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INFLUENCE OF ORGANIZATIONAL DRIVERS ON UTILIZATION OF HEALTH INFORMATION FOR DECISION MAKING BY OPERATIONAL LEVEL MANAGERS. A CASE OF IMENTI SOUTH SUB-COUNTY HOSPITALS, MERU COUNTY, KENYA

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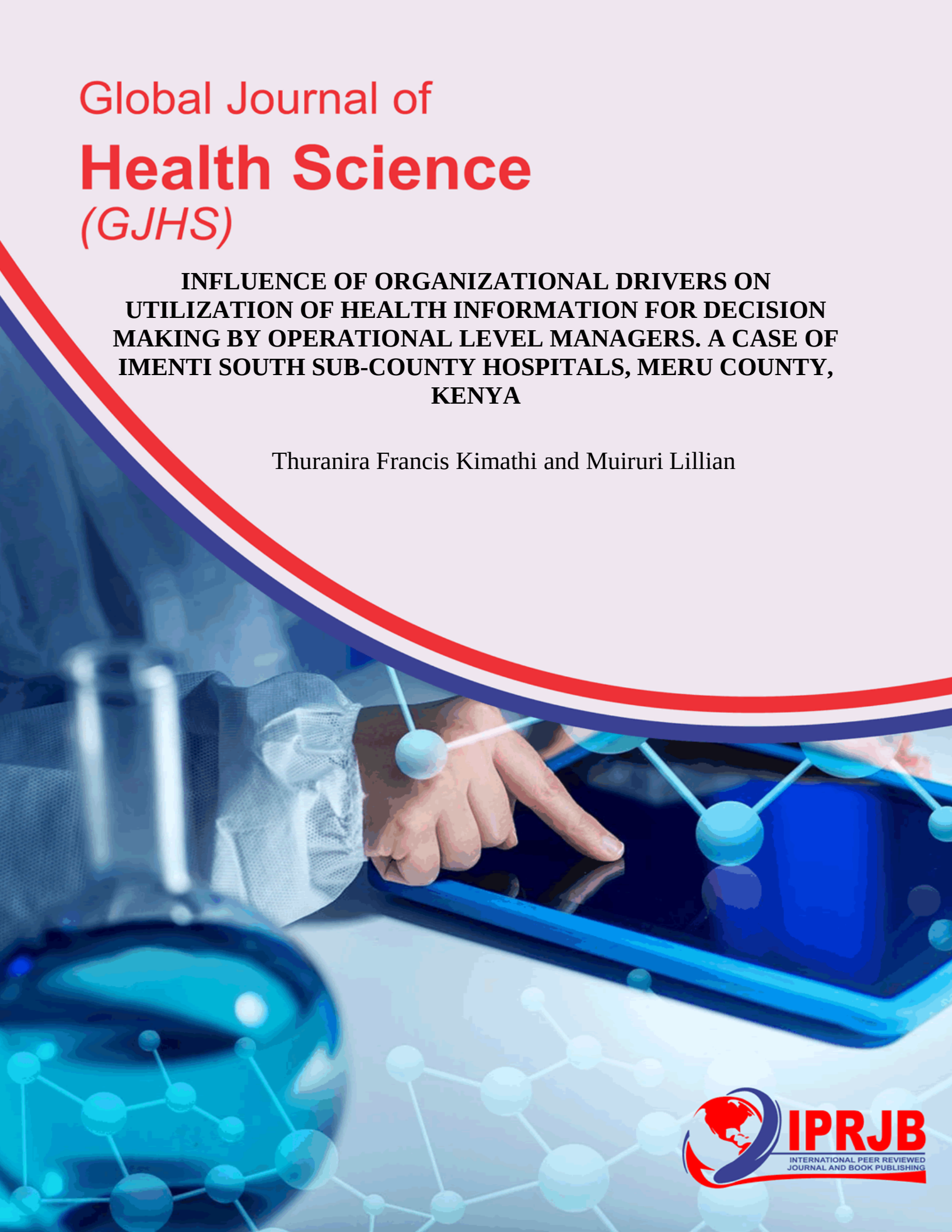

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INFLUENCE OF ORGANIZATIONAL DRIVERS ON UTILIZATION OF HEALTH INFORMATION FOR DECISION MAKING BY OPERATIONAL LEVEL MANAGERS. A CASE OF IMENTI SOUTH SUB-COUNTY HOSPITALS, MERU COUNTY, KENYA

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Abstract

Purpose: This paper sought to determine the effect of organizational drivers on utilization of health information by operational level managers in Imenti South sub-county hospitals.

