

Determinants Of  
Effective Implementation  
Of Health Management  
Information System: A  
Case Of Wajir County  
Kenya

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## ABSTRACT

The general objective of this study is to establish the determinants of effective implementation of Health Management Information System, a case of Wajir County, Kenya. The study was pegged to the following four specific objectives; health information management practices, technology, human resource and stakeholders. The study employed a descriptive survey research design to gain knowledge and understanding of the design and implementation of health information systems using Wajir County as a case study. The target population of this study was Health Information Officers, Sub County Health Management Team and hospital departmental Managers of the six sub counties of Wajir county. This study used an interview guide and a questionnaire to collect primary data. Data analysis used SPSS to generate quantitative reports through tabulations, percentages, and measures of central tendency. Based on the study observations the study concludes that health information management practices influence the implementation of Health Management Information System to very great extent. Although there was Internet connection in Wajir County, the Internet connection was not reliable. The study noted that the common internet connections utilised in the Wajir County was 2G of 3G with very few facilities utilizing 3G network connections. The findings also reveal top management of health facilities played a key role in the implementation of Health Management Information System. However, majority of the respondents indicated that the monitoring and evaluation function was weak in many of the facilities in Wajir County. The study recommends that the government should provide adequate infrastructure in the form of computers, internet connection and office space if necessary with the help of funds available with each institution. Take measures to involve the private sector through regular consultations and bringing in requisite legislations so that a comprehensive picture of the health status in the country could be obtained. Ensure the resources to strengthen data utilization are developed and distributed to every facility in the County for example manuals, standard operating procedures, research results and equipment like computers. The county should also improve the skills and competency of the staff with regard to data interpretation, use of information and evidence-based decision making through regular training programmes. Training related to HMIS activities should be conducted regularly in a planned manner with adequate and timely release of funds. There should be clear guidelines for the type of reporting and management of different data elements. Management of Wajir County Government should strengthen the Monitoring and evaluation function in health facilities with a view of enhancing efficiency and effectiveness in these facilities.

**Key words:** Health Information Management systems, human resource, infrastructures and system design.

## 1. INTRODUCTION

### 1.1 BACKGROUND TO THE STUDY

A health management information system (HMIS) is a handle whereby wellbeing information are recorded, put away and handled for policy-making, arranging, execution and assessment of wellbeing programs (Ballester,

2009). The system is crucial for evidence-based policy and informed decision-making at all levels from national down to the institutional levels. Evidence-based decision making is critically important for the appropriate use of scarce resources particularly in resource-limited countries like Kenya (Miranda, 2006). Globally studies examining the success of HMIS have found mixed results. Cleveland (2009) argued that use of HMIS in Sweden to improve health information sharing would result only in positive impacts with few negatives. Research supported this argument by demonstrating that the introduction of new HMIS led to positive outcomes (Durst, 2009). On the other hand, research also showed that billions of dollars were spent on HMIS projects that failed to provide the expected outcomes in Australia (Rocheleau, 2007).

Indeed, Kenya was the first country in Sub-Saharan Africa to deploy a completely online national DHIS 2 (DHIS 2 in Action, 2013). DHIS 2, like any web-based platform, is used by different people from different parts of the country. Currently, there is an active core group of 500 users. Though these users may be from non-governmental organizations, academia or in their individual capacities, the majority are officers in charge of data entry and data management at all levels of the country who use the system routinely (Manya, 2012). However, at all levels of the health system; the County and Sub County, according to MOH report, there is little evidence to show how this data is utilized. It moreover focuses out that there is a need of rules and arrangement, insufficient capacities of HMIS staff, numerous parallel information collection framework and destitute coordination among others (Manya, 2012).

There is a striking disconnect between the need for information and ability to respond to that need, this is because the health care did not make any improvement despite the decentralization of the health system. (MOH, 2009).

