

Assessing the influence of process interventions of community health volunteers on use of community based health management information systems in selected counties, Kenya.

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DOI: 10.29322/IJSRP.8.8.2018.p8003

<http://dx.doi.org/10.29322/IJSRP.8.8.2018.p8003>

Abstract - The World Health Organization (WHO) identified information as one of the six key pillars of an effective health system. In this context, the need to strengthen community health information has been felt globally. African countries have faced the greatest challenges in collecting, analyzing, evaluating and interpreting indicator data to guide evidence based policy-making. The generation of health information starts at the community level through the Community-Based health information system (CbHMIS) (Kaburu, Kaburi, & Okero, 2016). At the community level, this source of information is complete in coverage and in planning and action-oriented (Odhiambo-Otieno, 2005). High health threats characterized by low levels of life expectancy, deteriorating healthcare facilities, high disease incidences, high levels of infant mortality (73/1000) and maternal mortality (488/100,000) specifically on communicable diseases are currently facing Kenya (Flora, Margaret, & Dan, 2017). The importance of effective information use is still a key impediment to these problems, hence affecting greatly the health care service delivery at all levels, and the worst level in its information use is level 1 – the community. In Kenya, According to a situation analysis on the state of Community Health Services in year 2014, the functionality of CbHIS was said to be at 64% which came down considerably to 55% in year 2015 documented by USAID, and that access to quality data was not guaranteed through the current CbHMIS. Some known and assumed barriers include: lack of proper processes, lack of physical access, lack of awareness of what is available; lack of relevance of available information (i.e. not meeting peoples' needs in terms of scope, style or format); lack of time and incentives to access information; and lack of interpretation skills (Flora *et al.*, 2017). Processes forms an integral part of performance (Aqil *et al.*, 2009). In Kenya, the Kenyan Health Information System has had several weaknesses which include weak linkages, data sharing, inadequate feedback, and lack of an operational CBHMIS manual, among others. The purpose of the study was to assess the influence of process interventions of the CHVs on CBHIS use in Kiambu, Kajiado

and Nairobi Counties, Kenya. The study objectives were to 1. examine the influence community units assessments on CbHMIS use; 2. Assess the influence of feedback on CbHMIS use; 3. Assess dialogue and action days influence on CbHMIS use; 4. Determine the influence of reporting channels on CbHMIS use. A cross-sectional analytical study design was adopted, utilizing both quantitative and qualitative approaches. The target population was 156 active CUs from the 3 counties, from whence a total sample of 122 CUs was derived. Multistage sampling was used to identify the CUs, and systematic random sampling to identify 366 respondents. One Focus Group Discussion with the members of the community health committees and two Key Informant Interviews (KIIs) were conducted in each of the three counties. The respondents in the KIIs were County Community Strategy Coordinators and Sub-county Community Strategy Officers. Quantitative data was analyzed using SPSS to generate univariate and bivariate analysis at $p < 0.05$ significance level and results were presented in form of graphs, frequency tables, figures, and narration. Qualitative data was analyzed using content analysis based on key themes generated from the objectives. Majority were Females 72.4% $n=265$; majority attained secondary level education 42.6% ($n=156$); Non-formal occupation stood at 84.7% ($n=310$); Use of CBHMIS stood at 56.6% ($n=207$). Process interventions, 36% of the respondents agreed that the Sub-county team and CU leadership are quick to act on the feedback of our MIS reports. Process interventions (X_4) explains 67.4% of total variation in CbHMIS use. ($R^2 = .674$). Attention should be given to reporting channels by ensuring that CUs are technologically enabled to be reporting in a timely manner. The study recommends that CUs should be provided with enabling technology and further capacity development in technical, computer and electronic reporting skills.

Index Terms: Process interventions; Community Health Volunteers; Community based Health Management Information Systems; Use