Methodology: A cross sectional study design adopting quantitative and qualitative approaches was employed targeting all 64 operational level managers heading various units of the 39 Imenti South sub-county registered health facilities. Data was collected through questionnaires as well as using interview and observation techniques. The questionnaires were self-administered and consisted open and closed-ended questions. Data was analyzed using the Statistical Package for Social Sciences. Descriptive analysis was done through the use of means, frequencies and percentages while inferential analysis involved the use of regression models and correlation analysis. Content analysis was done for qualitative data. Results were presented in tables and pie charts.

Findings: In the results and findings, it was observed by majority of the respondents that there was an increase in the establishment of data control systems in health facilities as opposed to a contrary finding earlier by the ministry of health. It was also observed that variables included in the regression model of environmental factors on utilization of health information revealed significant prediction for utilization of health information in health care decisions. It was evident that the evaluation of HMIS and information use was still very low and in some instances, it had not been adopted as supported by a large percentage of the respondents. This showed that health care workers and managers did not always put the data collected to best use.

Unique contribution to theory, practice and policy: Organizational drivers do influence utilization of health information for decision making by operational level managers of health facilities. The county government should reorient operational level managers on health information essentials for allocative efficiency and effective health care decisions.

Keywords: *Organizational drivers, Health Information Systems, Utilization*

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1.0 INTRODUCTION

A health system consists of all organizations, institutions, people and actions that promote, restore or maintain health (WHO, 2007). Quality health services require robust financing mechanism and reliable information on which to base decisions and policies among others (Neame & Boelen, 2010). According to Lippeveld *et al*., (2000), health system outcomes entail improving health and health equity, in ways that are responsive, financially fair and make the most efficient use of available resources. Health outcomes are poor across most of the developing world and the existing deep rooted inequities in health status is a problem from which no country in the world can be exonerated. Some of the challenges include getting drugs, vaccines and information to users in a prompt, reliable, adequate and affordable manner. Globally, the responsible systems needed to provide these drugs, vaccines and information are deteriorating or are discriminating across populations. Failing or inadequate health systems impede scaling up interventions that promote achievement of internationally agreed health goals such as the Millennium Development Goals.

According to the World Health Organization's (WHO's) health system framework, the six essential functional health building pillars needed for quality health outcomes include: service delivery; health workforce; information; medical products, vaccines and technologies; financing as well as leadership and governance (WHO, 2007). A functioning Health Information System (HIS) is one that ensures the production, analysis, dissemination and use of reliable and timely health information by decision makers at different levels of the health system, both on a regular basis and in emergencies. It involves health determinants, health systems performance and health status. To achieve this, a health information system that possess a set of information components to collect and process data, disseminate information and provide a feedback mechanism is in a position to meet an organizational mandate as well as storage of information for future reference (WHO, 2008). According to Lippeveld *et al.*, (2000), clear performance indicators and sustainable HIS supply are critical factors for evaluation of efficient and effective health care delivery processes.

In many countries HIS suffer from mismanagement and insufficient resources. It is designed to produce information that serves interests of few specific projects lacking cognizance for the national policy that could regulate data quality and relevance. Also observed is that few developing countries are able to produce data of sufficient quality that is critical for the evaluation and strengthening of health systems. Most of the global health data generated is seldom used for decision making (Lippeveld *et al.*, 2000).

At some point Nigeria's health information was highly variable in quality whereby underutilization of health information was attributable to lack of awareness of what was available, misreporting of conditions, poor understanding, low confidence and acceptability, limited relevance of available information and lack of time, skills and incentives to access and interpret information (WHO, 2008). In Ethiopia the major impediments to Health Management Information Systems (HMIS) performance include, lack of attention to HMIS, shortage of resources and lack of strategic planning, absence of information standards and guidelines, inadequate staffing and poor ownership among others. This results in conflicting reports and poor quality of data preventing information users from effective utilization of information for

decision-making and research (WHO, 2007). Tanzania's HMIS generates data that is insufficient to allow managers and policy makers to make informed decisions either at the district or national level. This was due to incompleteness of reporting, data inaccuracy, inaccurate analysis and late submissions (Kimaro and Nhampossa, 2007).

According to Ekirapa *et al*., (2012), Kenya's limited (HMIS) capacity undermines informed decision making across all levels thus compromising effective planning, monitoring and evaluation. In addition, they assert that the key challenges revolve around inadequacy of manager's capacity to use data for decision making and lack of training on data analysis, interpretation and report writing among others (Moreland *et al*., 2013). Meru County is structured into nine sub-counties that suffer disparities in their healthcare potential. This may describe a county whose health information system capacity varies across sub-counties thus compromising on generation sharing and utilization for decision making. This is critical considering the integral role played by information in allocative efficiency and effectiveness especially at a time when the health sector is in the hands of new managers in a devolved system.