## **1.2 STATEMENT OF THE PROBLEM**

Having recognized the critical role played by a functional HMIS, in 2010 Kenya's Health Information System Division at the Ministry of Health was mandated to overhaul the existing system and replace it with the web-based District Health Information Software (DHIS2). DHIS2 is designed to facilitate generation, analysis and dissemination of quality health information for informed decision making. Despite the current effort to decentralize decision making and building capacity at the County level, the use of information has been found to be especially weak at Sub County level, which raises serious concern. There is also a lack of consensus between producers and users of data at each level of the health care system regarding the information needed (Lippeveld, 2010).

Locally no known studies have been conducted at the County Level and more specifically at Wajir County on the implementation of health information systems. Lack of relevant research done at County level about the introduction and use of technologies like information systems justifies the taking of this research. This research

therefore, focused on assessing the implementation of Health Management Information System. A case of Wajir County, Kenya.

### **1.3 OBJECTIVES OF THE STUDY**

The study worked around these specific objectives;

- To determine how health information management practices, influence the implementation of Health Management Information System
- To assess how technology, influence the implementation of Health Management Information System
- To analyze the role of human resource in the implementation of Health Management Information System
- To establish how stakeholders' influences on implementation of Health Management Information System

## **2. LITERATURE REVIEW**

### **2.1 HEALTH INFORMATION MANAGEMENT PRACTICES ON IMPLEMENTATION OF HMIS**

At the territorial level and more particularly in Africa WHO has unequivocally emphasized on the utilization of computer innovation in the plan of district-based wellbeing data framework (Rodrigues, 2010). In any case, numerous of the nations which have computerized their HMISs are enduring from need of fittingly prepared staff, equipment and computer program Upkeep Issues (WHO, 2012). It's further argued that regional or provincial and district health managers and planners in the developing countries have not been able to analyze and interpret such data for planning and should be empowered through strong decentralization. The computer-based information system should be implemented to facilitate better storage, analysis, and dissemination of health data. However, introducing computer technology in the development of health information system is not necessarily the silver billet that solves the efficiency problem of the health service (Lungo, 2008).

### **2.2 TECHNOLOGY ON IMPLEMENTATION OF HMIS**

Technology foundations incorporate equipment, programming and network. The equipment required ought to be recognized before the presentation of the framework. Chetley (2006) uncovered that before they begin of a venture an appraisal ought to be made about the equipment officially accessible and the equipment which is as yet required for full presentation of the framework. The other issue is that it relies upon the innovation being utilized. Adaptability and flexibility are additionally a test when presenting such a framework (Kuhn, 2009). Chetley (2006) expressed that with network an association needs to manage things like the absence of an empowering telecom arrangement and administrative condition; access to power, sun based power alternatives, back-ups, deficient framework, availability access and high expenses. The better these things are working the more prominent the shot for fruitful usage.

### **2.3 HUMAN RESOURCE ON IMPLEMENTATION OF HMIS**

While the ability to adjust data to guarantee that it is socially suitable and applicable is a noteworthy test, so too is the ability to utilize ICT viably. A gifted ICT workforce is a fundamental element for the compelling utilization of ICT in medicinal services. Frameworks experts, administrations suppliers and undertaking group pioneers with high expertise levels and involvement in an association are critical segments of accomplishment. It is hence essential to recognize the aptitudes show in the association and the abilities which still should be prepared (Chetley, 2006). Preparing is likewise an essential piece of limit improvement. On the off chance that the planned preparing approach isn't attempted there will be an absence of comprehension of changes expected to go with the advancement. HMIS information gathering, handling, and data utilize expect a specific level of general instruction and pro preparing among wellbeing specialists, which is regularly not accessible, particularly in littler wellbeing units in creating nations.

