sectional study.

Setting: Kenyatta National Hospital.

Subjects: Forty (40) healthcare workers who were involved in the implementation of the Health Management Information System.

Results: The response rate was more than 90%. The main indicator used in evaluating the electronic HMIS in KNH was performance 17 (53.1%), Other indicators that were commonly applied in HMIS evaluation in KNH were connectivity 9 (28.1 %) and durability 7 (21.9%), all these indicators are major items to consider and evaluate in an effective HMIS, although not at a good scale it can be concluded that the HMIS at KNH was fair since it's the first time KNH is adopting the concept. Most health workers 17 (53.1%) felt that the electronic HMIS in KNH had achieved its objectives while the rest 16 (46.9%) were for the opinion that the electronic HMIS in KNH had not achieved its objectives. From the findings in the operation criteria the benefits of the electronic HMIS included improved efficiency and reduced workload. Other areas that were impacted on by the electronic HMIS were costs, and ICT skills or training.

Conclusions: From the findings in the operation criteria, the indicators showing successful implementation were: routine use of HMIS in healthcare activities, managerial support for HMIS, changes in hospital structure and integrated managerial processes, HMIS advocacy, data collection, analysis and interpretation and potential for ICT expansion. For the remaining indicators respondent did not strongly agree or agree that implementation had been successful. The area in which implementation was not judged successful were: effective and fair distribution of computers, partial HMIS implementation, inadequate numbers of skilled and trained staff, and inadequate ICT infrastructure. Lastly the goal of monitoring and evaluation is not to focus on what is wrong and condemn it; rather, it is to highlight the positive aspects of the system that make it work, as well as to identify what went wrong as a basis for improving the system. From the findings most health workers (53.1%) felt that the electronic HMIS in KNH had achieved its objectives which will in return lead to effective utilisation of HMIS and better healthcare service delivery.

INTRODUCTION

HMIS is a critical part when it comes to any health facility transition. It is imperative to know what works for whom and under what circumstances. We must understand the system in order to strengthen it and from that base we can design better interventions

and evaluations for health systems strengthening. Healthcare organizations should overemphasize the iterative nature of the process since any changes in mission, operations, functions, or information and data needs must be assessed to reveal their impact on analyses already completed, since these changes could have a profound effect on the system to be acquired.

According to (1) evaluation of DHMIS is one of the most neglected areas in the MOH Kenya and without the comprehensive evaluation criteria there is little justification of maintaining or implementing a HMIS.

Study Purpose: The aim of the study was to evaluate the operation criteria in the implementation of a Health Management Information System in Kenyatta National Hospital.

MATERIALS AND METHODS

The study was conducted in Nairobi County at Kenyatta National Hospital and used a descriptive purposeful research design. Purposeful sampling, in contrast to probabilistic sampling, is "selecting information-rich cases for study in depth". In this case KNH being at the apex of the National Hospital Referral System was purposefully selected. These shall allow the study to collect data which will be analyzed quantitatively using descriptive and inferential statistics [2]. Therefore, the descriptive survey was deemed the best strategy to fulfill the objective of this study. The design took on a case study at KNH.

The targeted population was 40 accredited healthcare service delivery officers at Kenyatta National Hospital who were directly or indirectly involved in the operation phase of implementing the HMIS. The scope was deemed appropriate due to the fact that with rise in technology, urban areas and cities in specific embrace it with ease. The scope was also significant to minimize expenses which would otherwise be incurred outside the researchers' residential city.

The researcher used convenience sampling, Convenience sampling (sometimes known as grab or opportunity sampling) is a type of non-probability sampling which involves the sample being drawn from that part of the population which is close to hand, that is, a sample population selected because it is readily available and convenient. This method is used when one is unable to access a wider population, for example due to time or cost constraints. This ensured that every person within the hospital that was involved in implementation had an equal chance of being selected with the sampling carried out in a single stage and with each element chosen separately rather than in