Campbell (2003) notes that managing effectively requires relevant and reliable information on which to base management decisions. Policy makers, managers and care providers need information on which to base decisions. According to Odhiambo-Otieno (2005), if senior managers fail to promote evidence based decision making and the use of information for transparency and accountability then a culture of information use is unlikely to be fostered. Land and Kennedy-McGregor (2002) acknowledge that inadequate governance structures, failure of the leadership to enforce policy framework documents and fragmented vertical strengthening interventions are some of the environmental drivers that undermine the value of HIS thereby discouraging its information use by operational level managers for healthcare decision making. According to Lippeveld *et al.*, (2000) nonexistence of quality control mechanisms causes generation of low quality data thus undermining a manager's desire for its utilization in healthcare decisions.

Tradition of information underutilization for decision making is characteristic in across all health care levels in most of the developing countries even among health managers (Galimoto, 2007). A Malawian study for instance revealed only a 20% utilization of information for health care decisions across operational level managers in the country (Moyo, 2005). Various studies have established that most of the global data generated in developed and developing countries serves political expediency and are also tailored along specific donor interests (Odhiambo-Otieno, 2005). Negative attitude among health workers towards data collection translates into resource misuse hence detrimental to data quality. A Nigerian study discovered that variability in information quality impedes policy formulation at the national level thus compromises planning, monitoring and evaluation of health services resulting into inefficient management of health services (Neame & Boelen, 2010). Although it has never been quantified the magnitude of losses that can be attributable to the influence of each factor, several global studies have indicated that behavioral factors, environmental factors and technical factors pose the greatest obstacle to quality health data generation, analysis and utilization globally. The proportion of disease specific mortalities and morbidities emanating from misinformed healthcare policies cannot be underestimated. Although several initiatives have been undertaken to satisfy recommendations of the previous studies, no study had sought to determine the influence of the identified factors on

utilization of health information. This paper aspired to determine the influence of the environmental drivers on uptake of health information for decision making among operational level managers of Imenti South sub-county hospitals in Meru, Kenya, so as to recommend interventions for demand driven health information, a critical pillar in the strengthening of health systems.

2.0 LITERATURE

Brosio (2000) states that healthcare are an ally of organizations whose performance is data dependent. Gething (2007) describes Health information systems data as that classified along population features among which include census, household surveys and vital registration systems. In the case of health institutions, this data also comprises public health surveillance and health services data also sometimes known as health management information system or routine health information system. An Evaluation of Kenya's HMIS by USAID / Kenya (2010), revealed that collected routine service data is based on patient service records and reporting from various health facilities. Treatment points fill the data sheets and submit them to the district levels on monthly schedules. This process adopts an onward transmutation to the national levels through File Transfer Protocol system (FTP). Reporting rate across facilities was over 80%. This emphasized on HIS strengthening as it proved to be an integral component of any health system.

According to MOH (2003), most of the data generated in the then Kenyan districts employed manual papers with resultant compromise in coordination and maintenance of a uniform system in the public to monitor implemented health services. The main reason for the situation was due to lack of policy and legal framework to harmonize and enforce the data and information management at all levels. A study by USAID/Kenya (2010) discovered that there were limitations on allocation of resources for development, publications and conveyancing of periodic reports, alongside limitations on financial allocation on information collection collation, analysis and embracing knowledge management culture that would facilitate learning and sharing of experiences and best practices. Environmental impediments to functional HMIS are characterized by inadequate governance structures, failure to implement policy framework documents and fragmented vertical strengthening interventions. Others include lack of information feedback as well as failure to use information for management and decision-making across health systems and management units. A study conducted in Ethiopia revealed that of all the health facilities, 77.1% of health officers collect health data on a daily activity of patients. Most of them (61.2%) collected socio economic and demographic data while only 49.4% said that there was a rule for minimum period of maintenance and dispatch time concerning data. Most of the data collected (18.3%) was used by external users while 19.3% of the health officers had mechanism to disseminate health information (Teklegiorgis *et al.*, 2016).

Further, Teklegiorgis *et al.*, (2016) revealed that information use for decision making stood at 45.6% while 64.7% used information for future reference, 35.3% used information to observe trends on service delivery and 42.4% used information to pass report data to health offices. Also revealed by 27.7% of the health personnel was that there were policies concerning information use and 32.1% had legislative and regulatory environment about data security while 18.9% reported existence of incentives for information use.

