

Decentralization of Data Use for Learning in Public Health: Case Study of Nairobi County Kenya

¹Samuel Biwott, ²Dr.David Sang, ³Dr.Peter Memiah, ⁴Geoffrey Olado

¹²Maseno University

Abstract: Health systems require quality data from health information systems to plan for and ensure that the workforce is fully funded and equipped with the necessary commodities, infrastructure, resources, and policies to deliver services. Health data are, in and of themselves, prerequisites to improving each of the other five building blocks. This paper discusses the unique role of health data in strengthening health Information system building blocks of health systems. The overall aim of the paper is to articulate specific interventions that can improve the demand for and use of data in decision making so that improvements in the other health building blocks can be realized. The study adopted an exploratory and descriptive, cross-sectional design. The study objectives was to measure level of knowledge of health managers on data use and learning and examine the capacities of health managers in data use and learning and explore barriers to data use for learning. A structured questionnaire and observation checklist was used to collect data from 125 health managers and 125 management and service delivery offices. The study recommends elimination of paper-based data collection and train and re-train staff on data analysis skills to produce information and interpret also Improve the feedback/supervision system, focusing on checking use of information and comparison among facilities on health services indicators which will improve sharing the use of information and role modelling to promoting a culture of information use. The study recommend for further study on evaluating of impact of various types of training on improvement of data use for action and learning culture and Effect of decentralization and devolution of Health service on data use for action and learning

Keywords: Data, Decision, Information, Learning, Service Providers and Utilization.

I. INTRODUCTION

Health data and information lack value unless they are used to inform decisions. As such, interventions that increase demand for information and promote/facilitate data use for decision making is critical to improving the effectiveness and sustainability of the health system (Ed Abel., et al, 2012).

A Health Information System (HIS) is a system that integrates data collection, processing, reporting, and use of the information necessary for improving health service effectiveness and efficiency through better management at all levels of health services. Despite the credible use of HIS for evidence-based decision-making, countries with the highest burden of ill health and the most in need of accurate and timely data have the weakest HIS in the vast majority of world's poorest countries. Although a data for decision making forms a backbone for strong health systems, most developing countries still face a challenge in strengthening routine health information.

A key element in improving health system performance is the data and information base and its effective use in making routine as well as strategic decisions. Improving performance to make it more effective requires that:

1. The quality of data collected is improved and that weaknesses in data quality are identified and understood.
2. The data are actually used for making decisions (Scott M, 2009).

As the Ministry of Health decentralizes their core business, the demand for sound information and skilled workforce to manage and use the information needs to be strengthened. To this end, the Ministries will mobilize resources to improve and strengthen database management and communication technology skills in the counties in order to provide information that meets the needs of policy makers, managers and service providers. This calls for development of infrastructure and human capacity to collect, process the data and use the information for evidence-based decision making at all levels. (Ministry of Health, 2010).

Use of information technology in the healthcare sector also creates its own set of issues. These issues concern the right to privacy of individuals and the protection of this right in relation to health information and the development of suitable standards for regulating the provision of healthcare services by the use of technology. Proper regulation of the creation and use of healthcare information is imperative and is a matter of special concern to the government as well as other stakeholders in the field of healthcare (Ministry of Health, 2010).

A Health Management Information System (HMIS) is a system that integrates data collection, processing, reporting, and use of the information necessary for improving health service effectiveness and efficiency through better management at all levels of health services. Maintaining a good HMIS is an essential part in strengthening a health system (Chawla, Bansal & Indrayan 1997; World Health Organization Regional Office for the Western Pacific 1986).

In 2007, the World Health Assembly (WHA) passed a resolution on strengthening of Health Information Systems (HISs). The resolution acknowledges that sound information is critical in framing evidence-based health policy and decision-making. It is also fundamental for monitoring programs towards internationally agreed upon health-related development goals. Although a HMIS forms a backbone for strong health systems, most developing countries still face a challenge in strengthening routine HIS (USAID/Ministry of Health 2006; WHO 2008a).

In a good HMIS, data collection should be similar with the data requirements of users (only relevant data) and to the available processing capabilities; also the information generated should be simple to obtain and only the minimum required information must be collected, so that analysis can be done quickly. Feedback to the providers of the health data is an essential component of any reporting system (WHO 2004, 2008b).

II. STUDY AREA

Nairobi City County (NCC) is one of the 47 counties created under the Kenya constitution 2010. It is the smallest yet most populous of all counties, its successor of the defunct City Council of Nairobi. It operates under the auspices of the Cities and Urban Areas Act and devolved Governments Act and a host of other Acts. The County is charged with the responsibility of providing Health services to fluid residents within Nairobi and its environs.

The 2009 population census estimated the population density of Nairobi to be 4 million inhabitants (UN Habitat, 2009; Kenya census, 2009) with a total household of 985,000. Similar to other cities in the world, the figures have multiplied since first recorded in 1906 shortly after the establishment of city. It is estimated that Nairobi hold more than 10% of Kenya population of which 60% of its population live below poverty and slums informally constructed and without planning. With increased populace the need for quality health services increases. The demand and supply in provision of health services requires adequate information for appropriate actions. The choice of the study area was informed by strategic roles Nairobi County plays in more than 10 neighboring counties. Literature show poor performance of social determinants indicators e.g Poverty Index, Malnutrition, Unmet Family planning need and Child Survival. Nairobi City County Health system is funded and support by county government with support from various public benefit organization at service delivery and management level. Finally It is believed that improved Health outcome in Nairobi will significantly touch Health service in other 20 counties and more so neighboring Machakos, Kajiado, Kiambu, Narok and Nakuru Counties.

