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## **Factors Influencing Utilization of Health Information System in the Management of Missed Appointments among HIV Positive Patients in Mombasa County**

By

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### **Abstract**

A health system requires a well-functioning health information system as it enhances measurement of health outcomes, accountability for resource allocations and assists in arriving at effective health care decisions. An effective health information system captures individual patient data including demographics and data related to clinics on management of population, analysis and reporting of patient risk elements and pinpointing of proactive patients therefore providing reminders where care is delivered. This process of utilizing health information reduces missed appointments, increases retention rate and improves patients' health outcome. With low retention rates among HIV positive patients, this study aimed at determining the factors associated with the utilization of health information in curbing missed appointments. Utilization of health information involve collection, collation and monitoring in identification of key areas worth addressing within the health structures to direct designing of suitable health mediation to advance health. The research study was guided by the following specific objective to establish infrastructural factors influencing health information utilization. This study utilized descriptive cross-sectional study design using quantitative method of data collection to assess utilization of health information among healthcare workers. The study population for this research was approximately 215 CCC, a sample size of 69 health care workers in three high volume hospitals offering HIV care in Mombasa County (Coast general, Bomu Hospital and Portreitz). Primary data was obtained via questionnaires while secondary data was obtained from hospital records available, the registers, EMR and reports generated. The data was coded and analyzed using the statistical package for social sciences (SPSS). A p-value of less than 0.05 was considered as statistically significant. From the findings, half of the staff had been trained on data management while half was not. All the health facilities used Electronic Medical Records however with unstable local network connectivity. It was also noted that staff supervision was inconsistent and that staff had negative attitude towards data use. There is need for users and utilizers of health information to be trained in all aspects of data to enhance data quality; there is also need to ensure availability of data collection tools either soft or hard. Advocacy for consistent support supervision to facilitate data utilization; this would improve the staff attitude on data capture, demand and use.

**Key words:** Electronic Medical records, Information Technology, Health Information System, Standard Operating Procedures, Comprehensive Care Centre, Human Immunodeficiency Virus, Anti-retroviral Immune Deficiency Syndrome, Mombasa County, Kenya

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### **Introduction**

#### **Background to the Study**

Prompt and dependable information regarding health is necessary basis for action in public health and in reinforcing health systems either globally or nationally. Reliable information is particularly pressingly required in instances of arising diseases and other risks of drastic health, where quick realization, analysis and actions can conserve lives and deter wider national pandemics including worldwide outbreaks. Outbreaks and monitoring of arising diseases results in information related to actions in public health therefore the need for promptness in disclosing and response, an additional vital step in reinforcing systems of health information which is associating users with the produced information. According to world health organization [WHO] (2005), those utilizing information related to health encompass the ones tasked with providing care and those whose role is to administrate and design programs associated with health. An effectively operating system of health information is necessary in reliably offering prompt information related to health. Ala Alwan et al. (2016) argue that information is necessary for: crafting policies and making decisions that are based on evidence, effective management of health and well informed allocation of resources and for tracking and assessing health systems. Low retention rates among HIV positive patients is attributed to poor utilization of existing health information systems that facilitates poor follow up, under-reporting and uninformed decision.

Human Immunodeficiency Virus (HIV) key universal health problem; those with HIV infection were approximated to be 36.9 million by the year 2017. By the time the epidemic started, about 77.3 million individuals had become HIV positive while those who had died due to illnesses related to AIDS were approximately 35.4 million. In 2018, 1,493,382 Kenyans were living with HIV; 5.2% were women and 4.6% were men. Mombasa County is among the 47 counties in Kenya with relatively high HIV prevalence rate at 7.4% (Kenya Aids Strategic Framework, 2018). It is estimated that there are 54,570 people currently living with HIV in Mombasa County, amongst them are 6870 children; this is according to (Mombasa county HIV infections, 2015). It is also estimated that there are 1600 new HIV infections and 900 HIV deaths that do occur on annual basis in Mombasa County.

The retention rate in Mombasa County is slightly below the expected standard percentage which is 85%. It ranges from 73% and 75% in the years 2018 and 2019 ([www.hiskenya.org](http://www.hiskenya.org)). Poor retention includes a number of conducts including not attending one clinical appointment to not following up, which means that those who had failed to present themselves to a clinic within a specified time frame where assumed not to be alive (Rosen et al., 2007).