Despite training on the HIS, health care workers and managers do not always put the data collected to best use (Galimoto, 2007). Observable is a culture of reporting rather than that of using the information. Tradition of information underutilization for decision making is characteristic in the facility level among most of the developing countries, even among health managers. Studies conducted in Ghana, Nepal, and South Africa revealed that although most districts exhibited accuracy in data collection and analysis, with routine reports feedback to management and facilities, they did not embrace a culture of information use. The study revealed enormous differences in culture of data use among studied districts' different management styles within the same organizational culture (Neame & Boelen, 2010). Moyo (2005) assessed the quality of HMIS data in selected health facilities in Malawi. In the study, it was revealed that information was underutilized since, at the health facility level, only 30% of the facilities used information for monitoring, 40% of the facilities were having discussions about information and 20% were making decisions after the discussions.

According to world health organization WHO, (2007) most of the developing countries have been attempting to enhance their national health information systems, often with the support of partner agencies. Their occasional evaluations revealed that overall progress was slow, data returns were untimely and of poor quality, with low utilization and little reporting and feedback. Planning, monitoring and evaluation of health services were hampered by the dearth of reliable data. The health services at the national, state and local government levels could not be managed efficiently relying on the available data. An increasing volume of data was available, though of variable quality and coverage, thus linking information to policy-making at the national level remained to be a critical, but elusive, goal. An evaluation study conducted at Kwa Zulu South Africa revealed that data validation was limited to ensuring that the data submitted was complete, and occasionally checking that it was correct. Clinic staff and supervisors reported that even if the data did not look correct, checking it was rarely done due to lack of time. Little analysis of data occurred at the clinic or by clinic supervisors. Data was neither discussed in staff meetings nor analyzed. The study found that the clinic staff could not calculate the indicators presented in graphs from their facility data. However, most of them were able to interpret the graphs (LaFond & Fields, 2003).

2.1 Theoretical Framework

This study was based on Strategic Choice theory proposed by Child John in 1972. Child (1997) studied integrative potential of strategic choice within organizations. He states that strategic choice follows the determinism theories (structural, contextual, environmental) in regard to decision makers. Strategic choice is a process whereby power holders within organizations decide upon courses of strategic action. Decisions of such managers are guided by attitudes, values and beliefs based on their professional, corporate, national affiliation. Culture, experience and training impact evaluations, cognition and mental process culminating into an action. The relevance of this theory on utilization of HIS for health care decision making includes the fact that organizations decisions are made by managers who apply their professional knowledge or contributions from professionals in various disciplines working in the health sector. Managers' decision to apply information for health care allocations is influenced by organizational culture that serves the interest of the affiliate institutions, either national or corporate, and application of his experience and training to convince the employing bodies otherwise. Political expediency

and donor fund power have been found to be some of the organizational factors that influence HIS quality and its utilization from previous studies.

2.2 Summary of Gaps in the Literature

The utilization of relevant health data generated from all levels of a health system is an integral part of planning, monitoring and evaluation of performance within the health system. In the foregoing literature, various studies established that most of the global data generated in developed and developing countries does not necessarily serve the interests of the health sector in as far as improving the sector is concerned. The data was seldom utilized in decision making processes. Though it has never been quantified the magnitude of losses in the health facilities that are attributable to the influence of organizational factors, several global studies have indicated that behavioral, environmental and technical factors pose the greatest obstacle to quality health data generation, analysis and utilization. It was established that healthcare is an ally of organizations whose performance is data reliant. Kenya's HMIS portrays a scenario where data collection and reporting rate across health facilities is significantly high. However, the pending question was whether the data becomes a pivotal pillar upon which decisions are based by operational level managers in the health facilities. Further, most of the data was manually generated due to lack of policy, legal and technical framework to harmonize and enforce data information management across all levels of health facilities. Limitations on financial allocation to invest in information collection, collation, analysis and management further aggravated the situation. In addition, it was revealed that there was a culture of reporting rather than using information and information underutilization for decision making was common in health facilities among most of the developing countries. It is therefore imperative to scrutinize the organizational environment so as to foster a culture of not only data generation and reporting, but also information use by managers for purposes of decision making in health facilities. It was upon this background that this study sought to determine the influence of organizational factors in terms of organizational data policy, data capture, processing and data management, among others, on utilization of health information for decision making by operational level managers.

3.0 MATERIALS AND METHODS

3.1 Study Design, Sampling, Data Collection and Analysis

A cross sectional descriptive study design employing quantitative and qualitative approaches was employed. The choice of this design was based on its ability to give a snapshot of events as they are at a specific point in time (Oso & Onen, 2009). It was also preferred for its ability to satisfy descriptive and analytical requirements of the study. The purpose and approach of the study called for a design that was more focused towards intended results (Kothari, 2011). The target population included operational level managers and these were; nursing officers, medical lab scientists heading peripheral facilities, public health officers and HMIS officers heading respective units in Imenti South sub-county health facilities. The study focused on managers across public, private and faith based organizations based on the fact that health information ought to consolidate centrally for purposes of monitoring a countywide disease trends and inform containment strategies. Census approach was employed targeting 64 operational level managers

to include 39 facility managers across 39 facilities. Data was collected through questionnaire, interview and observation methods. Key informant interview guide was used among HIS managers. Observation method, using an observation guide, was used to establish infrastructural designs and other technological investments in the facilities. Data was analyzed using the Statistical Package for Social Sciences. Descriptive analysis was done through the use of means, frequencies and percentages while inferential analysis involved the use of regression models and correlation analysis. Content analysis was done for qualitative data. Results were presented in tables and pie charts.