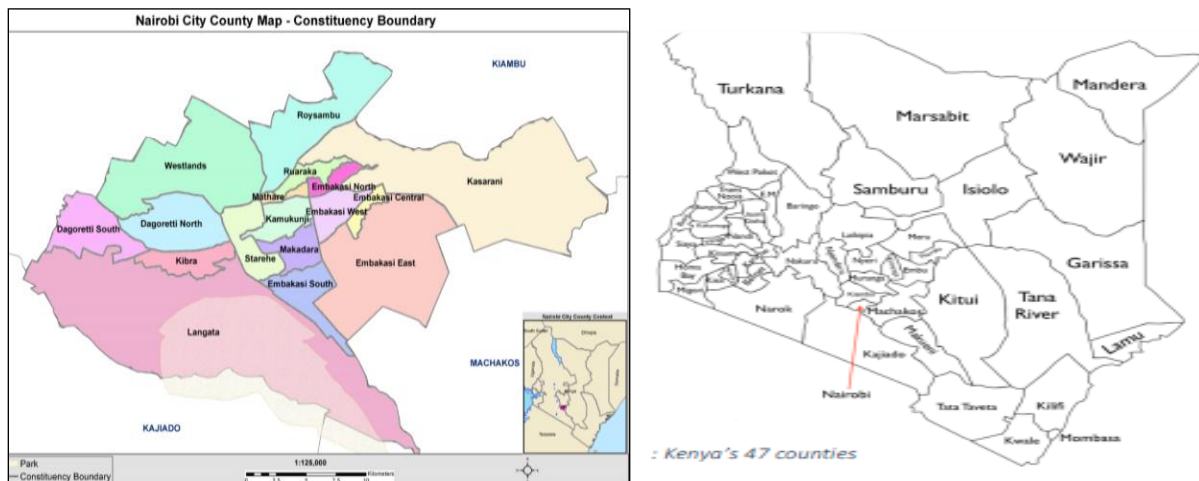


Figure 1A: Map of Kenya Showing the Study site

III. MATERIAL AND METHODS

Study Design:

The research study adopted a descriptive survey research design whereby data was collected from a cross-sectionally from health managers from management and service delivery level in Nairobi County. The purpose of descriptive research is to observe, describe and document aspects of a situation as it naturally occurs (Polit & Beck, 2004). A descriptive research design is a scientific method which involves observing and describing the behaviour of a subject without influencing it in any way (Martyn, 2008). On the other hand, descriptive survey studies are used to describe an event or process in its natural ambit and the main objective is to answer how, who, and what questions (Robert K. Yin, 2003).

The study adopted the descriptive survey design because it provided the opportunity for the researcher to explore and explain while providing additional information or meaning about the research topic. The research design was helpful at describing what was happening in more detail, filling in the missing parts and expanding understanding of the research topic.

The mixed methods were particularly useful, because the investigation entailed both qualitative issues and quantitative aspects. Combining these two methods allowed for robust data collection and ensured validity and reliability of data. The research design was developed to ensure participation and to yield as much information as possible.

The principal tool for data collection was a structured interview questionnaire administered to sampled Health managers at management and service delivery levels of County, sub County and Health facilities.

Study population:

The study population was all health managers at service delivery and management units at County, Sub County and Health Facilities for Public sector within Nairobi County. Because all health facilities in the administration currently manage public health data, Health managers from the 3 level of service delivery and management were all unit and/or department heads from all health facilities were included in the study. In Nairobi County there are a total of 17 sub counties has a total of 225 health managers at management and service delivery levels of county, sub county and health facility management teams. Target population was chosen based on their expertise in functional, strategic, operational, administrative, statistical management of healthcare and public health.

Inclusion and Exclusion Criteria

Inclusion Criteria:

The study incorporated Health Managers identified management and service delivery levels in Nairobi County government Health system who consented and agreed to participate in the study.

Exclusion Criteria:

The study disqualified Health manager working in private or faith based facilities and those who are away on leave during the data collection period and excluded those who refused to voluntarily participate in the study.

Study Variables:**Independent Variables**

- 1) Knowledge
- 2) Capacities
- 3) Barriers

Dependant Variable:

Data use and learning

3.4.3 Intermediate Variable

Intervening Variable:

- 1) Demand and Supply factors
- 2) Health Managers

Sampling Techniques and Sample Size:

Stratified and purposive sampling techniques was used in this study. In stratified sampling, the health systems of levels and tiers was treated as strata from which a sample was drawn using purposive sampling method. According to Mugenda and Mugenda (2003) deliberate purposive sampling is a sampling technique that allows a researcher to get cases that have the required information with respect to their expertise in the area of study.

Selected technique was appropriate due to the non-homogeneity of the strata's of county, sub counties and health facilities in terms of Management sizes, number of staff in each department and nature of services offered at point care. Through purposive deliberate sampling, the study focused on the following health managers in each level: Medical, clinical, paramedical, on-medical at management and service delivery level in health system tiers. A purposive sample was used to select 125 Health Managers for the study from the 4 levels of service delivery. A sampling frame was developed from Master facility listing with all facility details and the contacts. Facility list was randomized to select the target facilities and the respective Health Managers.