The patient missing appointments has been highlighted as one of the challenges that affect management of chronic illnesses such as HIV, it actually increases cost of care delivery, increases waiting time for appointments and leads to underutilization of equipment and personnel thus creating negative relationship between the patient and the health provider (Paterson, Charlton, & Richard, 2010)

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To track care retentiveness, dependable monitoring of patients and a system of monitoring was required to pinpoint patients who had not attended an appointment or who had been assumed not to be alive. The use of registers or electronic medical records enhances monitoring using systems to reveal the homes of patients to establish if the patient is not held on or had relocated or had passed on. This procedure encompasses a technique of pinpointing a patient who had not honored a visit, then monitoring the locale of the patient and enabling them to come back to care (Weigel et al., 2011). Journals of medication can act as vital records for data collection thus improving patient long-term adherence hence improve the health outcomes (Harold Van Driel & DorotheeKasteleijn- Nolst Trenite, 1999). A health information system involves different cadres working in team so as to be able to achieve its goal

A number of the elements that contribute to underutilization of health information for patient tracking included; lack of tools for collection of patient information, lack of technical know-how on the use of the available tools and lack of supervision for the staff using the tools. However, there were benefits in the utilization of health information including continuity of care, curbing re-infections that could be even fatal hence improved health outcomes (Mugavero et al., 2009).

This study explored elements that influenced the use of an available health information system among the health care providers that would help improve the tracing of patients who missed their appointments in time before they become lost to follow or even died. In order for improved health outcomes among HIV positive patients, it is important to make prompt follow ups. The study also helped identify and recommend appropriate approaches in health information system utilization that can enhance effective patient follow up.

Sessions and systems for monitoring patients that were used in Rwanda together with financing focused on performance, which provided further financing of clinics to enable them, attain the targeted number of attended patients. Connecting payment to high sessions assist in maintaining motivation for employees of the clinics to track and respond on the rates of those attending. Nevertheless, performance based financing needed considerable further resources and those to supervise it to authenticate relayed data effectively to deter abuse.

In Kenya, the employees of clinics reviewed indicators of attendance, derived from the scheduled visits in the system, and discussed accomplishments and opportunities for advancements during meetings with staff on a monthly basis. This enabled employees to monitor their extent of accomplishment thus motivating them to support norms of adhering to patients support. Scheduled visits and indicators of abidance were straightforwardly derived from books of scheduled visits and could result in being a standard system of information for the clinic which could be utilized in tracking long standing care accomplishments and developing ongoing standard accomplishment endeavors.

In Mombasa, patient appointment system was maintained, however there were still increased number of patients missing their appointment dates. It was a routine procedure carried out but lacked well-coordinated use of the information collected for follow up purposes therefore making no difference in the retention rates among the HIV positive patients. There was lack in supervision of staff thus unable to monitor performance in terms of patient tracking system.

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### **Statement of the Problem**

A health system requires a well-functioning health information system as it enhances measurement of health outcomes and accountability for resource allocations (Kraschnewski & Gabbay, 2013). Health information facilitates monitoring of commodities provided/dispensed, monitoring of disease, and level of personnel services to enhance in the management and leadership levels of public health. An effective health information system captures individual patient data including demographics and data related to clinics on management of population, analysis and reporting of patient risk elements and pinpointing of proactive patients therefore providing reminders where care is delivered. This process of utilizing health information reduces missed appointments, increases retention rate and improves patients' health outcome.

In spite of the heavy investment in the District Health Management Information Systems (DHMISs currently DHIS2) since 1978 to reinforce the standard information by placing data directly to those making decisions at various levels in the system of health, Health Metrics network (2008), indicated that only 51% of health workers use data. In Mombasa County, there are lower retention rates among the HIV positive patients; in 2018 the active patients on ART were 3270, yet the net cohort initiated on HAART was 4000 giving a defaulter rate of 17%, in 2019, 4013 active on ART with a net cohort of 5326, giving a retention of 75% within a period of 12 month (DHIS 2). These trends indicate poor retention rates among the HIV positive patients prompting the utilization of health information.