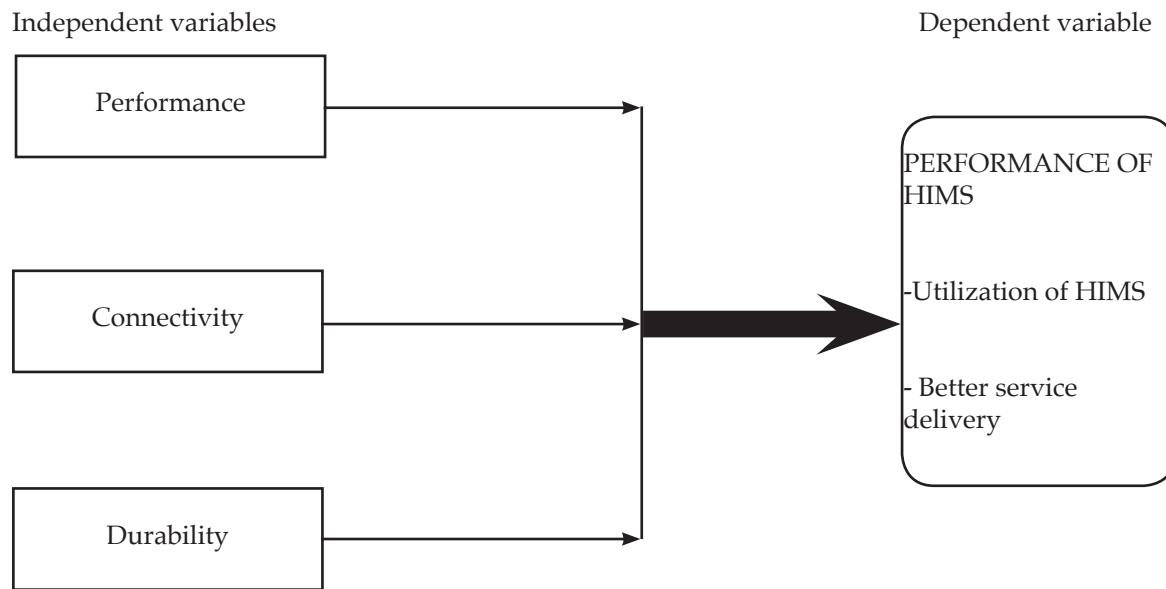
clusters. The sampling method used ascertained representativeness of the general population. Based on the representativeness of the technique used, it permitted the researcher to draw conclusions as a representation for the entire population [3]. From the study the independent variables were performances, connectivity and durability in the operation criteria when adopting a Health Management Information System at the Kenyatta National Hospital, since an independent variable refers to the status of the presumed cause whereas the dependent variable is the presumed effect. Effectual Implementation of Health Management Information System at the Kenyatta National Hospital due to the importance of the implementation criteria thus was the dependent variable.

These were a qualitative data analysis and were done using SPSS, MS Excel and MS Word software's with univariate and bivariate statistics being utilised. Univariate statistics is taking one variable and analysing it whereas, Bivariate analysis is one of the simplest forms of quantitative (statistical) analysis. It involves the analysis of two variables for the purpose of determining the empirical relationship between them in order to see if the variables are related to one another, it is common to measure how those two variables simultaneously change together. Bivariate analysis can be helpful in testing simple hypotheses of association. Thematic statistics were also used whereby they convert conversations into themes or codes for qualitative statistics.

Before data collection, a permit was sort from the Kenya Methodist University and the Kenyatta National Hospital/University of Nairobi ethics committee. On production of the research permit, consideration for permission to carry out the research was to be granted by the research and ethics board team. The Administrators, staff and the support staff of the departments selected were informed in advance concerning the visits and for data collection in their respective departments and offices. The researcher ensured that confidentiality was paramount and the information obtained used only for the purpose of these study.

Conceptual framework: Based on the discussion of the various variables, the study was guided by the following conceptual Framework. See Figure 1

Figure 1
Conceptual Framework



RESULTS

The response rate was more than 90%. According to the responses of health workers interviewed in the operation phase, the main impact of the electronic HMIS in KNH was improved efficiency. Other areas that were impacted on by the electronic HMIS were costs, workload and ICT skills or training.

According to the responses of health workers interviewed in the post implementation phase, the main impact of the electronic HMIS in KNH was improved efficiency (Figure 2). Other areas that were impacted on by the electronic HMIS were costs, workload and ICT skills or training.

The main indicator used in evaluating the electronic HMIS in KNH was performance. Other indicators that were commonly applied in HMIS evaluation in KNH were connectivity and durability as shown in table 1.