3.2 Model Specification

A basic regression analysis was done. The regression model was specified as follows:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

The variables in the model were defined as follows:

$Y \rightarrow$ Response variable symbol representing utilization of health information for decision making by operational level managers.

$\beta_0 \rightarrow$ Constant term representing the vertical intercept.

$\beta_1 \rightarrow$ Regression coefficient representing the slope of the line of best fit (regression line). The coefficient indicates the amount of change in the outcome variable to be occasioned by a unit change in the exogenous variable.

$X_1 \rightarrow$ Exogenous variable symbol representing environmental drivers.

$\varepsilon \rightarrow$ Model stochastic disturbance term (error term) accounting for other terms affecting the response variable that are not captured by the model.

The independent variable (organizational drivers) was operationalized by:

i) Available organizational information data capture and processing devices (hardware and software).
ii) Dedicated data management rooms.
iii) Existing information policies / Organizational data policy.

4.0 RESULTS AND DISCUSSION

The targeted sample size was 64 participants as shown in table 1.

Table 1: Response rate

Questionnaires	Frequency	Percent (%)
Response	62	97%
Non-response	2	3%
Total	**64**	**100%**

Source: Author's Survey Data, 2020

The participants comprised nursing and clinical officers, medical lab technologists, health information resource officers and public health officers heading various units of peripheral

facilities in Imenti South sub-county. However, those who filled and returned questionnaires were 62 respondents making a response rate of 97%.

The composition of the specific responses is as indicated in table 2 below.

Table 2 Specific Response

Facility Category	Nursing officers	PHO	HRIO	Lab Technologists	Total
Public	28	5	3	6	**42**
Private	5	0	0	3	**8**
Faith based	7	0	2	3	**12**
TOTAL	**40**	**5**	**5**	**12**	**62**

Source: Author's Survey Data, 2020

Among the participating managers from the 39 out of 49 registered health facilities, there were 40 nursing officers, 12 lab scientists, 5 Public Health Officers (PHOs) and 5 Human Resource Information Officers (HRIOs) adding up to 62 out of 64 targeted respondents within the existing facilities. The study established that 7 private facilities and 3 public facilities had closed down due to either deregistration or underutilization.

4.2 Demographic Results

The respondents had different socio characteristics in terms of gender, age, level of education, profession, years of experience and the type of health facility that one worked in. A summary of the aforementioned characteristics is provided in table 3.

Table 3: Respondents Characteristics

Characteristics	Category	Frequency	Percent
Gender	Female	33	53%
	Male	29	47%
Age	31-40	32	52%
	51-60	18	29%
	41-50	12	19%
Highest level of education completed	Diploma	43	69%
	Degree	13	21%
	Masters	6	10%
Profession	Nurse	43	69%
	Lab scientist	11	18%
	HRIO	4	6%
	Lab Technician	2	3%
	SPHA	1	2%
	PHO	1	2%
Number of years in profession	1-10	29	47%
	11-20	16	26%
	21-30	9	15%
	31-40	8	12%
Health facility type	Health center	29	47%
	Dispensary	21	34%
	Sub-county hospital	9	14%
	County hospital	3	5%

Source: Author's Survey Data, 2020

The respondents comprised 47% males and 53% females with majority being in the age group of 31 to 40 years as represented by 52% in the table above. In regard to the level of education attained by the respondents, majority had diploma (69%), 21% had a degree while the remaining 10% had achieved masters level of education. The majority of the respondents in the study (69%) were nurses while another significant group were lab scientists represented by 18% as illustrated in the table above. Concerning the period the respondents had been in their current professions, majority (47%) indicated between one and ten years, while 26% said between 11 and 20 years and 27% saying above 21 years of experience. This illustrated that the information gained from the research was provided by respondents with adequate knowledge of their area of profession. The majority of the respondents (47%) were from health centers, 34% from dispensaries and 19% from County and Sub-County hospitals.

In the descriptive results on organizational drivers, it was established whether the respondents had any data control systems in their facility. The findings are presented in table 4.