INTRODUCTION

Process Interventions

Information is any entity or form that resolves uncertainty or provides the answer to a question of some kind. It is thus related to data and knowledge, as data represents values attributed to parameters, and knowledge signifies understanding of real things or abstract concepts. Information is not an end in itself, but a means to better decision making in policy design, health planning, management, monitoring and evaluation of health programs and services including patient care (Jeremie *et al.*, 2014a). Decision makers in many developing countries lack the required data needed for evidence-based health care management. One reason for this is that the routine national health management information systems (HMIS) do not extend to the 'last mile', the communities and the informal setting of villages, where a significant proportion of health events occur (Asangansi, 2012). A Community based health Information System (CBHIS) is a type of health information system that is based in the rural community and informal settlements of urban areas. The development of comprehensive community based health information systems is increasingly becoming important for measuring and improving the quality of health services. In Sub Saharan Africa (SSA), there is recognition of the importance of Health Information Systems (HIS) in the generation of reliable data and information. Little change is evident in the use of data to improve health care despite an increase data production at the community level. Many developing countries including Kenya have made efforts to strengthen their national health information systems to provide information for decision-making in managing health care services (Jeremie *et al.*, 2014a). Processes form an integral part of performance (Aqil *et al.*, 2009). Performance of Routine Information System Management (PRISM) framework was developed to improve routine health information systems (RHIS) and data use (Aqil *et al.*, 2009). The framework is innovative in that it puts emphasis on RHIS performance and the three interrelated determinants of that performance: technical, behavioral, and organizational determinants. Process intervention components in this study was evaluated using the following indicators : Assessments; feedback; dialogue and action days; and reporting channels.

Assessments: Cheburet and Odhiambo-Otieno, (2016a) has found out that assessments promotes strategies for increasing the use of data in decision making that are generated from evaluation research. According to several researches the frequency of supportive supervision to health facilities on the other hand assisted in provision of feedback and cross checked the data quality and helped them make informed decision to avoid future errors (Mate, Bennett, Mphatswe, Barker, & Rollins, 2009) . However, Odhiambo-Otieno (2005) in his assessment stated that the objective of data collection by CHVs was to improve their own work, management and output but such an arrangement, would enable the community address some of its health-related problems with its own resources for example, construction of latrines and other health-related problems required assistance from the health system for example, immunization of infants (Mate *et al.*, 2009).

Feedback: The role of feedback in ensuring good and high quality information in supporting the delivery of better healthcare is well documented (Kihuba, et al., 2014). While this invariably includes better data collection, the adoption of better data collection systems at the primary healthcare level is not always synonymous with the generation of information that can help in supporting decisions at the primary healthcare level. This situation was observed in Uganda, where the strengthening of data collection systems did not result in better utilization of the information at the primary healthcare level since all the efforts were directed towards better data collection, and none to analysis (Kihuba, et al., 2014). A caution regarding the of health information systems is that the information must be made relevant to the clinician as he answers to the needs of patients and should not just be relevant to epidemiology and other high level consumers of the information (Wright, O'Mahony, & Cilliers, 2017). This position is shared by who adapt it not just to the clinician, but also to the community. They indicate that the community should be able to access and use health data collected locally to make decisions regarding community health (Maden, Sahay, & Sudan, 2007). These views indicate that the consumers of information generated via community based health information systems are varied and can span both the providers and consumers of healthcare, individually and in concert. This position, when presented from the information needs view would then indicate that various players within the health information system will have different information needs (WHO, 2008). The decision making power available from health systems is indeed a useful and practical way of getting value from existing health systems.

Dialogue and Action days: Dialogue and action days refer to scheduled events that bring together the CHVs through community units and other community members including other players at level one together, and where health information is passed discussed and passed on. One of the benefits of community dialogue and action days is that they support the dissemination of key health indicators at community level (Jeremie *et al.*, 2014a). Community dialogues are planned and done in a quarterly basis while the the action days are conducted monthly to respond to issues outlined as priority health issues in the community. Dissemination of health information is one of the benefits that should accrue from the implementation of the CbHMIS since the system should deliver higher quality information compared where it is lacking. In addition, the dialogue and action days play a major role in influencing the habits of health consumers in regards to their access to health services (Jeremie *et al.*, 2014a). This can be attributed to the power of information to affect behavior, and in this case, the information is local and has an immediate local appeal.

Reporting Channels: Processes form an integral part of performance (Aqil *et al.*, 2009). Performance of Routine Information System Management (PRISM) framework was developed to improve routine health information systems (RHIS) and data use (Aqil *et al.*, 2009). The framework is innovative in

that it puts emphasis on RHIS performance and the three interrelated determinants of that performance: technical, behavioral, and organizational determinants. The data collection processes, systems, and methods, the behaviors of data users and how data are used for problem solving and program improvement, organizational structure and processes of the organizations that use the resulting information determine the performance of any system. The PRISM emphasizes that specific technical, behavioral, and organizational activities need to be implemented to improve demand for, analysis, review, and use of routine health data in decision making (Aqil *et al.*, 2009). Majority of the staffs feel that analysis and direct utilization of health data/information were left for higher levels and their duty were only collecting and passing the data to the next levels