Non probability sampling technique of deliberate sampling was used to sample county, Sub Counties and health facilities in Nairobi County. Multi stage cluster sampling was applied to sample the target Health facilities and dispensaries. The Sample Size was calculated using the Formula in the Kothari, (2004) called the Sloven's formula. This is because the total number of Health care worker is less than 10000. ($225 < 10000$)

$n = N \sqrt{1 + \frac{e^2}{N}}$ n =Desired Sample Size, N =Population Size=225 e = Level of precision (error Margin) ≥ 0.05 Sample Size is 125

$$n = N \sqrt{1 + \frac{e^2}{N}}$$

n =Desired Sample Size,

N =Population Size=225

e = Level of precision (error Margin) =0.05

Sample Size was 110

Researcher interviewed 54 Health facility Managers 38 CHMT and 33 SCHMT sampled deliberately due to their expertise and the position of influence. The study calculated conservative sample estimate of 125 Health Managers including statistical number of 14% of the sample was added to the target sample to accommodate participants who may opt out or decline to participate.

Sampling Method:

This study used a population based sampling design that captured information about coverage and progress of the study objectives and also answered questions within target populations and generalize across population regarding study intervention. The sampling size for the 3 level (County, Sub County and Health Facilities) followed the probability

proportional to size (PPS) approach, drawing upon popular purposive sampling methods. Typically, stratified sampling was used when it is not possible to obtain a sampling frame in a large or scattered population over a large geographical area. Strata relied on representing a sample of a homogenous grouping and are selected randomly. Using this approach, all health managers in the selected levels of study had an equal probability of selection, and the proportion of health managers with different technical, structural and behavioral characteristics surveyed roughly equated to the actual proportion in the population.

Target Population:

The research study targeted 125 health managers at Management and service delivery levels of County, Sub county and Health facilities who are the key players in data use generation and use for decision making with respect to planning and programming

TABLE 1: Proportionate sample distribution per Sub County

Nairobi Sub Counties n = 17	Proportionate Sample (26%) out of 125
Dagoreti North Sub-county	7
Dagoreti South Sub-county	7
Embakasi Central	2
Embakasi East Sub-county	4
Embakasi North Sub-county	10
Embakasi South Sub-county	3
Embakasi West Sub-county	5
Kamukunji Sub-county	5
Kasarani Sub-county	4
Kibra Sub-county	15
Langata Sub-county	11
Makadara Sub-county	12
Mathare Sub-county	5
Roysambu Sub-county	8
Ruaraka Sub-county	13
Starehe Sub-county	7
Westland's Sub-County	7
Total	125

Study Instruments:

Primary data was collected using a structured questionnaire developed to answer to the study objectives. A structured questionnaire was preferred in this study because since it offers an effective way of collecting information from large samples in a short period of time and at a reduced cost. Additionally, a questionnaire facilitates easier coding and analysis of data collected. Additionally, questionnaires are standardized so it is not possible to explain any points in the questions that participants might misinterpret. Responses was be measured on an ordinal (Likert) scale for the closed ended questions.

The study questionnaire was self-administered by the respondents. The methods of administration was appropriate for the study because of the diverse experiences and roles the respondents had with respect to utilizing data for decision making, the huge spread of the facilities in the population, cost effectiveness and for increased chances for a higher response rate. A letter introducing the objective of the research accompanied the questionnaire.

Secondary data review:

The study reviewed relevant information from authentic and credible secondary and published sources on health information, public health and data investment for action and learning. Secondary data also involved documentation review and analysis of behavioral, structural and technical determinants for data use for decision.

Structured study questionnaire:

A structured study questionnaire was developed capturing the intended questions as derived from the study objectives. The questionnaire was developed in a kobo collect ODK based platform and administered using android phones directly related to a central database. This increased credibility and reduced errors in the data collection processes. The survey questionnaire is annexed.

Key informant interviews:

The study involved the administration of key interviews to selected key informants. These included the following:

- 1) County Management Team
- 2) Sub County Management Team
- 3) Health Facility Managers

Observation Guide:

The tool was administered through interview and observation with well-structured mechanism to validate and verify which include:

- Objective and Subjective
- Observation
- Documentation Review
- Trace and Verification-Onsite
- Cross-Checks/Spot check

Pre-testing Study Instrument:

The pilot study was done to catch a clear vision of the research topic and questions, the techniques and methods, which was applied, and what the research schedule will look like. (Blaxter, Hughes & Tight, 1996:121), trying out all research techniques and methods, which the researcher have in mind to see how well they will work in practice and then adapt and modify accordingly. (Blaxter, Hughes & Tight, 1996:121)

The pilot study of the current research can therefore be defined as both a feasibility study as well as a pre-testing of instruments, questionnaires and interviews.

Validity and Reliability:

Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are whereas, reliability is the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. (Joppe 2000).

Kirk and Miller (1986) identifies three types of reliability referred to in quantitative research, which relate to: the degree to which a measurement, given repeatedly, remains the same, the stability of a measurement over time and the similarity of measurements within a given time period. Reliability of instruments is important as it provides assurance that instrument will represent the true position is accurately recorded. The reliability of the instrument was enhanced by adopting an appropriate sampling technique and tools.

All the data collection tools were validated before commencing the data collection exercise. Validity was ascertained by ensuring that all the items in the tools address the objectives of the evaluation. Attention was paid to ensure that all the required values for parameters of interest to the study objectives were measured by sharing the tools with supervisors for review. Further, reliability of the tools was established through developing the structured questionnaire and observation checklist in Kobo Collect digital form with inbuilt sound recording and pilot testing where final changes was made to the tools thus ensuring more clarity and ease of administration in the field.