Figure 2

Respondents Electronic HMIS impact at KNH
Stakeholders involvement in implementation of electronic HMIS in KNH

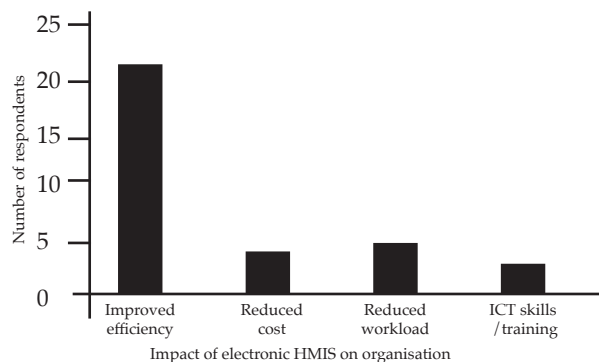


Figure 3

Stakeholders involvement in implementation of electronic HMIS in KNH

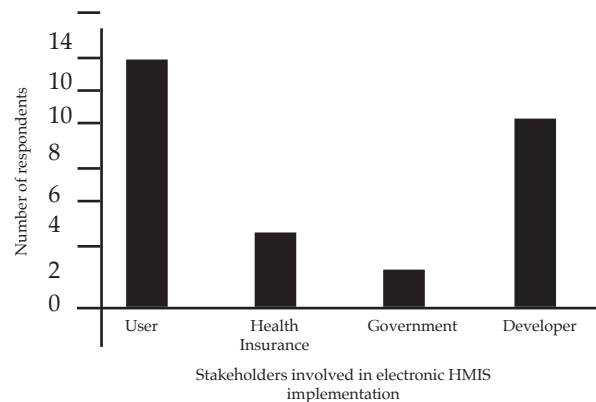


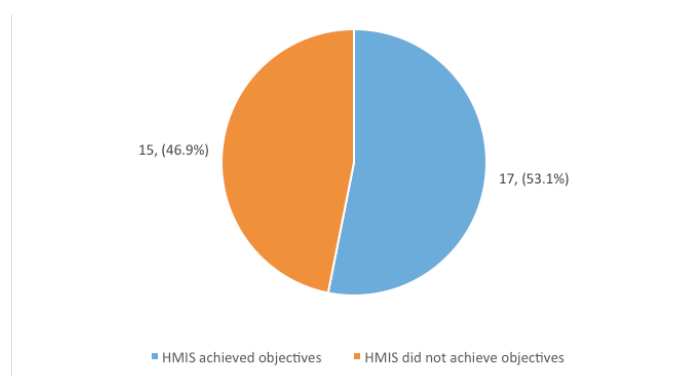
Table 1

HMIS indicators used in KNH

Indicators	Frequency, n	Percent, %
Performance	17	53.1
Connectivity	9	28.1
Durability	7	21.9
Compatibility	3	9.4
Other indicators	2	6.2

Various stakeholders were involved in the implementation of the electronic HMIS in KNH. Figure 3 shows that health workers reported that HMIS users, developers, health insurers and government were involved during the HMIS implementation phase.

Figure 4
Health worker's perception of HMIS objectives achievements in KNH



As indicated in Figure 4 above in relation to health worker's perception of HMIS objectives achievements in KNH, Most health workers 17 (53.1%) felt that the electronic HMIS in KNH had achieved its objectives while the rest 16 (46.9%) were for the opinion that the electronic HMIS in KNH had not achieved its objectives.

Table 2
Chi square results indicating perception of HMIS implementation

	SD / D /	A / SA	Difference	P value
KNH uses HMIS in routine health care service activities	16.1%	83.9%	67.8%	<0.001
KNH management supports HMIS	13.8%	86.2%	72.3%	<0.001
Change has brought about better, effective and efficient healthcare delivery in KNH	13.4%	86.6%	73.2%	<0.001
There is effective and fair distribution of computers in the hospital*	46.0%	54.0%	8.0%	0.066
HMIS has been fully implemented by the hospital*	51.3%	48.7%	-2.7%	0.54
KNH has developed changes in its structure into a more integrated process of management	29.6%	70.4%	40.8%	<0.001
There is proper HMIS advocacy by the management in KNH	39.1%	60.9%	21.8%	<0.001
The ICT structure is conducive for the growth and expansion of HMIS in KNH	25.0%	75.0%	50.0%	<0.001
Cost of ICT equipment and tools affects the application and implementation of HMIS*	27.6%	72.4%	44.8%	<0.001
There exists an adequate pool of highly trained skilled labor in the department*	48.6%	51.4%	2.7%	0.5385
Lack of proper training affects the growth and expansion of HMIS in KNH*	17.3%	82.7%	65.4%	<0.001
More computers should be added to the department*	9.2%	90.8%	81.5%	<0.001
The department collects, analyzes, interprets and stores data in its computers	14.6%	85.4%	70.8%	<0.001
KNH has a current and up to date ICT infrastructure*	40.0%	60.0%	20.0%	<0.001

A total of 14 indicators were used to assess successful implementation of HMIS in KNH as shown in the table 2 above. Implementation was judged to be successful if respondents were significantly more likely to agree with a statement regarding HMIS implementation.