### **2.4 STAKEHOLDER AND IMPLEMENTATION OF HMIS**

The stakeholders are the human piece of the association and ordinarily seek after various targets, concerns, needs and imperatives. Rogers (2002) specified that partners are every one of the general population or associations that will be influenced by the framework and who impact the framework necessities. This can be simply the improvement group, the supervisors, beneficiaries of the items yield, coordinate clients and their administrators, individuals who may lose their occupations and so on. The perspective of the presentation of the procedure of a HMIS incorporates above all else a treatment of the partners and cooperating of the distinctive gatherings to get to a solitary perspective. These diverse objectives are an issue that makes information administration in social insurance associations a testing undertaking (Berndt, 2001). The effective usage of ICT and wellbeing programs requires a perplexing adjusting of the contending perspectives and worries of the distinctive partners.

### **2.5 THEORETICAL FRAMEWORK**

This study was guided by two theories which include the Resource-Based View Theory and the Technology Acceptance Model (TAM) and Unified TAM which are explained as follows;

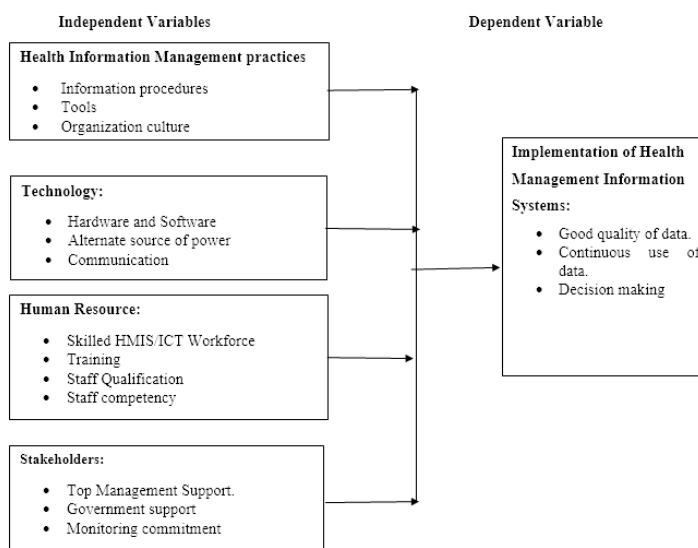
#### **2.5.1 THE RESOURCE-BASED VIEW THEORY (RBV)**

The theory argues that quality performance can be generated by the unique bunch of resources and capabilities that a business has access to. The resources can be thought of as inputs that enable an organization to carry out its activities which can either be tangible or intangible. In relation to HMIS, the RBV theory is used to demonstrate how health organizations leverage their performance in Internet-related issues to create unique Internet-enabled capabilities that determine organization's overall effectiveness. This theory will reinforce the second and the third variable which are the status of technology and human resource in the implementation Health Management Information System.

### 2.5.2 TECHNOLOGY ACCEPTANCE MODEL (TAM) AND UNIFIED TAM

The Technology Acceptance Model (TAM), which is viewed as an adaptation of the Theory of Reasoned Action (TRA), is one of the most influential and robust models in explaining Information Technology (IT)/ Information System (IS) adoption behaviour (Park, 2009). The theory was originally designed to predict users' acceptance of IT and usage in an organizational context. Generally, the model can be used to explain user behaviour across a broad range of end-user computing technologies and user populations (Davis, 2008). This theory reinforces the first and fourth variable which is Health Information Management practices and stakeholder on an implementation of Health Management Information System.

### 2.6 CONCEPTUAL FRAMEWORK



## 3. MATERIALS AND METHODS

### 3.1 RESEARCH DESIGN

The study adopted a descriptive survey research design since the study intended to gather quantitative and qualitative data that describes the nature and determinants of implementation of Health Management Information Systems in Wajir County. The study considered this design appropriate because it facilitates towards gathering of reliable data describing determinants of effective implementation of Health Management Information Systems.