Measuring of content validity was done using C. H. Lawshe (1975) method proposed for each of the subject matter expert raters (SMEs) on the judging panel respond to the question for each item. Using Lawshe's formula termed the Content Validity Ratio (CVR):

$$CVR = (ne - N/2)/N/2$$

Where: CVR = Content Validity Ratio

ne = number of SME panelists indicating "essential"

N = total number of SME panelists

This formula yields values which range from +1 to -1; positive values indicate that at least half the SMEs rated the item as essential. The mean CVR across items was used as an indicator of overall test content validity (Lawshe, 1975).

Substituted as in

$$CVR = (11 - 12/2)/12/2$$

$$= 0.8333.$$

Therefore, the questionnaire passed the overall test content validity.

Data Collection:

Data used in developing this study was collected over a six day period two month within Nairobi County. The data was collected by trained research assistants closely supervised by the researcher and also monitored the entire process of data collection. The completed questionnaires were checked for accuracy before being accepted. Incomplete questionnaires were inadmissible. The qualitative observation were captured and reviewed.

Data was collected by technical team in collaboration and with support from the researcher. The team comprised of experienced data collectors whose associate experience on public health, gender and human rights. The researcher collected data revolving around conceptual framework.

The target respondents for data collection were purposely selected from county, sub county and health facility management team at service delivery and management levels respectively.

Qualitative data from the open-ended items in the structured questionnaire, observation guides and document analysis guides was analyzed using content and thematic analysis. Using the content analysis technique, data was coded and thereafter summarized into theme categories as they occurred. Findings was interpreted and presented in form of charts, graphs, tables, frequencies narratives, statements, explanations and discussions.

Data Analysis:

Data analysis was done using descriptive statistics. This involved coding the collected data and entering it into SPSS Version 20.0. Information for the different variables was obtained by computing the variables, recoding the variables and synthesizing the information from the data collected for meaning. In the data analysis, the researcher examined each piece of information in the instrument for completeness, errors and inconsistencies. Missing data was verified with the original questionnaires. Outputs for the data were generated in the form of frequencies, means, standard deviation, coefficient of variation and Pearson's product moment correlation coefficient denoted as r for the sample statistic so as to assess possible linear relationship between the independent and dependent variables. The significance level was set at probability $p < 0.05$ for every statistical set. The results were then presented in the form of tables for ease of interpretation

Study Quality Assurance:

A face-to-face interview using a structured questionnaire was used to collect primary data among all unit and/or department heads of the health facilities. The questionnaire was adopted from the PRISM framework assessment tool version 3.1. This tool is useful to collect detailed information on the strengths and weaknesses of HIS in its input, process, and output and identifies factors affecting its performance. Two health professionals who are members of HIS monitoring team were assigned as supervisors. Six health professionals who had basic HMIS training and had prior experience on data collection were assigned as data collectors. To maintain data quality during the data collection period, the two supervisors and the researcher performed the supervision of data collection procedures, checked every completed questionnaire, and gave onsite technical assistance to the data collectors.

Minimization of bias:

This was done through pre-testing of questionnaire to ensure all information required for the study was included and restricting the study population to Health manager at service delivery and management level working in County Owned Facilities in Nairobi County. Validation of data collection tools using digital software. Selection bias was minimized though non probability expert purposive sampling and probability stratified sampling.

Ethical considerations:

Stufflebeam and Shinkfield (2007) recommend that a researcher should strive to control bias, prejudice and conflict of interest when conducting a research. First, was obtained from different sources to authenticate the information. It included the health managers from County, Sub county and Health Facility tiers and also management and service delivery levels. Secondly, the researchers at all times acknowledged the source of information in order to avoid plagiarism especially as regards secondary data. Thirdly care was taken throughout the study to ensure that the necessary consent is received first from health managers selected to participate in this study. The study was conducted in such a way that does not deny the respondent to participate and it does not disrupt normal workflow.

This is in accordance to Creswell (2009) who noted that the researcher must obtain informed consent from all the respondents before undertaking the study. At management and service delivery levels, consent was sought from health managers and at the institution level consent was sought from the heads of institutions and consent of authority and permission to conduct the study was obtained. No one was coerced to participate in the study and all respondents were given the freedom to withdraw their participation any time they felt uncomfortable or chose to. Institutional ethical clearance was first sought Maseno University Ethical Review Board (MUERC) and Maseno University, School of Graduate Studies. Approval and ethical clearance and letter of authority will be sought from National Commission for Science, Technology and Innovation (NACOSTI), Nairobi City County Government. Data was collected after expressed and implied consent was provided by participants to the researcher. During the interview each participant was informed about the aim of the study also discussed the issues of confidentiality and participants were informed that they had full right to refuse or discontinue participating in the research. Voluntary consent was sought and explanation on study risk and benefits, Respect of human subject and protection through anonymity and confidentiality of information provided for study use only. There was no compensation for participating in the study.

