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Original Research Article

Utilization of health information data in Nairobi County public health facilities; lessons from the field

Duncan C. Njuguna*, Lillian Muiruri, Kezia Njoroge

Department of Health Systems Management, Kenya Methodist University, Nairobi, Kenya

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***Correspondence:**
Dr. Duncan C. Njuguna,
E-mail: dnjuguna10@gmail.com

ABSTRACT

Background: The vital use of data and information for successful policy-making, planning, monitoring of operations, and decision-making is essential to the administration of today's health systems. Vital health choices typically rely on political expediency, donor pressure, and rarely replicated countrywide studies that are insensitive to changes unfolding over shorter timescales because data utilization has been constrained and is inadequate.
Methods: A descriptive cross-sectional research study was conducted where quantitative technique was used for a minimum of 216 respondents. The results were presented in form of tables and charts.
Results: The results show that access to routine data (p=0.0001), having a working computer (p=0.023), having access to the internet (p=0.030), having a high level of education (p=0.025), the gender of the health worker (p=0.010), the cadre (p=0.001), participating in data discussion forums (p=0.013), receiving training on data use (p=0.036), collecting data (p=0.041), analysing data (p=0.032), and data management (p=0.007) were substantially correlated with the use of health information data.
Conclusions: The level of education, gender of the health worker, cadre, involvement in data discussion forums, training on data utilization, data collection, data analysis, data management, overall levels of competency, access to routine data, access to functional computer and access to internet significantly influenced the utilization of health information data.

Keywords: Data quality, Health information data, Individual factors, Organizational factor, Staff involvement, Utilization

INTRODUCTION

The health information system (HIS), according to the World Health Organization (WHO), is a system that combines data collection, analysis, processing, and application of knowledge and information to influence program intervention, research, and decision making. Health information is the cornerstone of the general basic components of health systems, which will improve and allow health professionals to make the same use of information for effective strategy, preparation, execution and tracking and assessment of health services.[1] The use of routine health information has the ability to promote the creation of metrics for public health services, such as decision-making, forecasting, implementation and control. In Africa, Sub-Saharan nations, for example, Kenya, Uganda, Botswana, Rwanda, Nigeria among others have seen developing public area commitment and interest in the part of the general population revenue driven area in wellbeing administration arrangements.[2] This is also comparable to most other countries, particularly those with low and moderate incomes. Many nations have a thriving and developing general health industry, which some see as a reaction to losses in the field. Healthcare professionals should deliver more accessible, economical, and customer-focused services.[3]

The global wellness plan inspired 1970s African attempts to improve medical treatment and remove barriers to uptake.[4] The Kenyan Ministry of Health (MoH) realized the need for health data systems in the mid-1970s. The HIS was made of a few information sources. Information gathered zeroed in on the Ministry of Health base camp requirements. The data produced was required to aid the definition of health arrangements, setting of needs, and assessment of medical care programs. The vital health statistic unit and the evaluation and research unit are the units that come from the health management information system (HMIS) in the HIS.[5]

Statement of the problem

In Kenya, 42% of wellness office chiefs break down and utilise information to affect the spending readiness cycle and scheduling of healthcare services, and 43% of information producers require information examination and comprehension skills.[6] The service contains a plethora of data, but only 37% of it is evaluated and used for dynamic purposes; as a consequence, the information is not translated into data and information to provide outcomes. One of the most suffering attributes of the data age is that we have zeroed in a lot on dominating exchange information and insufficient on transforming it into data and information that can prompt business results.[7,8] At Nairobi County, however local level directors consistently talk about data and utilize routine data in the district implementation plans (DIP), the utilization of data for operational plans and at hotspot for dynamic are restricted. An evaluation of the nation's status on data utilizes demonstrated that this territory was extremely frail particularly for information that is regularly gathered. Arranging was likewise not connected to wellbeing data and the allotment of assets did not depend on accessible proof. Checking and assessment of wellbeing programs and different intercessions should be founded on reports from the routine health management information system (HMIS). Nairobi County health facilities lack the necessary infrastructure, health products, and adequate personnel to manage and treat various medical conditions. In 2019 alone, the hospital had a workload of 348,116 new outpatients and 507,234 revisits. The admissions for the same period were 100,671 patients. The routine data that is generated is not used to detect drug stock-outs, disease trends, and allocation of resources to where there is a need. This leads to poor management of patients and inappropriate decisions that do not solve the patients' needs. Healthcare information lack importance unless it is used to inform decisions and the distribution of resources at all levels of healthcare. Thus, the need to study factors influencing utilization of health information data in Nairobi city county public health facilities.