Table 4: Data Control Systems in Health Facilities

Response	Frequency	Percentage
Yes	43	69
No	19	31
Total	**62**	**100**

Source: Author's Survey Data, 2020

The results indicated that 69% agreed while 31% disagreed that there were data control systems in their facility. This finding differed from earlier findings by MOH (2003) that most of the data generated in health facilities in Kenya did not have well-coordinated and maintained uniform systems to harmonize and enforce the data and information management at all levels. This, therefore, indicated that there had been an increase in the establishment of data control systems in health facilities. The study further sought to establish how the data control systems were used. The results are as shown in table 5 below.

Table 5: Use of Data Control Systems in Health Facilities

Use of Data control system	Response	Frequency	Percentage
To maintain data quality	Yes	43	69
	No	19	31
To provide data security	Yes	54	87
	No	8	13

Source: Author's Survey Data, 2020

The results indicated that 43(69%) agreed while 19(31%) disagreed that data control systems were used to maintain data quality. On the other hand, 54(87%) agreed while 8(13%) disagreed that data control systems were used to provide data security. This indicated that the different facilities sampled in the study had similar uses for the data control systems such as ensuring security and quality of the data. Similarly, Seitio-Kgokwe *et al.,* (2015) noted that data quality and security are important aspects for a facility's performance that should be maintained routinely. Regarding the personnel that were deemed suitable for regulation of data generation

and dissemination, the results indicated that 37% of the respondents were for appointed management teams while 63% indicated that it was the role of HMIS officers. Results on evaluation of HMIS and information use are shown in table 6.

Table 6: Existence of Policy for Data Quality Standards

Response	Frequency	Percentage
Strongly disagree	7	10.5
Disagree	48	77
Not sure	1	1.8
Agree	7	10.7
Strongly Agree	0	0
Total	**62**	**100**

Source: Author's Survey Data, 2020

It was established that a combined percentage of 87.5% disagreed, 1.8% were not sure while only 10.7% agreed that there was a policy for data quality standards in their respective facilities. This showed that most of the health facilities had not set up and implemented sufficient policies to ensure data quality, thereby coinciding with findings by WHO (2008) that failure to create and implement policy framework documents is among the major environmental impediments to functional health information systems.

According to the Health Information System policy, the introduction of the HMIS was as a result of weak and traditional institutional frameworks. Effective and efficient management depends on quality data to generate critical information in policy-making, planning, monitoring of health outcome and evidence based decision-making. The study sought to establish whether there was data audits existed in the health facilities. The results are indicated in table 7.

Table 7: Availability of Schedules on Periodic Data Audit

Response	Frequency	Percentage
Strongly disagree	13	21
Disagree	41	66.5
Not sure	0	0
Agree	7	10.7
Strongly Agree	1	2
Total	**62**	**100**

Source: Author's Survey Data, 2020

It was noted established that 87.5% disagreed while 12.5% agreed that there were available schedules on periodic data audit. This indicated that few health facilities represented in the study audited their information systems and thus likely to negatively affect the quality and relevance of information that could be used to make decisions. This was also noted by Seitio-Kgokwe *et al.*, (2015) who observed that health management should audit data quality routinely and update HRIOs so as to protect its quality and relevance. Concerning the availability of audit tools, the study established the results indicated in table 8 below.

Table 8: Availability of Audit Tools

Response	Frequency	Percentage
Strongly disagree	10	15.6
Disagree	47	75.5
Not sure	0	0
Agree	4	6
Strongly Agree	2	2.9
Total	**62**	**100**

Source: Author's Survey Data, 2020

In the results, 91.1% disagreed while 8.9% agreed that there were audit tools in place indicative of the lack of routine data auditing for lack of sufficient tools. Alongside this, the study also looked into the existence of evidence of previous audited reports and obtained the results in table 4.9 below.

Table 9: Existing Evidence of Previous Audited Reports

Response	Frequency	Percentage
Strongly disagree	6	10.3
Disagree	49	79
Not sure	0	0
Agree	5	8
Strongly Agree	2	2.7
Total	**62**	**100**

Source: Author's Survey Data, 2020

It was established that 89.3% disagreed while 10.7% agreed that there was existing evidence of previous audited reports. Given these results, it was evident that the evaluation of HMIS and information use was still very low and in some instances, it had not been adopted as supported by 89.3% of the respondents who disagreed with the statement that there was existing evidence of previous audited reports. This showed that health care workers and managers did not always put the data collected to best use. These findings were in line with Galimoto (2007) who noted that despite training on the HIS, health care workers and managers did not always put the data collected to best use. Observable was a culture of reporting rather than that of using the information. **T**he study also sought to establish the information receiver at the facility. The results are shown in figure 1 below.

