

Original Research Article

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Health systems strengthening: assessing the influence of organizational factors of community health volunteers on use of community based health information systems in selected counties, Kenya

Susan N. Mambo^{1*}, George W. Odhiambo-Otieno²,
George Ochieng'-Otieno³, Wanja Mwaura-Tenambergen⁴

¹Department of Environmental Health and Disease Control, Jomo Kenyatta University of Agriculture and Technology, Juja, Kenya

²Department of Health Sciences, Rongo University, Rongo, Kenya

³Department of Health Informatics and Information Systems, Kenyatta University, Nairobi, Kenya

⁴Department of Health Systems Management, Kenya Methodist University, Meru, Kenya

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***Correspondence:**

Dr. Susan N. Mambo,

E-mail: susan.mambo@jkuat.ac.ke

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ABSTRACT

Background: WHO places health information as a key pillar of an effective health system (HS). HS strengthening has become a key focus of many nations. A paradigm shift from being disease specific focus to holistic strengthening of pillars of a HS. Kenya's functionality of CbHMIS (community based health information systems) stands at 55% down from 64% in year 2015, majorly contributed to by organization of community health volunteers (CHVs) work. The aim was to establish influence of organizational factors of CHVs on CbHMIS use in Kenya.

Methods: A cross-sectional design which employed both quantitative and qualitative approaches was used. Kiambu, Kajiado and Nairobi counties formed the study location. A systematic random sample of 366 respondents was drawn. Multistage sampling was used to identify the community units (CUs). Ethical clearance was obtained from KEMU, ethics and research committee (SERC), national commission for science, technology and innovation (NACOSTI) gave a research permit. 3 FGDs and 6 KIIs were conducted. Quantitative data was analyzed using SPSS version 23 to generate univariate and bivariate analysis at $p<0.05$ significance level. Qualitative data was analyzed using content analysis. Results were presented in form of graphs, tables, figures and narration.

Results: Use of CbHMIS stood at 56.6%. Organizational factor explains 39.9% ($R^2=0.399$) of total variations in the use of CbHMIS. Organizational factors of the CHVs were found to positively and significantly influence use of CbHMIS.

Conclusions: Organizational factors influences use of CbHMIS by CHV. Government/partners to build CUs capacity on sustainable resource mobilization strategies.

Keywords: Health systems, CbHMIS, CHV, Organizational factors

INTRODUCTION

Background

Some of the factors identified in literature as impediments to RHIS used include inadequate resources (both human and financial), little help from management, no oversight and lack of leadership.² Local environments play a key role in the implementation of policies because of the impact of local culture.⁹ Cultural attributes of a location include its people, their fundamental beliefs about time, social relations and cultural taboos as well as their acquired habits. The implementation of CbHMIS system would be affected by the cultural systems in the counties. According to Odhiambo-Otieno, the main weaknesses of the system included poor utility of information where the data was collected (those who collected data had no practical use for it) and very little feedback getting back to the districts after sending data to the line ministry headquartered in Nairobi.¹⁶

Resource availability

Resource constraints, good governance, transparency and accountability have recently become the mantra of development and consequently more attention is given to strengthening evidence-based decision-making and information systems.² Some authors, according to Aqil et al (2009) assumed that if senior management provided the resources (finances, training material, reporting forms and computer equipment) and developed organizational rules (RHIS policies and data collection procedures) then the information system would be used and sustained. However, despite provision of resources such as finances, training material, reporting forms and computer equipment, studies showed that data quality was poor in Mozambique and Kenya.¹⁴ In addition, the use of information for planning and decision-making was found to be weak in Brazil and south.

Recognizing and utilizing the local available resources in the communities such as expertise, materials, finance and assets like indigenous knowledge in transport and medicine a recognizing individual/family/household initiatives to their own health improvement, a beneficial/better practice to be emulated.⁶

Information culture

For CHVs to be able to make an effective contribution, they must be carefully selected, appropriately trained and very important adequately and continuously supported. Majority of the CUs 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, this however is bad culture.¹ Large-scale CHVs systems require substantial increases in support for training, management, supervision, logistics and cultivating information culture.⁷ Naikal et al in their study noted that organizational culture is a set of

practices adopted and used over time, under the consensus that they produce desired results for the organization.¹³ Recruits are inducted to the culture using formal and informal systems and their attitudes, thought patterns and actions become aligned to the culture of the organization. In this regard, an approach to RHIS implementation that considers lessons from organizational culture may support their effective use.²⁰

Leadership structure

The current devolved system of government in Kenya is a key factor in the implementation of a CbHMIS. The county governments are now the final units of authority when it comes to the management of health services.⁸ Before this, districts were the main decision making level for health services, but they were under the control of the ministry of health. There is wide expectation that the new devolved structures would lead to better management of healthcare services that would be more responsive to local demands. An understanding of local social, cultural and political processes in Kiambu, Nairobi and Kajiado counties is essential to the understanding of how the CbHMIS works.⁸ There is a critical role of partnerships in making possible the delivery of highly targeted interventions to improve health outcomes.