Objective of the study

The aim of this study was to examine the factors influencing utilization of health information data in Nairobi city county Public Health Facilities, Kenya.

METHODS

The study was descriptive cross-sectional study adopting quantitative research approaches. The study was carried out in public health facilities in Nairobi County. The study population included departmental clinicians who have ordinary contact and give care to patients; these included nurses, midwives, medical officers, clinical officers, pharmacy staff, and laboratory technologists. There were approximately 396 health care staffs in selected health facilities. The formula below was employed to calculate the study sample:

$$n = \frac{NZ^2pq}{e^2(N-1)+Z^2pq}$$

$$n = \frac{396 * 1.96^2 * 0.5 * (1-0.5)}{0.05^2(396-1)+1.96^2 * 0.5(1-0.5)}$$

The calculated sample size was 196.

10% of 196 was added for lost, incomplete, non-response, or unexplained reasons questionnaires. Therefore, the study sample was 216. This research adopted multistage sampling techniques; purposive sampling was employed to select one Kenyan County with Nairobi County selected. The study was conducted within a period of two months. Started in April and completed in end of May 2022. Analysis utilized SPSS v25. Descriptive statistics-frequencies, means, and standard deviation- summarized the data. Correlation study was used to test the connection among study factors. A confidence level of 95% was utilized.

RESULTS

The study achieved a response rate of 100% which was considered excellent for analysis and reporting.[16]

Utilization of health information data

The percentage use of the routine health information data generated for decision making was determined in each hospital and presented an overall data use. Less than two-third of respondents 141 (65.3%) sometimes used routine data for decision making. Additionally, 43 (19.9%) and 32 (14.8%) rarely and always use the routine data/health information generated for decision making. The findings support research from South Africa that found that 65% of HMIS information was used on average.[9] The performance of routine information system management (PRISM) framework was used in a study from Cote D'Ivoire, and the results revealed that 38% of healthcare institutions utilized health information overall.[10]

Routine data use for decision making

The average of all eight dimensions, which comes to 73.6%, was used to determine the total routine data consumption index. This is consistent with a study in

Kenya that most of healthcare workers utilize routine data for planning and epidemiology.[11] The study results showed that, age, duration at the facility and working experience of the health worker were not significantly related to use of routine data for decision making. Age (χ^2=6.761; df 4; p=0.149), duration at the facility (χ^2=10.684; df 2; p=0.099) and working experience (Fischer exact test, p=0.763) had no statistical relationship to use of routine data for decision making, p>0.05, thus does not influence utilization of routine data. Health information officer 88 (40.7%), nursing/midwife 72 (33.3%), support staff 45 (20.8%), clinical officers 4 (1.9%) and medical officers 7 (3.2%) filled the monthly reports/data in the selected facilities. The outcomes concur with a Kenyan study in three metropolitan antenatal facilities which found that most of health data are mostly responsibility of health record officers.[11] This has been with the case of information communication and technology (ICT) upheld offices, just as the office utilizing manual structures. The average of all eight dimensions, which comes to 73.6%, was used to determine the total routine data consumption index. The analysis found that a variety of factors, including specialized, individual, and hierarchical views, limited the information's quality.

Influence of data quality in the utilization of health information data

Over than half (61.6%) and (56.0%) respectively disputed that they had come across erroneous data when making judgments and that such data had prevented them from routinely using data to make decisions (Table 1).

Table 1: Data accuracy.

Data accuracy		Frequency	Percent
Encountered erroneous data	Strongly disagree	13	6.0
	Disagree	120	55.6
	Neutral	10	4.6
	Agree	73	33.8
	Strongly agree	0	0.0
Inaccurate data prevents data-driven decision-making.	Strongly disagree	13	6.0
	Disagree	108	50.0
	Neutral	17	7.9
	Agree	78	36.1
	Strongly agree	0	0.0
Fix data accuracy concerns before using.	Strongly disagree	0	0.0
	Disagree	58	26.9
	Neutral	18	8.3
	Agree	136	63.0
	Strongly agree	4	1.9
Used non-health data to make decisions.	Strongly disagree	7	3.2
	Disagree	47	21.8
	Neutral	20	9.3
	Agree	142	65.7
	Strongly agree	0	0.0

Data completeness

According to the study's findings, the majority (93.1%) agreed that the data presented contains all the required data set reports, and the majority (93.5%), 84.3%, 64.4%, and 53.2% agreed that the data sufficiently captures the department's work and is sufficient for our needs, respectively. The majority (93.5%) also agreed that routine healthcare data is irrelevant for my current data analysis and aggregation needs (Table 2).