Lipincott (2013) observed that, health care givers require access to appropriate information regarding patients (medical records and history of patients) to be able to link the patients with a suitable treatment of program existing while project administrators need to have access to information in order to direct daily functions, monitor accomplishments, acquire an understanding from previous outcomes and enhance liability. Utilization of existing health information would facilitate patient tracking therefore providing information for management of missed appointments among the HIV positive patients. NASCOPs vision is to have more that 90% retention of patients on care. The WHO (2014) opines that those in charge of providing care from different levels in the system of health can't detect challenges and prioritize their demands nor can they monitor advancement and estimate the effect of involvement without data utilizing data.

### **Objective of the Study**

- i. To establish infrastructural factors influencing health information system utilization in management of appointments among HIV positive patients.

### **Review of Related Literature**

#### **To establish infrastructural factors influencing health information system utilization in management of appointments among HIV positive patients**

Boone, (2016), outlined infrastructural factors influencing health information utilization in management of appointments among HIV positive patients as those linked with skilled technology and expertise to craft, administer and enhance health information systems accomplishments and procedures. Notwithstanding the big accomplishments realized to develop a state system of health information, some issues and challenges have to be tackled that are connected with health information utilization in management of appointments among

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HIV positive patients utilization in making decisions, discussion on policies and suitable utilization of techniques for remolding information from data.

Mutale et al. (2013) noted “that weak Infrastructural system on information related to health are an essential obstacle to reaching the goals of millennium development that are focused on health due to accomplishments in health systems that can’t be properly evaluated or tracked where infrastructural factors influencing health information utilization are partial, flawed or mistimed”.

According to Sauerborn (2018), “the infrastructural factors influencing health information utilization is utilized in keying in and data documentation because it a vitally essential element influencing the use of ordinary information related to health in facilities of care. Gopalan (2013) argues that infrastructural factors influencing health information utilization such as IT usage and peripheries are the latest notions in the current institutions of health within countries that are developing specifically in the content of Africa. Argues Gopalan (2017) “each nation needs better health information pointers that deliver several health requirements, though they should sustain a provided number of infrastructural factors influencing health information utilization among the HIV positive patients“. The evaluation also illustrated the hindrance caused by systems which do not function and also having too many health system indicators to handle the health information among the HIV positive patients.

The effects of infrastructural factors for HIV health information utilization highly regarded as divulged in the extensively effects of HIV patients’ considerable levels of satisfaction (David Pickton & Amanda Broderick, 2013). A research by Suartini Bambang in Indonesia on utilization of health information showed that health information among the HIV positive patients was inadequate especially the baseline information on population. Without quality health information data, data capable of influencing informed making of decisions would not happen and the results would be ineffective and inefficient programs. A survey that targeted middle level health workers within a developing nation that was unidentified, to evaluate how effectively they assessed and utilized data from health information among the HIV positive patients divulged a considerable existence to train health workers approaches of evaluating data and utilization and connecting data application activities when health information systems are installed.

The influence of staff capacity on health information utilization has an impact on health information, demand and utilization among the HIV positive patients. According to Hozumi, (2016) opines that Staff capacity always influences the health information application often need ineffable perceptions such as outlook, the norms grasped by health workers in relation to information regarding health, duties, inspiration, manner in which health workers accomplish their duties, and the hierarchy of command of health management. To ascertaining a number of the elements connected with staff capacity on health information utilization require interventions beyond simple training among the health workers to improve skills and knowledge in analyzing data and using health information in the strengthening and management of missed appointments among HIV positive patients.

The influence of staff capacity on health information utilization among the HIV positive patients provide intuition that is essential in the manner in which policy developers, administrators and healthcare staff utilize information among the HIV positive patients. For instance the main task of the health provider is service delivery in health centers which rotates on their daily/clinical job as technical worker or health service manager. They perceive duties

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such as surveillance of diseases, keeping of stock, budgeting and evidence-based planning as not important compared to health care provision as extra work.