METHODOLOGY

The study adopted a cross-sectional analytical design, employing both quantitative and qualitative approaches. Kiambu, Kajiado and Nairobi counties formed the study location where a target population of 156 active Community Units (CU) was considered to arrive at a total sample of 122 CUs was derived using Mugenda formula of populations below 10,000 (Sample = $nf = n/(1+n/N)$). Multistage sampling was used to identify the CUs, and systematic random sampling to identify 366 respondents. Quantitative data tools were semi-structured closed ended questionnaires; qualitative data tools included observation checklist, Focus Group Discussion (FGD) and Key Informant Interviews (KIIs) guides. Three

RESULTS:

Process interventions indicators

The findings indicate that, on assessments, the respondents disagreed with the statement on the sub-county team assesses and ensures the management information system is working well (composite mean score, 2.98); that we have a technical support team who ensure the systems are working well (composite mean score, 3.17); and that our volunteers are ready to learn from past experiences and improve on the services that we offer (composite mean score, 4.08). On feedback, the respondents disagreed: Sub-county team and CU leadership are quick to act on the feedback of our MIS reports

(Abajebel *et al.*, 2011). According to Abajebel *et al.*, 2011, the organization and support supervision was an important component that was not taken seriously. Two out of five of the CHVs were able to be visited once. The level of efforts required for reinforcing report submission from the CHVs for collection and analysis was beyond the CHEWs capacities. This compromises the quality of data submitted by CHEWs since they have additional roles. This was also supported by Odhiambo-Otieno (2005) in his study that supervision empowered the community by ensuring that information was regularly fed back to the community and that community members were trained to interpret data through the spot-checks.

FGDs with the members of the community health committees (one from each county) and Six KII were conducted (two from each County; Community Strategy Coordinators and Sub-county Community Strategy Officers were the KIIs). Quantitative data was analyzed using SPSS to generate univariate and bivariate analysis at $p < 0.05$ significance level; Qualitative data was analyzed using content analysis based on key themes generated from the objectives. Results were presented in form of graphs, tables, figures, and narration

(composite mean score, 3.12), however, they agreed that we disseminate information in a way that it is understandable to our community (4.10). On Dialogues and Action meetings: the respondents strongly agreed with the statement that our community unit always holds review meetings monthly (composite mean score, 4.14). On reporting channels: respondents agreed with the statement that our community unit has a strategic plan in place that guides our activities (composite mean score, 3.52) as shown in table 1 below.

Table 1: Process Interventions indicators

Indicator	Construct	N	Mean	Std. Deviation
Assesments	The sub-county team assesses and ensures the management information system is working well	365	2.98	1.31971
Assesments	We have a technical support team who ensure the systems are working well	363	3.17	1.16352
Assesments	Our volunteers are ready to learn from past experiences and improve on the services that we offer	362	4.08	0.94322
Feedback	Sub-county team and CU leadership are quick to act on the feedback of our MIS reports	363	3.12	1.36594
Feedback	We disseminate information in a way that it is understandable to our community	364	4.10	0.76569

Dialogues and action	Our community unit always holds review meetings monthly	361	4.14	1.06952
Reporting channels	Our community unit has a strategic plan in place that guides our activities	359	3.52	1.06696

Quick Feedback on the MIS Reports

36% of the respondents said that the Sub-county team and CU leadership are quick to act on the feedback of our MIS reports while 17% of them disagreed as in figure 1.

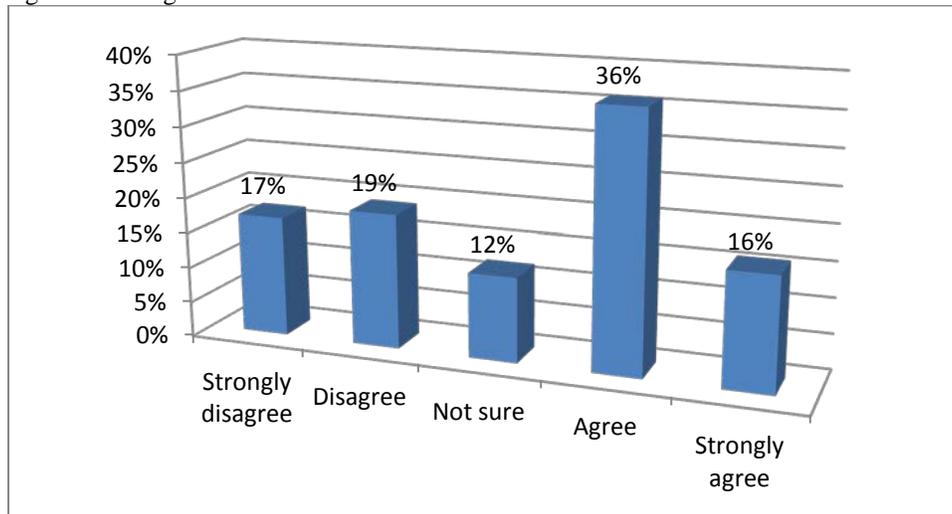


Figure 1: Sub-county team and CU leadership are quick to act on the feedback of our MIS reports

Assessments of Community Units

On assessments, 33% agreed to having a technical support team who ensure the systems are working well while only 8% strongly disagreed. This information is presented in figure 2.