Table 2: Data completeness.

Data Completeness		Frequency	Percent
All the needed datasets are reported	Strongly disagree	0	0.0
	Disagree	3	1.4
	Neutral	12	5.6
	Agree	188	87.0
	Strongly agree	13	6.0
We have reported enough data for our needs	Strongly disagree	0	0.0
	Disagree	25	11.6
	Neutral	9	4.2
	Agree	176	81.5
	Strongly agree	6	2.8
Data reported describes in summary all the department work	Strongly disagree	0	0.0
	Disagree	7	3.2
	Neutral	7	3.2
	Agree	192	88.9
	Strongly agree	10	4.6
I don't require routine health data in my current data analysis	Strongly disagree	12	5.6
	Disagree	42	19.4
	Neutral	23	10.6
	Agree	139	64.4
	Strongly agree	0	0.0
Aggregating contradictory data adds nothing	Strongly disagree	13	6.0
	Disagree	73	33.8
	Neutral	15	6.9
	Agree	115	53.2
	Strongly agree	0	0.0

Data timeliness

Respondents' views on the facility's on-time reporting: agreed 170 (78.7%), disagreed 22 (10.2%), neutral 24 (11.1%). Regarding the claim that we always consider the most recent data when making judgments, there were the following responses: disagree 21 (9.7%), neutral 22 (10.2%), and agree 173 (80.1%). The responses were as follows in regards to the claim that data is always used for decision-making: disagree 15 (7.0%), neutral 27 (12.5%), and agree 174 (80.6%) (Table 3).

Table 3: Data timeliness.

Data timeliness		Frequency	Percent
Facility reports are always timely	Strongly disagree	4	1.9
	Disagree	18	8.3
	Neutral	24	11.1
	Agree	120	55.6
	Strongly agree	50	23.1
Corrective measures are always done promptly	Strongly disagree	5	2.3
	Disagree	25	11.6
	Neutral	18	8.3
	Agree	133	61.6
	Strongly agree	35	16.2
We utilize current data for decision-making	Strongly disagree	5	2.3
	Disagree	16	7.4
	Neutral	22	10.2
	Agree	124	57.4
	Strongly agree	49	22.7
Decision-making data is always available on time	Strongly disagree	3	1.4
	Disagree	12	5.6
	Neutral	27	12.5
	Agree	125	57.9
	Strongly agree	49	22.7

Staff involvement influences the utilization of health information data

Results showed that 87 (62.1%) respondents sometimes attended facility data discussion groups, while 28 (20.0%) engaged frequently. Additionally, involvement in data discussion forums (χ^2=8.660; df 2; p=0.013) was significantly associate with utilization of health information data for service delivery. This is similar to a Kenyan study that indicated lack of enough computers and training on data use among health managers as main challenges in Kenyan health facilities.[11]

Individual factors influencing the use of health information data

The extent of continuous professional training in aspects of routine data use, that is, HMIS, survey, data utilization, data analysis, planning and computer software. The findings revealed that 156 (72.2%), 154 (71.3%), 152 (70.4%) and 155 (71.8%) of healthcare workers had training on data collection, data analysis, data management and data utilization respectively. The results indicate statistically significant association between extent of training on data utilization (χ^2=6.627, df 2, p=0.036), data collection (χ^2=6.411, df 2, p=0.041), data analysis (χ^2=6.864, df 2, p=0.032), and data management (χ^2=9.886, df 2, p=0.007) with utilization of health information data among the health workers participated in the study. The findings are consistent with those of a previous study, which found that the most frequently reported limitations were poor analytical and data use skills, with a significant portion of respondents expressing a need for additional training on data quality assurance, analysis, and use (Table 4).[14]

Table 4: Continuous professional training.