IV. RESULTS***Social Demographic:***

One hundred and twenty five respondents participated in this study. Out of this numbers 43.20% (54/125) were male and 56.80% (71/125) were women. The distribution of respondents according to years of experience indicated 38.40% had 11 years to 20 years of experience, 26.40% had an experience of 6 years to 10 years, 25.60% had less than 1 year to 5 years' experience and 9.60% had an experience of above 21 years. According to the level of service delivery 40.80% were under facility, 30.40% at the county level, 26.40% at the sub-county level and 2.40% were at the dispensary level. Based on professional cadre 32.00% of the respondents were under community strategy, 18.40% were under HRIO, 12.00% were under public health, 10.40% administrators, 9.60% laboratory workers, 9.60% pharmacists, 4.80% under rehabilitation, 3.20% health promoters. Distribution of respondents as per the level academic qualification indicated that 51.20% were degree holders, 34.40% diploma holders, 9.60% master's degree holders and 4.80% certificate holders.

Level of knowledge on data use for decision making and learning:

The study comprised of one hundred and twenty five respondents. According to the findings, the males who were aware of data investment for learning were 77.78% (42/54) as compared to females who were 91.55% (65/71). Based on the duration of years of experience the higher the number of years of employment the higher the level of awareness of data investment for learning that is 87.50% (42/48) for 11 to 20 years, 63.64% (21/33) for 6 to 10 years, 100% (12/12) for respondents above 21 years and 100% (32/32) for respondents of less than 1-5 years. According to Employment status of the respondents those who were aware of data investment for learning were 86.21% (75/87) permanent workers, 82.86% (29/35) contract workers and 100% (3/3) retired employees.

The respondents who were aware of data investment for learning based on the level of service delivery were 100% (38/38) at the county level, 100% (3/3) for dispensary, 88.24% (45/51) for facility and 63.64% (21/33) at the sub-county level. Based on professional cadres the awareness of data investment for learning was as follows 100% (13/13) were administrators, 85.00(34/40) were under community strategy, 100% (23/23) were HRIO, 100% (4/4) were health promoters, 50% (6/12) were under the laboratory, 50% (6/12) were pharmacists, 100% (15/15) were under public health while 100% (6/6) were under rehabilitation. According to the level of academic qualifications the respondents who were aware of data investment for learning were 100% (6/6) certificate, 90.63% (58/64) had degrees, 72.09%(31/43) had diplomas and 100%(12/12)

A chi-square test was done to determine if there was an association between the level of awareness and the demographics, a p-value <0.05 was considered statistically significant. Findings show that there is an association between awareness of data investment for learning and gender (P-value 0.03), years of experience (P-value<0.001), level of service delivery (P-value <0.001), Professional cadre (P-value<0.001) and Education level (P-value 0.013) respectively.

Relational of knowledge and competence show health managers who were trained in DHIS, only 30.30% are able to check, run report and do analysis for the facility compared to 69.70% of health managers who were trained in DHIS yet they were not able to check, run report and do analysis for the facility.

Measuring practice among the health managers who were trained in data use for decision making and learning, only 36.47% were able to use facility report and data to generate evidence for learning compared to 63.53% of the health managers who were trained in data use for decision making and learning yet they reported to be unable to use facility report and data to generate evidence for learning.

Capacities for data use for learning:

The study levels of data use and learning among health managers and health facilities in Nairobi County shows 88.79% of the respondents have had data use forums to inform transformation in health service delivery in their facility. Only 35(28%) of the respondents can use facility report and data to generate evidence for learning. 116(92.8%) health facilities compile data on service delivery. In 75(60%) health facilities, there are forums where clients can share their feedback and complaints. 68% of the respondents have been trained on data use for decision making and learning and also 71.2% of the respondents have been trained in DHIS. 116(92.8%) health facilities benchmark their data use and learning with other service providers/points.

Data use for learning that transformed health in their facility. 12% of the health managers responded that data use/learning did not transform health in their facility. Infrastructure and supervisory support/Support supervision was ranked by the highest proportion (14.4%) of health managers followed secondly by training(13.6%) as the biggest data use/learning that transformed health in their facility. Identifying evidence for learning and using clients complains to improve service delivery were identified by the least portion (2.4%) of the health managers as the ways of data use/learning that transformed health in their facility.

Various factors influence investment in data use and learning among health managers and health facilities in Nairobi County. The factors include reward for good data investment and learning, whether investing in data will transform health in the county, feedback on submitted report, benchmarking data use and learning with other service providers/points, client feedback and how often data use for learning is done to discuss performance measurement.

All health managers think that investment in data will transform health in the County. In 46(36.8%) facilities, there is a reward for good data investment and learning and 92.8% of the facilities benchmark their data use and learning with other service providers/points. 50(40%) facilities/health managers have used clients feedback to transform health

Implementing partners supports data use and learning in facilities across all levels of service delivery. Implementing partners support data use and learning in 38(33.63%) County facilities, 33(29.21%) Sub county facilities, 3(2.65%) dispensaries and in 39(34.51%) health centers. Data use and learning in Health centers is supported by all 4 institutions. In 24(47%) of the health centers, data use for learning is supported by County government, in 6(12%) health centers data use for learning is supported by County government, in 6(12%) health centers data use for learning is supported by Central government and in 39(76%) health centers data use for learning is supported by Implementing partners. Central government only support health centers.

Contribution of the Sub county system was rated as poor by a high proportion (58.4%), 39.2% rated County system as fair while only 2.4% rated Sub county system as good. Peer review and in charge meetings are highly used by 99(79.2%) facilities use followed second in ranking by support supervision in 72(57.6%) facilities. Only 12(9.6%) facilities use mentorship, 15(12%) use documentation of case studies and abstract and 16(12.8%) use capacity building. Opportunities on for information sharing, data use and learnings which include Feedback and reporting is the most used method by the 67.8% facilities followed by data review meeting used in 59.2% facilities. Only 19.2% of facilities use supervision and mentorship.