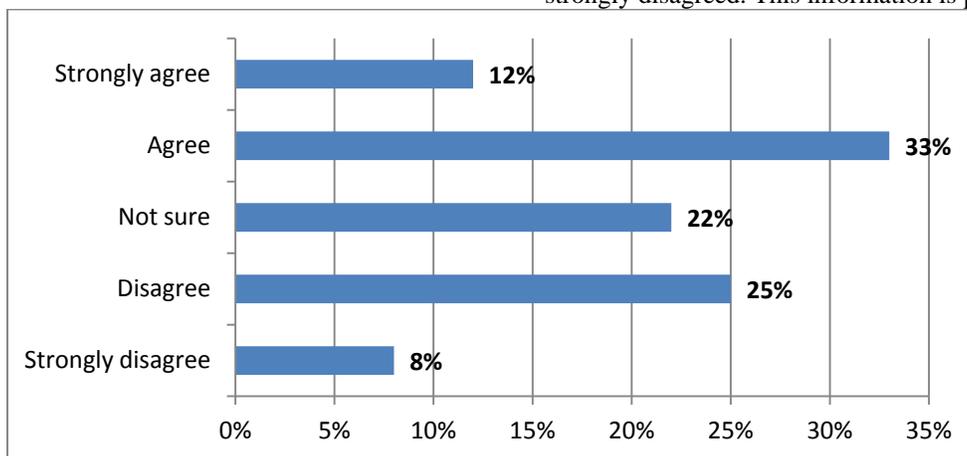


Figure 2: We have a technical support team who ensure the systems are working well

Relationship between process interventions and CbHMIS use:

The Bivariate correlations in Table 2: indicated that there is a positive and significant influence of process interventions of Community Units on the use of CbHMIS in Kenya across all parameters measured. However, reporting channels had the

weakest relationship with use of CbHMIS ($r = .252^{**}$, $P = .001$). This implies that attention to reporting channels will increase the use of CbHMIS by Community Units (CU). Similarly, CbHMIS improves significantly when the community units have implemented certain process interventions.

Table 2: Relationship between process interventions and CbHMIS use

S#	Indicator	CbHMIS Use	P Value	n
1	Assessments	.369**	.000	366
2	Feedback	.697**	.000	366
3	Dialogue	.372**	.000	366
4	Reporting Channels	.252**	.000	366
5	Process-interventions Composite	.660**	.000	366

Process Interventions predictor of CbHMIS use: Regression

Significant parameters at Pearson correlation level were subjected to stepwise linear regression analysis and two were predictive (feedback and reporting channels) to use of CbHMIS, as shown in table 3. These findings were subjected to further analysis where a univariate linear regression model $Y = \beta_0 + \beta_4 X_4 + \epsilon$ was used to determine the influence of organizational factors on use of CbHMIS by CUs. Results in Table 3 shows that the model is valid ($F_{(1, 363)} = 106.619$, $P = .001$) hence the explanatory variable (X_4 , Process interventions) is good in explaining total variations in Use of CbHMIS by community units..

The study further showed that the process interventions of community units (X_4) explains 67.4% of the total variation in the use of information by community units in CbHMIS ($R^2 = .674$). The value of the constant in the Table 3 shows that the process interventions of community units will always exist at a certain minimum ($\beta_0 = 2.255$, $P < .001$). The process interventions of community units were found to influence the use of CbHMIS positively and significantly ($\beta_1 = .367$, $P < .001$). This confirms the findings of the bivariate correlations which indicated that when the process intervention factors of the community units are well implemented, the use of CbHMIS will improve.

Table 3: Model summary on process interventions - Regression

Model summary					
R	R square	Adj. R square	Std. Error of the Estimate (SEE)		
.821 ^c	.674	.671	.33568		
Full regression model					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	84.202	3	28.067	249.081	.000 ^d
Residual	40.791	362	.113		

Model	Unstandardized Coefficients		Standardized coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	1.098	.103		10.666	.000
Feedback	.261	.022	.428	11.613	.000
process interventions composite	.620	.051	.663	12.214	.000
Reporting channels	-.136	.027	-.246	-4.990	.000
Assessments			.028 ^d	.586	.558
Community Dialogues and Action days			-.034 ^d	-.586	.558

*p<0.05

DISCUSSION

The study findings indicate that process intervention factors for community units have a positive and significant influence on the use of CbHMIS by community units in Kenya. This means that the more the community units implement different interventions the more they improve the use of CbHMIS.