### 3.2 TARGET POPULATION

The target population of this study was 137 Health Information Management Officers, Sub County Health Management Team, County Health Management Team and Hospital Departmental Managers in all six sub counties of Wajir County. The Health Information Management Officers are those officers who have been trained on health information. The hospital managers included the medical superintendents, laboratory officers,

radiologists, nurses and physiotherapist. Sub County Health Management Team and County Health Management Team are individuals entitled at managing health issues at sub County and County level.

### **3.3 SAMPLING TECHNIQUE AND SAMPLE SIZE**

From each stratum, 80% of the entire population were considered for this study. In total 113 respondents, were considered in this study for the data collection. The study, therefore, considered 17 Health Information Officers, 45 Hospital managers, and 45 Sub County Health Management Team and 6 County Health Management Team

### **3.4 CONSTRUCTION OF RESEARCH INSTRUMENTS**

This study utilized a questionnaire and an interview guide to collect primary. The questionnaire designed in this study comprised of two sections. The questionnaire was meant for the Health Information Officers, Sub County Health Management Team and County Health Management Team. The study used an interview guide in this study; this was meant for Health Information officers only. Observation was also used in this study. Observation is basically to see physical impact under investigation of the topic in question.

### **3.5 DATA ANALYSIS TECHNIQUES**

This study collected both qualitative and quantitative data using a self-administered questionnaire and an interview guide. Ethical Approval was sought from the Kenya Methodist University and was taken along to enable the administering of the research instrument. Data collected was purely quantitative and qualitative and it was analyzed by descriptive analysis and content analysis. The descriptive statistical tools helped in describing the data and determining the extent used while inferential statistics were used to develop a straight line predictor model. Data analysis used SPSS and Microsoft excels to generate quantitative reports through tabulations, percentages, and measures of central tendency. Tables were used to present responses and facilitate comparison.

### **3.6 ETHICAL CONSIDERATIONS**

Ethical approval was sought from the KeMU Scientific and Ethical Review Committee (SERC), Along with this, due to the sensitivity of the information collected, the researcher held a moral obligation to treat the information with utmost confidentiality. The researcher also sought a research permit from Wajir County Government and National Commission for Science, Technology and Innovation. Respect for intellectual property was guaranteed by giving proper acknowledgement for all the contributions to this study.

## **4. RESULTS**

### **4.1 IMPLEMENTATION OF HMIS**

The research sought to establish wither the facility had currently implemented health management information system. Results are analyzed in Table I.

Table I: Implementation of HMIS

Opinion	Frequency	Percentage
Yes	96	93
Don't Know	8	7
Total	104	100.0

Reacted moreover clarified that adaptability and versatility were enormous a challenge when presenting wellbeing administration data framework. Other challenges cited included need of an empowering telecom approach and administrative environment; get to power, alternatives, back-ups, deficiently foundation, network get to and tall costs need of software's designers and need of solid ICT administrations. The findings concur with findings of Azeb (2011) who identified that HIS at health facilities lack appropriates inputs. Similar assessment study conducted by Meseret (2013) on HMIS at public hospitals also reveals the existence of low commitment of the decision-making bodies in allocating human, material and financial resources.

Respondents also indicated the need for efficient service provision by Wajir County government lead the quest to the implementation HMIS desire to lower operational cost. Other factors cited included availability of donor support, availability of technical assistance, vendors. Respondents further reported that the main objective of the HMIS was to promote efficiency in delivery of health services in the County, lower the cost of operations, and reduce the paper work and employee workload.

**4.2 HEALTH INFORMATION MANAGEMENT PRACTICES AND IMPLEMENTATION OF HMIS**

HMIS had as of now been recognized, 26% of the respondents were completely ignorant while 14% of the respondents shown that the objective had not however been set up. This implies that the key goal of goal of the HMIS had already been identified by key stakeholders manning Wajir healthy sector. Many scholars, however, remark that HMIS in any country shall focus on data quality since timely, complete and accurate information is invaluable in measuring and improving the coverage of health services through effective and efficient management at all levels of health services (Cleveland, 2009; Caldeira, & Ward, 2003).