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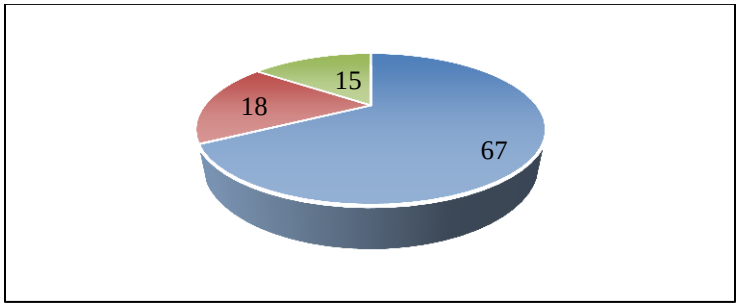

Figure 1: Information Recipient

Source: Author's Survey Data, 2020

The results indicated that information was received by administrators, the Chief Executive Officer (CEO) and all managers. Forty two respondents (67%) stated that information was received by administrators while 11 respondents (18%) stated that the CEO received information. Nine respondents (15%) indicated that information was received by all managers. This indicated that the top decision makers in the institution were provided with data from different health institutions and had the essential components on which they could base their decisions. The receiving of information, however, did not mean that the information generated from the health facilities in the sub-county was used for decision making, as shown in table 10 below.

Table 10: Purpose of Data Generated

Statement	Frequency	Percentage
To satisfy routine exercise	35	56%
To satisfy donor requirements	24	39%
For healthcare decisions	2	5%

Source: Author's Survey Data, 2020

Regarding the purpose of the data generated, the results indicated that 35(56%) were for the idea that the purpose of data generated was to satisfy routine exercise. On the other hand, 24(39%) indicated that data generated was meant to satisfy donor requirements while 2(5%) stated that the data was for healthcare decisions. It was evident that data generated at the healthcare facilities was meant to satisfy routine exercise as supported by 57% of the respondents. Availability of Information Communication Technology (ICT) networks across the county health facilities was also established. The results were as indicated in table 11.

Table 11: ICT Networks across Health Facilities

	Agree		Disagree	
	Frequency	Percentage	Frequency	Percentage
All facilities connected	4	6	58	94
A few connected	57	93	5	7
None connected	7	12	55	88

Source: Author's Survey Data, 2020

Results indicated that 94% of the respondents agreed that not all facilities were connected with ICT networks across the county. On the other hand, 57 respondents (93%) agreed that a few were connected while only 7(12%) agreed that none were connected. This indicated that there was a low connectivity of ICT networks across the county facilities. This finding is in tandem with findings by Carbone (2009) that majority of the health facilities across developing countries have stationary materials like paper and pen but a shortage of information technology equipment like computers, internet or any kind of network connectivity. Concerning the availability of adequate and functional computers in the health facilities, the results were as depicted in table 12.

Table 12: All Facilities have Adequate and Functional Computers

Response	Frequency	Percentage
Strongly disagree	36	58
Disagree	26	42
Not sure	0	0
Agree	0	0
Strongly agree	0	0
Total	**62**	**100**

Source: Author's Survey Data, 2020

It was noted that 36 respondents (58%) strongly disagreed while another 26 (42%) disagreed that all facility units had adequate and functional computers thereby indicating a shortage of important hardware for information systems which would greatly affect the utilization of health information. Analysis on the availability of data capture software gave the results indicated in table 13 below.

Table 13: All Data Capture Software for Various Pillar Components are Available

Response	Frequency	Percentage
Strongly disagree	18	29
Disagree	33	53
Not sure	0	0
Agree	7	11
Strongly agree	4	7
Total	**62**	**100**

Source: Author's Survey Data, 2020

A combined 82% disagreed while 18% agreed that all data capture software for various pillar components were available. This further illustrated the need for data capture and processing devices. The findings also show that by adopting effective and productive health information systems, it is possible to realize an increase in the quality of service delivery in the healthcare system. The various pillars (leadership and HIS, finance and the workforce as well as health products and technologies) permit a coherent approach in strengthening the health system. According to WHO (2008), monitoring and evaluation structures integrating the aforementioned pillars brings together data sources and results in its entirety. The study further sough to find out

whether there was networking between the main hospitals and lower health facilities in the county. The results were as shown in table 14 below.

Table 4.14: Networking between Main Hospitals and Lower Health Facilities Exists

Response	Frequency	Percentage
Strongly disagree	26	42
Disagree	31	50
Not sure	0	0
Agree	5	8
Strongly agree	0	0
Total	62	100

Source: Author's Survey Data, 2020

In the results, 92% disagreed while 8% agreed that networking of main hospitals with the lower health facilities was established. This indicated that information sharing between health facilities in the county was not automated. The growing demand to integrate information systems cross cutting various health facilities in the county and national level, has given rise to various modules of eHealth in a bid to improve health and mitigate health system challenges.