DISCUSSION

For effective implementation of any DHMIS, it is prudent to apply the external evaluation criterion

in order to ascertain the degree to which the DHS management is supportive of the DHMIS's operations (1). The main indicator used in evaluating the electronic HMIS in KNH was performance 17 (53.1%), as shown in Table 4.10. Other indicators that were commonly applied in HMIS evaluation in KNH were connectivity 9 (28.1%) and durability 7 (21.9%), all these indicators are major items to consider and evaluate in an effective HMIS, although not at a good scale it can be concluded that the HMIS at KNH

was fair since it's the first time KNH is adopting the concept.

There was a good indication of progress in work and as (4) puts it, the goal of monitoring and evaluation is not to focus on what is wrong and condemn it; rather, it is to highlight the positive aspects of the system that make it work, as well as to identify what went wrong as a basis for improving the system. Therefore, the areas to improve on in order to have an improved and better functioning HMIS at KNH were noted to be compactibility, durability and connectivity respectively. Health workers reported that HMIS users 13, developers 10, health insurers 4 and government 2 were involved during the HMIS implementation phase. There is concurrent since various stakeholders were involved in the implementation of the electronic HMIS in KNH. To guarantee the success of an EHR system implementation, it is therefore essential to have a good understanding of the factors that contribute to stakeholders' adoption of EHRs (5).

As indicated in Figure 3 above in relation to health worker's perception of HMIS objectives achievements in KNH, Most health workers 17 (53.1%) felt that the electronic HMIS in KNH had achieved its objectives while the rest 16 (46.9%) were for the opinion that the electronic HMIS in KNH had not achieved its objectives.

From the findings in the operation criteria the benefits of the electronic HMIS included improved efficiency and reduced workload. These augured well with [6] that the development of the HMIS is always a work in progress. It is a dynamic endeavor where managers and workers strive for constant improvement. Consequently, from the findings in the operation criteria the benefits of the electronic HMIS included improved efficiency and reduced workload. From the chi square tests it can statically be concluded that we reject the hypothesis: KNH did not successfully implement HMIS and instead accept the alternative: KNH successfully implemented HMIS. For a better and more effective Health system at KNH the operation criterion must be observed and adhered to when implementing HMIS which will in turn lead to better utilisation of health information

and delivery of quality healthcare services.

ACKNOWLEDGMENTS

To Prof. George W. Odhiambo-Otieno, Dr. Wanja Mwaura-Tenambergen, Ms Maureen Adoyo and Dr. Phillip Ayiecko for their exemplary guidance and support.

REFERENCES

1. George, W. Odhiambo-Otieno (2005). Evaluation criteria for district health management information system. *International Journal of Medical Informatics* (2005) 74, 31–38
2. Kothari, C, R. (2004). *Research Methodology; Methods and Techniques*. New Age International Limited, Mumbai.
3. Mugenda, A, G (2008). *Social Science research; Theory and Principles*. Applied Research and Training Services, Kijabe printing Press, Nairobi
4. World Health Organization. (2012). Retrieved from WHO Website.
5. Bhattacharjee, A., & Hikmet, N. (2008). Reconceptualizing Organizational Support and its Effect on Information Technology Usage: Evidence from the Health Care Sector. *The Journal of Computer Information Systems*, 48(4), 69-76.
6. World Health Organization. (2013). Research for universal health coverage. Retrieved from WHO Website. Godden, W. (2004). *Sample Size Formulas*. Retrieved from <http://williamgodden.com/samplesizeformula.pdf>
7. Health Systems Action1 (2006) *International healthnetwork concerns*. 316-334.
8. Kenyatta National Hospital (2013). *Performance Audit Report of the Auditor-General Specialized Healthcare Delivery at Kenyatta National Hospital*. Nov 2013
9. World Health Organization (2009) *Systems thinking for health systems strengthening*. 20 Avenue Appia, 1211 Geneva 27, Switzerland.
10. World Health Organization. (2000). *World Health Report 2000; Health Systems: Improving Performance*. Geneva, Switzerland.
11. World Health Organization. (2004). *Developing health management information systems: A practical guide for developing countries*. Geneva: Switzerland