Table II: Whether HMIS was user-friendly

User Friendliness	Frequency	Percentage
Yes	81	77
No	23	23
Total	104	100.0

Table III: Involvement of Users in Systems Design

Opinion	Frequency	Percentage
Yes	32	30
No	72	70
Total	104	100.0

**4.3 TECHNOLOGY AND IMPLEMENTATION OF HMIS**

From the examination, lion's share of the respondents demonstrated that 61.1% the equipment and computer program to be utilized for the HMIS had as of now been distinguished while 38.9% shown not. This implies that the hardware and software to be used for the HMIS had already been identified. Marie and Higgins (2011)



pointed out that all too often the traditional manual system creates situation in which people answer questions negatively, it may be misplaced despite a tracking system and it may have illegible and sloppy entries. Use of Computers and other forms of information technology in health facilities are able to handle large volumes of data as well as monitor various activities in settings. Use of computers to collect and analyze data helps to identify changes and problems that could be occurring. From the analysis, majority of the respondents (66%) indicated that there lacked reliable Internet connection while 34% indicated that there existed reliable Internet connection. This implies that there lacked reliable Internet connection in Wajir County. The study also noted that the common internet connection utilised in the Wajir County was 2G of 3G with very few facilities utilizing 3G network connections.

**4.4 HUMAN RESOURCE AND IMPLEMENTATION OF HMIS**

From the analysis, all the respondents (100%) indicated that human capacity development affects the implementation of Health Management Information Systems. This suggests human limit advancement influences the usage of Health Management Information Systems. The investigation additionally noticed that making openings accessible to see the HMIS practically speaking or an obviously announced trial ought to be joined by advancements presentation. Interests in limit improvement and preparing in innovative, correspondence and substance advancement of aptitudes will guarantee more fruitful usage of a HMIS.

Regarding training on HMIS, considerable number of interviewees indicated that training had been conducted however majority complained that the time allocated for training was too short and that same needed to be repeated adding that each sub group should be trained on at their own time unlike the previous time when orientation was done generally. Interviewees Indicated that they were familiar with database management, MS Word, office outlook, excel, and publisher.

**4.5 STAKEHOLDERS AND IMPLEMENTATION OF HMIS**

The study looked for to set up whether partners influence the usage of Wellbeing Administration data framework. From the investigation, larger part of the respondents (63%) shown that partners influence the usage of wellbeing administration data framework while 37% shown something else. This infers that partner influences the usage of Wellbeing Administration data framework. Respondents also added that successful implementation of HMIS depended of willingness of the stake holders to embrace the system as well as the project team preparedness in taken other stakeholders through the necessary change over steps. Comes about agree with the discoveries by Berndt, (2011) that partners ought to work together as bunches to get to a single point of see.

**4.6 REGRESSION MODEL**

*Table IV: Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.775	.601	.559	.43347

The findings presented in Table IV reveal that there exists a strong relationship between implementation of Health Management Information System and various determinants ( $r=0.775$ ). The findings further show that 55.9% of implementation of Health Management Information System in Wajir could be explained by health information management practices; technology; human resource; and various stakeholders.

Table V: Analysis of Variance

Model	Sum of Squares	Df	Mean Square	F	Sig.	
1	Regression	280.396	4	70.099	372.867021	0.00
	Residual	18.612	99	0.188		
	Total	299.008	103			

The F-critical (2, 102) was 3.92 while the F-calculated was 373.070 as shown in Table 4.12. This shows that F-calculated was greater than the F-critical and hence there is a linear relationship between the independent variables and the dependent variable. In addition, the p-value was 0.000, which was less than the significance level (0.05). Therefore, the model can be considered to be a good fit for the data and hence it is appropriate in predicting the effect of the identified determinants on implementation of health management information system.