Service curative was available in all 125 facilities. In 103(82.4%) facilities there was evidence of service delivery charter and in 97(77.6%) facilities there was evidence of documentation of register and report. Only in 6(4.8%) of the facilities was there evidence of client complaint and response mechanism in place, schedule for data use for learning and evidence of analyzed data and chart showing trends and cases. Evidence of client satisfaction and assessment and evaluation being done was in only 3(2.4%) facilities.

Barriers to data use for decision making:

Among the health managers who could not be able to check, run report and do analysis for their facility, the reason of the majority 25(40.3%) of them was because checking, running report and doing analysis was the responsibility of data managers and health record officers. 8(12.9%) had no reason why they were not able to check, run report and do analysis for their facility and for 13(21%), it was not a requirement for them to. 7(11.3%) health managers' reason was because they did not have user right and a computer, 3(4.8%) were lacked support and 6(9.7%) said that they worked at facility level whereas checking, running report and doing analysis for their facility was not done at the facility level but at the Sub County level.

Health managers ranked 18 issues seen as challenges in implementing sustainable data investments. 77.6% ranked lack of knowledge and skills on top of the list. Second was too much workload to handle 44.8%, less staff was ranked third by 29.6 of the health managers. .Poor quality of data and poor documentation was seen as a challenge by 14.4% of the health managers. The fact that data investment was only reserved for the manager was a challenge to 4.8% of the health managers. The issue with the fewest respondents was too many indicators and had 2.4% of the health managers.

Health managers ranked 13 issues. Most 58(46.4%) of the health managers indicated that Investing in staff training on data would increase adoption of data investment and learning followed by data review and quality improvement 15(12.9. 9(7.2%) indicated Investing in system strengthening and developing interest among staff, motivating and rewarding them, 8(6.4%) indicated increasing the number of staff, 6(4.8%) indicated Provision of safe working environment and involving in charges to take lead and 5(4%) indicated Funding, conducting need assessment and developing quality improvement. Involving service delivery level at health center and dispensary and Staff empowerment and target setting were the issues with the least 3(2.4%) respondents.

Conclusion Acknowledgement and Appendix:

The authors gratefully acknowledge support and supervision by Maseno University School of Public Health and Community Development, Nairobi County for authority and approvals.

V. CONCLUSION

The findings from this study have identified several actions that are needed to address the technical capacity for health managers in using data for decision making and also identified the constraints to data use and the strengthening of data used to make decision. The findings reveal that a majority of the health facility staff lack data analysis skills which are vital for decision making process. In general, it was clear that there is a big gap in data collectors and information user but it is showing great improvements. Health personnel across the spectrum are showing great interest and value of data use for making decisions. With increased capacity building in data demand and use of information for decision making there is high likelihood that data use will increase. A higher number of respondents also reported on barriers to data use this may have been as a result of leadership at the at the health facilities that promotes a culture of strengthening data. There is no evidence of performance-based resource allocation and no essay competitions and other rewards for best evidence-based decision making. There is also no practice-based training for health managers and health workers on data use for decision making process as such, staff competencies are very low as shown in this study.

VI. RECOMMENDATION

The research, has shown need to focus on improving staffs' technical skills to analyze and interpret data and to build capacity for using data and information to guide decision making. A first step to improving use of data for the health sector decision making is to sensitize staff working at all levels on their roles and the potential benefits to their health program. Support from policy makers, health administrators, program managers, and service providers is essential when building a culture of data and information use and learning, particularly because all of these stakeholders often make or influence decisions. In addition, respondents highly ranked "training health care providers in the importance of data collection, analysis, and use" and "encouraging evidence based decision making" as possible strategies to improving data use.

Conducting a comprehensive information technology needs assessment would further highlight data processing challenges and inform the development of practical solutions especially on workload and paper based documentation in registers and reporting tools

Providing training on data analysis, interpretation and presentation, particularly among middle and junior level staff, would address the expressed need for improved technical skills. Building lower level staffs' capacity to use computers in combination with improved data analysis and interpretation skills may further motivate interest in data use for decision making at management and service delivery levels.

The following recommendations have been derived from the study findings:

The need to eliminate paper-based data collection in the health facilities; to train and re-train staff on data analysis skills to produce information and using this information in decision making; to urgently address data use constraints such as staff shortage, inadequacy of staff, lack of delegation for managerial staff to make decisions and heavy workloads among data producers; to improve quality of data (i.e., accuracy, completeness, timeliness); to make efforts at the organizational level to improve motivation and culture of data use at all levels of the health system including data producers.

Improve skills in data interpretation, use of information and problem solving, and performance improvement tools (such as cause and effect analysis, flow chart, priority matrix, control chart etc.). Activities may include training of master trainers and conduct training of two staff per facility and all health area management team members.

Improve the feedback/supervision system, focusing on checking use of information and comparison among facilities on health services indicators. Activities may include preparing feedback guidelines for health area, develop a supervisory checklist for checking information use, and train all health managers on checklist and beneficiaries complain and feedback data use to transform health activities and outcomes.

Improve sharing the use of information and role modelling (promoting a culture of information use). Activities may include selecting existing channels of communication for sharing success stories on the use of information. Examples include providing a feedback report, sending directives, producing newsletters, etc. Create mechanisms to publish at least one story every month or every second month in official publications or other means.