The staff capacity in health care centers who are extremely proficient such as health managers, nurses, physicians and other subsidiary personnel are essential in delivering high standards of results and effective standard accomplishments thus growth in the hospital and better adhere to health information utilization in management of appointments among HIV positive patients (Argote & Fahrenkopf, 2016). There is a demand for careful appointment of qualified manpower. Accomplished appointment and sustainability of health employees is related to equipment of health personnel who should be regarded as invaluable hospital partners in its functions and provided with chances for growth.

To be able to enable development and standard service, hospitals need to embrace approaches of human resource that are effective such as careful appointments of well qualified health staff, and sustain nurses and physicians, tracking of doctors and making sure that they continuously accomplish certain targets and quality of practice to maintain credentials in the utilization of health information in management of appointments among HIV positive patients.

According to Aqil et al. (2015), the influence of staff capacity on health information utilization in management of appointments among HIV positive patients was challenged by complex forms and registers for collecting data, inadequate inspiration of health personnel to acquire data and inadequate comprehension of how the data should be used. Senior staff in health centers showed little interest in the utilization of the acquired data.

Many medical centers offer staff supervisions training services on health information are curative-oriented and urban-based. Health staff supervision is greatly caters for needs of patients, enhanced effectiveness in relation to cost and provides more service delivery content to personnel working in health centers. To remain effective in health information utilization and health management, there is need for supervision on the utilization of health information in management and appointments among HIV positive patients in the health facilities. Professional support as well as that coming from the organization, management of practices related to health as well as work life balance, chances in careers and professional growth have shown to be regarded by the supervisor to be essential in the usage of health information in management and appointments among HIV positive patients.

According to Sauerborn (2016), “the intricacy of the system crafted in keying in and documenting data is the crucial technical element influencing usage of ordinary information related to health within facilities of health”. A survey targeting health workers in a developing nation that was unidentified to evaluate their capability in assessing and utilizing data from a health system for information divulged that existed a considerable demand to train the health supervisor on how to evaluate and utilize, and to connect the used data activities when information systems are installed.

Supervision of HIV health information among positive patients and evaluation of their health management need also to be unlimited to predictors in regards to the degree of influence and intervention results. It is similarly essential to supervise and analyze the procedure for adopting health information management inputs, because together they decide on the accomplishment of an intervention of the real utilization of the HIV health information. Within all the levels, experiences can be grasped by managers and administrators and makers of policies within health systems. Pointers and a structure for assessing and analyzing the utilization of health information interventions are often not defined prior to information systems contribute to huge challenges to establish the productivity of health staff supervision

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strategies. Supervision and analysis of health information in management and appointments among HIV positive patients need more attention.

## **Theoretical Framework**

### **Health Information Actor-Network Theory**

The theory of actor network is a substitute technique in the social construction theory of innovation in the conceptualization of the responsibility of technology in small survey of utilization of health information in strengthening the management of missed appointments among booked patients. Borrowing key notions and presumptions for shaping social innovations on health information (Callon & Law, 2016) makes usage of health information strategies of actor networks to emphasize the interconnected and correlative nature of all constituents (technical and social). The theory of actor network in relation to information on health is basically in regards to studying technical and social matters connected with technology change on the use of information regarding health in strengthening the management of missed appointments among patients.

The hypothesis presupposes that technical and social elements are indivisible. The symbolic boundary between the health workers and technology related to health information is continuously changing in a dynamic and modern health duties and activities related to leisure, and health information in relation to the theory of network actors is an approach to research the matters and obstacles in the current world basing on the utilization of health information among HIV positive patients. In information health actor-network theory as articulated by Latour (2016) and Callon (2018), innovation in technology is perceived as a way to develop and stabilize a disperse structure on the utilization of health information in strengthening the management of missed appointments among HIV positive patients. Based on an outlook of the theory of actor network Walsham (2017) asserts that: Health information in relation to the theory of actor network which develops its elements, connected by coalition of similar networks with aligned interests. When health information innovation is initiated into health Centre, it comes with new purpose and hence disrupts the bond of social connection. An obligatory passage point occurs among the health workers which is connected by conversations bringing the solutions to challenges in regards to owned resources by health organizations that suggest utilization of health information in strengthening the management of missed appointments among HIV positive patients.