Variables		Use data: Rarely (%)	Use data: Sometimes (%)	Use data: Always (%)	Significance
HMIS	Yes	19 (14.8)	83 (64.8)	26 (20.3)	χ^2=10.466 df 2 p=0.005
	No	24 (27.3)	58 (65.9)	6 (6.8)	
Data collection	Yes	29 (18.6)	98 (62.8)	29 (18.6)	χ^2=6.411 df 2 p=0.041
	No	14 (23.3)	43 (71.7)	3 (5.0)	
Data analysis	Yes	29 (18.8)	96 (62.3)	29 (18.8)	χ^2=6.864 df 2 p=0.032
	No	14 (22.6)	45 (72.6)	3 (4.8)	
Data utilization	Yes	29 (18.7)	97 (62.6)	29 (18.7)	χ^2=6.627 df 2 p=0.036
	No	14 (23.0)	44 (72.1)	3 (4.9)	
Data management	Yes	28 (18.4)	94 (61.8)	30 (19.7)	χ^2=9.886 df 2 p=0.007
	No	15 (23.4)	47 (73.4)	2 (3.1)	
HMIS software's	Yes	17 (14.5)	72 (61.5)	28 (23.9)	χ^2=18.577 df 2 p=0.0001
	No	26 (26.3)	69 (69.7)	4 (4.0)	
Data presentation	Yes	12 (12.6)	56 (58.9)	27 (28.4)	χ^2=26.743 df 2 p=0.0001
	No	31 (25.6)	85 (70.2)	5 (4.1)	

Competence in routine data/information management tasks

On overall level of competence in routine health information data management tasks, 98 (45.4%) rated to be moderate, 23 (10.6%) low and 4 (1.9%) very high. Additionally, 55 (25.5%) said it's not easy to access routine data/information whenever needed. Further analysis results there is a statistical significance between overall levels of competency (p=0.0001) and access to routine data (p=0.001) with the utilization of health information data for service delivery. According to studies conducted in Kenya, Zambia, and India, a well-designed HMIS does not necessarily convert into quality data and effective use of the information created. Instead, ongoing capacity building is crucial.[1] Most of the respondents (42.1%) had moderate knowledge of information technology with 13.9% and 11.6% had basic and advance knowledge respectively. Data consumers frequently struggle with a limited capacity to comprehend, analyse, and interpret them in the context of programs. The competence or ability to perform a task is an important promoter to information use. When asked to describe their ability, 44.4% rated themselves to be having good ability to undertake HMIS tasks for instance, calculating percentages, plot graphs, explain finding and their implications use information to identify gaps and set targets. Data quality affects demand and information use in all level of health care delivery. The healthcare workers were of diverse discipline and this influence their perception on data quality dimensions. The data quality characteristics were poor/fair especially in terms of accuracy (51.2%), and completeness (52.2%). Among the health workers who participated in the study 97 (44.9%) and 97 (44.9%) reported to have access to computer and internet respectively. Chi-square analysis results that indicate statistically significant association between access to functional computer (χ^2=9.913; df 2; p=0.023) and access to internet (χ^2=7.046; df 2; p=0.030) with utilization of health information data. Routine data use is determined by access to functional resources.[15]

Level of support data/information management

Those in charge of data/information management concerns provided only little assistance to 137 (63.4%) whereas 75 (34.7%) and 4 (1.9%) received great or very strong support. In Uganda, Scientific Symposium Report (2020) found that organizational variables including information culture and quality oversight were insufficient. Some respondents expressed lack of departmental meetings as feedback to discuss and review management matter. The finding corresponds to previous study that lack of regular systems to support M and E activities to local level health workers for instance not holding meetings negatively affected the perceived importance of routine health information use.[16] Decisions were based on health needs (43.5%), cost (39.8%), personal liking (38.9%) and superiors' directives (38.0%).

Correlation of health information data

There was a statistically significant relationship between data quality with Individual factors; staff involvement; organization factors, as indicated by correlation coefficients of (r=0.310), (r=0.308), and (r=0.294), respectively. This indicates that for the utilization of health information data, the data quality should incorporate all the sectors in the health facility from individual factors, involvement in training, data collection, data analysis, and data presentation as well as organization factors. Analysis have also revealed that there was a significant positive relationship between individual factors with staff involvement (r=-0.399, p value =0.048) and organization factors (r=-0.214, p value =0.033). Further, there was strong significant association between staff involvement and organization factors, indicated by correlation coefficients of (r=-0.485, p value =0.003) (Table 5).

Table 5: Correlation of utilization of health information data.