Table VI: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.354	.253		1.399	.016
Health Information Management Practices	.177	.070	.152	2.529	.012
Technology	.248	.063	.261	3.940	.000
Human Resource	.483	.072	.457	6.708	.000
Stakeholders	.513	.137	.093	3.744	.000

It is clear from the findings presented in Table VI that implementation of Health Management Information System in Wajir County will be .354 when all the determinants under study are held constant. The findings further reveal that a unit increase in health information management practices will lead to a 0.177 ( $\beta_1$ ) increase in implementation of health management information system. The relationship is significant as the P-value (0.000) was less than the significance level (0.05). In addition, a unit increase in technology motivation will lead to a 0.248 ( $\beta_2$ ) increase in implementation of health management information system. The relationship was significant as the p-value (0.000) was less than the significance level (0.05).

Further, a unit increase in human resources will lead to a 0.483 ( $\beta_3$ ) increase in implementation of health management information system. The relationship was significant as the p-value (0.000) was less than the significance level (0.05). The Beta coefficient ( $\beta_4$ ) for the relationship between stakeholders and implementation of health management information system was 0.513. This shows that a unit increase in stakeholders' consideration will lead to a 0.513 increase in implementation of health management information system. The relationship was found to be significant as the p-value (0.000) was less than the significance level

(0.05). Using the unstandardized coefficients shown in Table VI above the following equation applies:  $Y = 0.354 + 0.177X_1 + 0.28X_2 + 0.483X_3 + 0.513X_4$

## 5. CONCLUSION

Based on the study observations the study concludes that health information management practices influence the implementation of Health Management Information System to very great extent. The key goal of implementing HMIS in Wajir had partially been identified; the objectives that drove the adoption of HMIS have partially been achieved, data quality was relatively low and this negatively affects implementation of health information management system. The research further County government of Wajir had not instituted monthly indicators, there lacks effective data collections tools hard, standard health indicators and that considerable number of healthy workers in the County had not been oriented on system operations.

The research study concludes that technological issues affected the implementation of Health Management Information System, although there was Internet connection in Wajir County, the Internet connection was not reliable. The study noted that the common internet connections utilised in the Wajir County was 2G of 3G with very few facilities utilizing 3G network connections. There needed dependable electrical control for common network of the equipment, a few offices had of the control back sources like standby diesel generators, sun oriented batteries, and wind vitality.

The study concludes that human resource influences the implementation of Health Management Information System, lack of employee training and development slowed the implementation of Health Management Information Systems. The investigation additionally infers that the greater part of the staff working in wellbeing were not exceedingly contended particularly in utilizing PCs, larger part had little PC abilities which contrarily influenced the execution of Health Management Information Systems.

The investigation reasons that partner's engagement impact usage of Health Management Information System in Wajir County, fruitful execution of HMIS depended of eagerness of the partners to hold onto the framework and also the venture group readiness in taken different partners through the important change over advances and that usage of ICT and wellbeing programs requires an unpredictable adjusting of the contending perspectives and worries of the distinctive partners.

## 6. RECOMMENDATIONS

In accordance to this investigation results the following recommendations emerge:

- Management of Wajir County to establish software and hardware policies and procedures which will go a long way in guiding implementation of the implementation of health management information system.

- There should be a deliberate effort to engage users as early as from design stage to get their input thus greater ownership and reduced resistance in implementation.
- Health facilities in Wajir County should be encouraged to use HMIS for education and community mobilization for a greater impact to be felt.
- The CEC for ICT should operationalize stable and reliable internet connectivity in health facilities run by Wajir County.
- Management of health facilities should ensure that departments within their health facilities are networked to enable information sharing and reduce paper work.
- Lower cadre employees should be given an equal chance to undergo staff competence and development.
- Management of Wajir County Government should strengthen the Monitoring and evaluation function in health facilities with a view of enhancing efficiency and effectiveness in these facilities.

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