### **Research Design**

This study utilized descriptive cross-sectional study design using quantitative method of data collection to assess utilization of health information among healthcare workers. The study population for this research was approximately 215 CCC, a sample size of 69 health care workers in three high volume hospitals offering HIV care in Mombasa County (Coast general, Bomu Hospital and Portreitz). Primary data was obtained via questionnaires while secondary data was obtained from hospital records available, the registers, EMR and reports generated. The data was coded and analyzed using the statistical package for social sciences (SPSS). A p-value of less than 0.05 was considered as statistically significant. The results were presented using frequency distribution tables and Descriptive table.

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## Results and discussion

### **Infrastructural factors influencing health information system utilization in management of appointments among HIV positive patients**

The objective of the study was to establish infrastructural factors influencing health information system utilization in management of appointments among HIV positive patients. The data collected was analyzed using Descriptive table as shown in the table 1 below.

**Table 1 Infrastructural factors influencing health information system utilization in management of appointments among HIV positive patients**

	N	Minimum	Maximum	Mean	Std. Deviation
The hospital has tools for data collection and analysis(a health information system in place	60	3	5	4.3	0.696
You have access to functional equipment in your office/workplace?	60	3	5	4.42	0.787
The hospital has linkage with the community health workers to facilitate home visit/home dispensing.	60	3	5	4.38	0.585
The hospital has adequate infrastructural resources for electronic health records for linkage and retention in the strengthening of management of missed appointments among HIV positive patients	60	2	5	3.9	1.145
The hospital has an effective working local area network that facilitates EMR	60	1	5	2.7	1.154
IT Investment, all staff able to access essential services and devices and perform work outside the office	60	1	4	2.32	0.911
IT Investment: All staff have been sufficiently trained on effective and efficient use of IT resources	60	1	5	2.55	1.185
IT Investment: The hospital has a dedicated IT department	60	2	5	3.85	1.205
IT Investment: Each department uses customized software	60	1	3	2.02	0.833
IT Investment: The hospital has integrated software to manage their funding and budget	60	3	5	3.92	0.72
IT Investment: All Circulars and other internal documents are available and easily searchable electronically	60	1	4	2.37	1.041
Valid N (list-wise)	60				

Source: Research data (2021)



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**Response on whether hospital has tools for data collection and analysis (a health information system in place)**

The study sought to collect data to determine whether respondent hospitals had tools for data collection and analysis; results showed 43.3% strongly agreed, 43.3% agreed, 13.3% were neutral in their opinion with an expected value and variation of 4.30 which is a high score and .696 which is small hence the values are close to the median of the data set respectively

**Response on whether respondents accessed functional equipment in their office**

The study sought to collect data to determine whether respondents accessed functional equipment in their office; results showed a 60% strongly agreed, 21.7% agreed, and 18.3% were neutral in their opinion with an expected value and variation of 4.42 which is a high score and .787 which is small hence the values are close to the median of the data set respectively.

**Response on whether respondents hospital had linkage with the community health workers to facilitate home visit/home dispensing**

The study sought to collect data to determine whether respondents' hospital had linkage with the community health workers to facilitate home visit/home dispensing. The results showed a 51.7% strongly agreed, 43.3% agreed, and 5% were neutral in their opinion with an expected value and variation of 4.38 which is a high score and .585 which is small hence the values are close to the median of the data set respectively.

**Response on whether the hospital has adequate infrastructural resources for electronic health records for linkage and retention in the strengthening of management of missed appointments among HIV positive patients**

The study sought to collect data to determine whether the hospital has adequate infrastructural resources for electronic health records for linkage and retention in the strengthening of management of missed appointments among HIV positive patients; results showed 48.3% strongly agreed, 35% were neutral, 11.7% disagreed and 5% agreed in their opinion with an expected value and variation of 3.90 which is a high score and 1.145 which is small hence the values are close to the median of the data set respectively

**Response on whether the hospital has an effective working local area network that facilitates EMR**

The study sought to collect data to determine whether the hospital has an effective working local area network that facilitates EMR results showed 35% disagreed, 30% were neutral, 13.3% strongly disagreed and 11.7% agreed in their opinion with an expected value and variation of 2.70 which is a low score and 1.154 which is small hence the values are close to the median of the data set respectively.