		Data quality	Staff attitude	Staff involvement	Organization factors
Data quality	r	1	0.310**	0.308*	0.294**
	Sig. (2-tailed)		0.002	0.039	0.003
	N	216	216	216	216
Staff attitude	r	0.310**	1	0.399*	0.214*
	Sig. (2-tailed)	0.002		0.048	0.033
	N	216	216	216	216
Staff involvement	r	0.308*	0.399*	1	0.485
	Sig. (2-tailed)	0.039	0.048		0.003
	N	216	216	216	216
Organization factors	r	0.294**	0.214*	0.485*	1
	Sig. (2-tailed)	0.003	0.033	0.003	
	N	216	216	216	216

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

Furthermore, 64.8% and 65.7% agreed that they had used/relied on other sources of data rather than regular health data to make judgments, and they had taken remedial action to resolve data accuracy concerns before usage. The results imply that the healthcare providers were dependent on the available health data and therefore the accuracy and quality of the data in paramount in decision making process. Similar findings were found in a research on information systems and data quality at three metropolitan Kenyan ante natal clinics, which found that all of the analysed reports had a restricted degree of accuracy and completeness.[12] The study found that 43 (19.9%) and 32 (14.8%) rarely and always use the routine data/health information generated for decision making. Implying the HMIS data is a key component in the decision-making process. The findings support a research from South Africa that found that 65% of HMIS information was used on average.[9] The performance of routine information system management (PRISM) framework was used in a study from Cote D'Ivoire, and the results revealed that 38% of healthcare institutions utilized health information overall.[10] Health information officer 88 (40.7%), nursing/midwife 72 (33.3%), support staff 45 (20.8%), clinical officers 4 (1.9%) and medical officers 7 (3.2%) filled the monthly reports/data in the selected facilities. This implies the importance of reports in the medical field. The outcomes concur with a Kenyan study in three metropolitan antenatal facilities which found that most of health data are mostly responsibility of health record officers.[11] Furthermore, 64.8% and 65.7% held that they had used/relied on other sources of data rather than regular health data to make judgments, and they had taken remedial action to resolve data accuracy concerns before usage. This implies that medical decisions greatly depend on the quality of the data realised from the past and current cases. Similar findings were found in a research on information systems and data quality at three metropolitan Kenyan ante natal clinics, which found that all of the analysed reports had a restricted degree of accuracy and completeness.[12] Additionally, involvement in data discussion forums (χ^2=8.660; df 2; p=0.013) was significantly associate with utilization of health information data for service delivery. This implies that sharing and providing personal views through discussion was key in making medical conclusions and decisions. This was similar to a Kenyan study that indicated lack of enough computers and training on data use among health managers as main challenges in Kenyan health facilities.[11] The results indicate statistically significant association between extent of training on data utilization (χ^2=6.627, df 2, p=0.036), data collection (χ^2=6.411, df 2, p=0.041), data analysis (χ^2=6.864, df 2, p=0.032), and data management (χ^2=9.886, df 2, p=0.007) with utilization of health information data among the health workers participated in the study. The findings imply that a collection various factors influence the utilization of health information data. The findings are consistent with those of a previous study, which found that the most frequently reported limitations were poor analytical and data use skills, with a significant portion of respondents expressing a need for additional training on data quality assurance, analysis, and use.[14]

There are few limitations of the study. The researcher predicted that participants could purposely provide erroneous data or perhaps even conceal information, given the sensitive nature of the data solicited. The researcher reassured respondents that the information they provided were kept confidential. The researcher advised respondents that the questionnaires they received were unmarked and didn't require them to supply any information that might be used to identify them, such as phone numbers, names, or email addresses. Further, the researcher informed the respondents that the questionnaires will be completely destroyed after the information provided by the respondents are obtained. The researcher ensured that the language used in the questionnaires were of kind and comfortable for the reader. For instance, the introduction was worded to make the respondent at ease and create readiness to respond to the questions.

CONCLUSION

The study concluded that healthcare workers utilized health information data for service improvement with majority using it for formulation of planning, identification of emerging epidemics and medical supply & drug management. The research found that inadequate data quality caused respondents and all health professionals to have negative judgments and attitudes. The study comes to the conclusion that the main challenges faced by healthcare workers when using data are that performance indicators have new additions but no deletions, technical skills: poorly trained in data, lack of knowledge of the benefits of data use, time: reporting takes a lot of time, and indicators are output-oriented. The study conclude that staff received minimal training at all in information areas like data analysis, data utilization, and HMIS software. Lastly, it was determined that a lack of access to working technology, such as computers and the internet, put the use of routine health information at risk. Most of staff had low support from in-charge on matters pertaining to data/information management of which most had low level of support respectively. Even though they were holding departmental meetings to share performance on key indicators, the meetings were irregular.

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