REFERENCES

- [1] USAID/Ministry of Health, 2006, Rwanda Health Information System Assessment Report, RTI International, Rwanda.
- [2] WHO, 2008b, Assessing the National Health Information System: An Assessment Tool Version, 4, WHO, Geneva.
- [3] Ministry of Health (2012). Division of Reproductive Health service statistics data.
- [4] Lomas J. Improving research dissemination and uptake in the health sector: beyond the Sound of one hand clapping. Analysis Policy Commentary 1997; C97: 1–45
- [5] Ministry of Health (2006). National Health Sector Strategic Plan II: 2005-2010. Nairobi: Ministry of Health.
- [6] Ministry of Health (2010).Health Information System Policy.
- [7] Aqil, A., Lippeveled, T. & Dairiku, H., 2009, 'PRISM framework: A paradigm shift for designing, strengthening and evaluating routine health information systems', Health Policy and Planning 24(3), 217–228, viewed 08 December 2012, from <http://www.qub.ac.uk/cite2write/harvard31.html>
- [8] Sahay, S., 2001, 'Special issues on IT and health care in developing countries', Electronic Journal of Information Systems in Developing Countries 5(1), 1–6.
- [9] WHO, 2007, Assessment of Ethiopian National Health Information System, WHO, Geneva.
- [10] Futures Group, Building Leadership in Data Demand and Use in Rwanda [Accessed on 2013 Sept], 2013
- [11] Chaulagai CN, et al. Design and implementation of a health management information System in Malawi: issues, innovations and results. Health Policy Plan 2005; 20(6):375-384.
- [12] Land FF, Kennedy-McGreggor M. Effective use of internal information. London: London School of Economics and Political Science, Department of Information Systems, Working Paper Series. 2002; 119.

- [13] Odhiambo-Otieno O., WWO. Evaluation criteria for the district health management information systems: lessons from the Ministry of Health, Kenya. *Afr. Health Sci.* 2005; 5(1):59-64.
- [14] Galimoto MS. Integration of health information systems: a case study of Malawi. Master's Thesis. Oslo, Faculty of Mathematics and Natural Sciences, University of Oslo; 2007.
- [15] Ekirapa A., et al, Data Demand and Use in the Health Sector in Central and Eastern Kenya Measure Evaluation, 2008.
- [16] Ekirapa A., Mgomella G., and Kyobutungi C. (2012). Civil Society Organisations:
- [17] Capacity to address the needs of the urban poor in Nairobi. *Journal of Public Health Policy* doi:10.1057/jphp.2012.33.
- [18] Health Metrics Network. Assessing the national health information system: an assessment tool. Geneva: Health Metrics Network, World Health Organization; 2008.
- [19] World Health Organization. Framework and standards for country health information systems, 2nd edition. Geneva: World Health Organization; 2008.
- [20] WHO, (1998). District health systems: an overview report on the challenge of Implementation of district health service for primary health care. Geneva: World Health Organization.
- [21] WHO, (2007), Everybody's business: Strengthening health Systems to Improve Health Outcomes. Retrieved from <http://www.wpro.who.int/> on 23rd March 2012
- [22] WHO, (2008). Utilization of Health Information for Decision-Making: Report of the
- [23] Regional Consultation. Colombo, Sri Lanka: WHO
- [24] Simba, D. O., & Mwangi, M. a. (2009). Quality of a routine data collection system for health: Case of Kinondoni district in the Dar es Salaam region, Tanzania. *SA Journal of Information Management*, 7(2). doi:10.4102/sajim.v7i2.262
- [25] Price, R., & Shanks, G. (2008). CHAPTER 4 Data Quality and Decision Making Data
- [26] Quality and Decision-Making. In *International Handbooks on Information Systems*,
- [27] 2008. *Handbook on Decision Support Systems 1* (pp. 65–82).
- [28] Rychetnik, L., Hawe, P., Waters, E., Barratt, A., & Frommer, M. (2004). A glossary for evidence based public health. *Journal of Epidemiology and Community Health*, 58,538–545. doi:10.1136/jech.2003.011585
- [29] Measure Evaluation. (2007). Data Quality Assurance Tool for Program-Level Indicators. *Quality Assurance*, (January), 53.
- [30] Mitre. (2013). Information and Data Management. Tenth Biennial Report on Great Lakes Water Quality.
- [31] LaFond A, R Fields. The Prism: RHINO Workshop on Enhancing the Quality and Use of Routine Health Information at District Level, Cape Town. RHINO 2003. [Accessed on 2017 Sept 12] Available from: http://www.rhinonet.org/Docs/Resources/RHINO_Program/enhancing_the_quality_use_of_rhi_at_district_level.pdf.
- [32] Nutley T. (2012). Improving data use for decision making- An intervention to strengthen
- [33] Health systems, MEASURE Evaluation: https://www.cpc.unc.edu/MEASURE/publications/SR-1273/at_download/document [Accessed on 2017 Aug 12].
- [34] Jones, H. (2012). Promoting evidence-based decision-making in development agencies Background Note, (February). Retrieved from <http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinionfiles/7575.pdf>
- [35] Commar, C. A. A. (2008). Neglected Health Systems Research: Health Information Systems Alliance for Health Policy and Systems Research. October, (October).