**Response on whether the hospital has an all staff able to access essential services and devices and perform work outside the office**

The study sought to collect data to determine whether the hospital has all staff able to access essential services and devices and perform work outside the office results showed 43.3% disagreed, 26.7% were neutral, 18.3% strongly disagreed and 11.7% agreed in their opinion with an expected value and variation of 2.32 which is a low score and .911 which is small hence the values are close to the median of the data set respectively.

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### **Response on whether the hospital staffs have been sufficiently trained on effective and efficient use of IT resources**

The study sought to collect data to determine whether the hospital has all staff sufficiently trained on effective and efficient use of IT resources; results showed a 33.3% disagreed, 26.7% neutral, 20% strongly disagreed and 11.7% agreed in their opinion with an expected value and variation of 2.55 which is a low score and 1.185 which is small hence the values are close to the median of the data set respectively.

### **Response on whether the hospital has a dedicated IT department**

The study sought to collect data to determine whether the hospital has a dedicated IT department results showed a 45% strongly agreed, 20% neutral, 20% disagreed and 15% agree in their opinion with an expected value and variation of 3.85 which is a low score and 1.205 which is small hence the values are close to the median of the data set respectively

### **Summary**

The objective of the study was to establish infrastructural factors influencing health information system utilization in management of appointments among HIV positive patients. The study established that inadequate IT knowledge, lack of documentation tools, system complexity and lack of knowledge to analyze influenced information availability for use in Mombasa County. This is in line with Sauerborn (2000) who indicated that the complexity of the system design used in entry and recording of data is the most important technical factor affecting utilization of routine health information by health facilities. In relation to the above, Boone (2013), also argued that the complexity of these systems makes it hard for health workers to utilize the system and end up using manual paper files recording which makes information spoilt and poorly managed. In addition to the discussion of the technical factors limiting utilization of routine health information, Rhoda (2010), discovered that some of the software for running the system of data entry and computation are also scarce, expensive and complex. Gopalan (2013), argues that IT use and applications are a new concept in modern institutions in developing countries particularly those in Africa. System complexity was also found to be influenced by lack of knowledge to analyze. This is in agreement with Garrib et al (2008) who assessed the rural South African district health information system found out that health facilities were not utilizing data aggregation tools as expected because they had limited skills to analyze, interpret and utilize the data and also agrees with the world health organization who emphasizes that correct use of data transforming tools into information needs to be dealt with.

### **Conclusion**

Based on findings of this study, It was concluded that lack of technical and analytical skills creates a barrier to producing high-quality, reliable data and information and also limited knowledge of the usefulness of HMIS data is found to be a major factor in low data quality and information use.

Just as it is depicted by Schneberger & Wade (2006) in the EBHIS theory, it was evident that there has to be a fit in between the Infrastructural factors, Staff Capacity factors, Staff Supervision factors and behavioral factors which must be supported by the organization in order for information to be effectively utilized. Also, it was noted that support from the higher level was very important to provide a mutual agreement between those factors to achieve a common ground for HMIS utilization.

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### **Recommendations**

From the conclusion made, the researcher would wish to make recommendations as follows:

#### **Infrastructural factors**

- Facilitate adequate reporting tools
- Advocate for functional equipment to facilitate data capture
- Strengthen community units using community strategy model because not all areas are covered
- Provide phones for CHVs so that reporting is done digitally therefore real time
- Have comprehensive EMR systems for departmental connectivity to avoid paper work
- Have a stable local area network and internet connectivity to avoid distracting data capture
- Facilitate IT training for all staff to complement infrastructure
- Empower the CHVs on technology use so that there are reminders on their phones each with the number of patients each CHV is attached to

#### **Suggestions for Further Research**

Owing to limitations of time and resources, the researcher only concentrated on the primary concerns in the study. From the study, the researcher identified that Service Delivery is quite dynamic and it entails underlying issues which in one way or the other. Towards this end it may be necessary to determine the association of this dynamics with performance. There is therefore need for further research to determine other influencing factors in the service delivery of the 47 county governments.

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