It is evident that majority of the respondents (CHVs) in the community units in Kenya always hold review meetings (Dialogues and Action days). However, this study established that the review meetings are conducted quarterly as opposed to monthly as stipulated in the community strategy manual. These findings contradict a study by Pepela and Odhiambo where they found out that community units provided feedback through monthly review meetings (Pepela & Odhiambo-Otieno, 2016). In an FGD, the Community units cited that they are not able to hold monthly meetings due to logistical issues, however, they also noted that data is analyzed by the community health assistant but they are only able to make sense of it and hold action days quarterly.

The results showed that community units' feedback system is good in that the community units disseminate information to the community through ways that the communities are able to understand. However, feedback it was also established that the Sub-County teams and the community units leadership are not very quick to act on the feedback that they receive from the MIS reports. These findings concur with Aqil *et al.*, that Feedback is an important process for identifying problems for resolution, for regulating and improving performance at individual and system levels, and for identifying opportunities for learning (Aqil *et al.*, 2009). However, feedback remains a weak process of CBHIS in many developing countries.

The results showed strong a self-assessment nature by the community units on their activities including their CbHMIS however, It also noted that there are weak vertical assessments from the sub-county teams in that they also lack a team from

the sub-county to assess their data and information needs. They also stated data tools stock outs and some of the tools are completely unavailable (MOH 517-Referral form) especially in Kajiado and Kiambu Counties. These results concur with a study by Pepela and Odhiambo that the process was majorly hindered by inadequate data collection and reporting tools (Pepela & Odhiambo-Otieno, 2016). Furthermore, Odhiambo-Otieno, (2005b); underscore that the design of HMIS and its implementation at the various level of health system require users expectation to inform data collection tools design. The tools being used in HMIS can either be paper-based or a combination of electronic data collection tools at facility level based on minimum dataset (Cheburet & Odhiambo-Otieno, 2016a) and (Odhiambo-Otieno, 2005b).

With the realization that processes are the backbone of performance (Aqil, Lippeveld, & Hozumi, 2009). Being that health systems are complex and dynamic, health system and health system strengthening frameworks have been developed to promote a common understanding among stakeholders. Frameworks can set realistic expectations and help prioritize investments across critical health system layers. Additionally, they can aid to identify where bottlenecks and problems exist, where and why investment is needed, what will happen as a result of efforts, and by what means change can be monitored. Nonetheless, the diversity of frameworks and the lack of common global consensus is confusion (Lenette, 2014)

Assuring measurement quality is not possible without establishing a formal process for checking data quality. Similarly, how well data are displayed reflects whether the data have been transformed into information (van Lohuizen and Kochen 1986), and shows its relevance for management, monitoring or planning purposes. Feedback is an important process for identifying problems for resolution, for regulating and improving performance at individual and system levels, and for identifying opportunities for learning (Knight 1995; Rothwell *et al.* 1995). However, feedback remains a weak process of RHIS in many developing countries. Feedback is

considered across/horizontal lower levels (CU to CU) and upper or vertical upper levels (Community to Subcounty and County). Facility staff receive feedback from self-assessing their performance using their own records and reports, and from the district management. The same process could be repeated at district or higher administrative levels

Community engagement is key to strengthening interventions that improve health outcomes. In particular, community based interventions are recognized as playing an important role in improving maternal, newborn and child health. Nevertheless, community-based systems have been largely ignored in health system frameworks (Lenette, 2014).

The study, therefore, concludes that process intervention factors of community units have a significant positive relationship influence on the use of CbHMIS in Kenya.

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Processes are a back-borne of any achievement, implementation of the right processes efficiently and effectively can improve the use of CbHMIS greatly. If process intervention factors of the community units are well implemented, the use of CbHMIS improves as indicated in this study.

It was also established that the Sub-County teams and the community units leadership are not very quick to act on the feedback that they receive from the MIS reports. The study revealed that there are weak vertical assessments from the sub-county teams in that they also lack a team from the sub-county to assess their data and information needs. Data tools stock outs and some of the tools being completely unavailable (MOH 517-Referral form) especially in Kajiado and Kiambu Counties was noted. This study therefore recommends that the counties to ensure that data tools.

Generally the use of the CbHMIS system (both manual and electronic) in the selected counties is very low. The electronic system is almost non-existent in all selected counties. The low use is attributed to the system quality, individual and institutional factors discussed above. There is limited use of computers as equipment in the facility due to the limited number.

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