- [36] AbouZahr, C., & Boerma, T. (2005). Health information systems: The foundations of public health. *Bulletin of the World Health Organization*. doi:/S0042-96862005000800010
- [37] Scannapieco, M., Missier, P., & Batini, C. (2005). Data quality at a glance. *Datenbank- Spektrum*, 14, 6–14. doi:10.1.1.106.8628
- [38] Tejay, G., Dhillon, G., & Chin, A. G. (2006). Data quality dimensions for information systems security: A theoretical exposition (Invited paper). *Security Management, Integrity, and Internal Control in Information Systems*, (1995), 21–39.
- [39] World Health Organisation. (2003). *A Guide for Developing Countries Improving Data Quality: Guide for Developing Countries* World Health Organization, 12.
- [40] Joan s. Ash, M. B. & E. C. (2004). Some Unintended Consequences of Information Technology in Health Care: The Nature of Patient Care Information System-related Errors. *J Am Med Inform Assoc.*, 11, 104–112. doi:10.1197/jamia.M1471.Medical
- [41] Karuri, J., Waiganjo, P., Orwa, D., & Many, A. (2014). DHIS2: The Tool to Improve Health Data Demand and Use in Kenya. *Journal of Health Informatics in developing Countries*, 8(1), 38–60.
- [42] KPMG. (2013). *Devolution of Healthcare Services in Kenya*, 0–23.
- [43] Fapohunda, B. (2012). *Using Health Facility Assessment Data to Address Programmatic Questions (Vol. 72)*. Chapel Hill, NC.
- [44] Kennerley, M., & Mason, S. (2008). *The Use of Information in Decision Making*. Business, 53.
- [45] Ledikwe, J. H., Grignon, J., Lebelonyane, R., Ludick, S., Matshediso, E., Sento, B. W., Semo, B. (2014). Improving the quality of health information: a qualitative assessment of data management and reporting systems in Botswana. *Health Research Policy and Systems / BioMed Central*, 12(1), 7. doi:10.1186/1478-4505-12-7
- [46] Loraine Blaxter & Hughes, Christina & Tight, Malcolm & ebrary, Inc (2010). *How to research (4thed)*. Maidenhead, England McGraw-Hill/Open University Press
- [47] Creswell, J. W. (2009). *Research design: Qualitative & quantitative approaches*. Thousand Oaks, CA: SAGE Publications.
- [48] Stufflebeam & Shinkfield (2007). *Evaluation Ethics for Best Practice: Cases and Commentaries* New York. Guilford Press.
- [49] Ed Abel, et al. *Data Demand and Information use in the health sector: Case study series [SR-08-44]*. Chapel Hill: Measure Evaluation, 2012.
- [50] Scott M., et al. *Data Use in the Indian Health Sector: Research Report [TR-010-76]*. Chapel Hill: Measure Evaluation, 2009.
- [51] Chawla, R., Bansal, A.K. & Indrayan, A., 1997, 'Informatics technology in health care', *National Med* 10(1), 31–50.
- [52] Nutt, P. C. (2008). Investigating the success of decision making processes. *Journal of Management Studies*, 45(2), 425–455. doi:10.1111/j.1467-6486.2007.00756.x
- [53] Polit, D. F., & Beck, C. T. (2004). *Nursing Research: Principles and Methods*. Nursing research principles and Methods.
- [54] Lawshe C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28, 563–575. doi:10.1111/j.1744-6570.1975.tb01393.x
- [55] Mugenda Olive M. *Research methods: quantitative and qualitative approaches*, Nairobi acts, 2003.
- [56] Robert K. Yin. (2003). *Case Study Research; Design and Methods (Vol. 5)*. London: SAGE.
- [57] Kenya 2009 Population and Housing Census Analytical Report on Projections of Special

- [58] Population Groups, 2010-2030, Kenya National Bureau of Statistics, Ministry of Planning, National Development and Vision 2030. 2012; Vol. XI
- [59] Traore, M., Bosso, A. E., Nutley, T., & Mullen, S. (2014). Moving data off the shelf and into action: an intervention to improve data-informed decision making in Cote d'Ivoire, 1, 1–10. Retrieved from <http://dx.doi.org/10.3402/gha.v7.25035>
- [60] Harrison, T. and T. N. (2008). A Review of Constraints to Using Data for Decision Making Recommendations to Inform the Design of Interventions.
- [61] Setzer, J. (2003). Second International Rhino Workshop on: Enhancing the Quality and Use of Routine Health Information at District Level. In Ensuring and Improving the Quality of Routine Health Information (p. 68).
- [62] Foreit K., et al., Data demand and information use in the health sector: A conceptual Framework [MS-06-16]. Chapel Hill, NC: MEASURE Evaluation, 2006.
- [63] Alwis, S. De, & Higgins, S. (2001). Information as a tool for management decision making: Case study of Singapore. Information Research, 7(1), 1–12. Retrieved from <http://arizona.openrepository.com/arizona/handle/10150/105593>
- [64] Ministry of Health (2006). National Health Sector Strategic Plan II: 2005-2010. Nairobi.
- [65] Braa, J., Hanseth, O., Heywood, A., Woinshet, M., & Shaw, V. (2007). Developing Health Information Systems in Developing Countries: the flexible Standards Strategy. Management Information Systems Quarterly, 31(August), 381–402.
- [66] Ministry of Health. (2010). Health Information System Policy 2010-2030.
- [67] Nutley, T., & Reynolds, H. W. (2013a). Improving the Use of Health Data for Health System Strengthening, 1, 1–10.
- [68] Nutley, T., & Reynolds, H. W. (2013b). Improving the use of health data for health system strengthening. Global Health Action, 6(1). doi:10.3402/gha.v6i0.20001