Inferential analysis results of organizational drivers and utilization of health information are presented in table 1 (Appendix). At 95% confidence interval organizational drivers demonstrated a statistically significant correlation on utilization of health information for decision making at 0.193. Regression of utilization of health information on organizational drivers resulted in adjusted R^2 of 0.631 and a significant positive beta coefficient for firm level strategy, capabilities and organizational culture of 0.465 ($p<0.001$). The model therefore explained 63.1% of the variation in the utilization of health information for decision making by operational level managers. The regression coefficient established that a unit change in organizational drivers increased utilization of health information for decision making by 0.465 units.

As conceptualized in the study, organizational drivers had three indicators; organizational data policy, organizational data capture and processing devices and dedicated data management rooms. On the other hand, utilization of health information had four indicators namely: Reports of information feedback, reports on information based allocations, reports on information dissemination and records of health information. Correlation analysis results showed high degree of positive relationship between organizational drivers' indicators and utilization of health information for decision making. The relationships were significant as indicated in table 2, (Appendix). This indicated that utilization of health information for the purposes of making decisions by operational level managers was greatly enhanced by a facility's organizational drivers and hence the need to ensure sound organizational drivers in health facilities.

5.0 CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Conclusion

The study established various organizational based deficiencies that impeded information generation analysis and transmission within and across the rural and referral sub-county levels of healthcare. Among observed and verbalized findings included, unavailability of data

management policies at rural and majority of the facilities, lack of dedicated data management rooms and lack of computers in most of the facilities which thereby implied no network connectivity across the larger part of the sub-county. The policy on data generation and use was absent within facilities where most of the employees were not aware of its structure and content. Tools for data capture were mainly manually improvised papers which were compiled and fed to official registers for onward submission to the sub-county HMIS office where HRIOs were based. Data categories were mainly disease profile, counselling and wellness center services and contraceptive use as well as pharmaceutical data as was found in a majority of the facilities. Among uses of data was to satisfy both organizational and donor programs. The culture of information use was limited as most of the data collected was meant to satisfy organizational routine monthly demand but most of the managers were not using it for meaningful decisions at facility level. Therefore, a negligible proportion was meant for satisfying system decisions. This supports earlier studies from Ghana, Nepal and Malawi where data was needed only by policy makers. Also observed was that appreciable proportions of managers collected data for further references. Data quality was not easy to ascertain as the tools for data capture at facility level varied with the handler and the mode of capture which was most likely linked with inconsistencies.

5.2 Recommendations

Given the findings, a number of recommendations were made which were considered useful in promotion of health information utilization for decision making by operational level managers so as to strengthen health systems. Firstly, the county government should develop a policy on health information and train all employees on information processes and associated importance in making health related decisions. Secondly, the county government should develops health information digital and hard copy forms for data capture and submissions to referral level for final analysis and utilization. Thirdly, the county government of Meru should hire and deploy trained HRIO to all county facilities for quality data capture analysis, sharing and utilization. Fourthly, the county government should dedicate special rooms for data processing and storage in all health facilities for quality, relevance and utilization. It was also recommended that the county government should formulate an internal data audit committee to oversee data generation, processing, sharing and storage for control and safety. Finally, the county government should reorient all operational level managers on the essentials of health information as a basis for making efficient and effective health care decisions.

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Appendix

Table 1: Regression of Utilization of Health Information on Organizational Drivers

Goodness of fit	**Test**	
	Statistic	**P-value**
Adjusted R-squared	0.631	
R-squared	0.633	
F-statistic (1, 268)	446.38	0.000***
Dependent Variable= utilization of health information	**Linear Regression Results**	
	Coefficients	**t-statistic**	**P-value**
organizational drivers	0.465	21.13	0.000***
Constant	3.37	1.05	0.293

Source: Author's Survey Data, 2020

Table 2: Correlations for Organizational Drivers and Utilization of Healthcare Information

	Correlations								
	Variable	1	2	3	4	5	6	7	8	9
1	Organizational data policy	1								
2	Data capture and processing devices	.606**	1							
3	data management rooms	.568**	.722**	1						
4	Reports of information feedback	.519**	.463**	.498*	1					
5	Reports on information based allocations	.554**	.598**	.667**	.557**	1				
6	Reports on information dissemination	.509**	.598**	.705**	.593**	.791**	1			
7	Records of health information	.382**	.370**	.466**	.467**	.621**	.673**	1		

Method: Pearson Product Moment Correlations
**. Correlation is significant at the 0.01 level (2-tailed).
Sig. (2-tailed, for all was 0.000 less than the P- value or 0.01 and 0.05.
sample (n)=62

Source: Author's Survey Data, 2020