Communication

Communication is the main channel of airing back views from one level to the other. This can be done through information sharing and feedback by ensuring information flows well back and forth in the CUs as well as from the top offices. Different users in the levels of health care provision have different information needs. However, each level must be able to produce proper and timely information for informed decision making. The challenges and opportunities in health care utilization in the Kenyan health facility system is that left out the tier 1 services and use of community information system to improve healthcare in Kenya.¹⁷

The new national HIS systems in developing countries have been designed to achieve standardization and integration of the many parallel and fragmented systems introduced to meet demands of different donors and other stakeholders.³ Comprehensive health information systems with easily available information which is accessible to all stakeholders will create the enabling environment for use of such information for decision making.⁶

Theoretical framework: actors-network theory-organizational factors

The actors-network theory (ANT) helps tie in organizational factors to the adoption and use technology.⁵ The theory looks at a technological environment as one made up of actors who are not distinguished as human and technology. The point here is that technology has become part of human endeavors to

the extent that it is no longer tenable to separate organizational processes into human actions and technology-driven actions. In the context of CbHMIS, ANT provides the basis for examining the constituent elements in a way that focusses on actions and outcomes without isolating actors into human actors and technological actors. This perspective will yield additional benefits to the analysis of the operations of the CbHMIS.⁵

METHODS

For achieving the aim of this study, a mixed method cross-sectional study design was utilized, which employed both quantitative, qualitative and descriptive approaches. Quantitative data was collected using an interviewer administered questionnaire. Qualitative data was collected through FGDs (focus group discussions) and KIIs (key informant interviews). Therefore, this research utilized triangulation of several research design. Descriptive research systematically, factually and accurately describes the facts and characteristics of a given population.

This was a hospital facility survey where all CUs (are all domiciled in health facilities level 1) in the selected counties formed the population of study, which encompassed three selected counties; Kiambu categorized as a peri-urban county, Kajiado categorized as a rural county and Nairobi categorized as an urban county. According to the master community units list, Kiambu county which has 12 sub-counties, has a total of 79 established community units with 64 CUs that are fully functional (ministry of health and social welfare, 2008) and (MoH, 2016). Nairobi has 17 sub counties with 140 established CUs with only 59 being fully functional (MoH, 2016). Kajiado county is divided into five sub-counties and has 56 established CUs with 33 CUs fully functional (Kajiado county, 2013) and (MoH, 2016).

The field research was conducted within a period of six months from November 2016 to April 2017. The study population for this study was 156 active CUs from the three selected counties where a sample of 122 CUs was drawn. Three (3) CHVs from each CU were interviewed. Focus group discussion were done on 3 functional community health committees (CHCs), one from each county. Six key informants (CHEWs (PHO's) and county coordinator) were considered with two from each county. Only CHVs who had been trained using the community strategy curriculum and have been on operation for at least one year in the selected counties were selected.

Inclusion criteria

All active CUs and CHVs, CHEWs and CHCs who are attached to an active CU and have been in operation for one year were included in the study.

Exclusion criteria

All inactive CUs and CHVs, CHEWs and CHCs who are attached to an inactive CUs and have not been in operation for one year were excluded from the study.

Stratified random sampling was used to identify the fully functional CU's and they randomly derived a representative sample of CHVs. CHEWs was the most useful approach to ensure that the data collected comes from as many players in the CbHMIS since the system covers a wide array of players from the grassroots all the way to the policy-making centers in the county executive and in the county assembly.

Sample size determination (quantitative data)

The study sample was then selected using the formulae given by where the sample size for a population of 10,000 or more is computed using the formula given below,¹²

$$n = \frac{pqz^2}{e^2}.$$

Sample size determination (qualitative data)

Qualitative data was collected through FGD and KIIS. 3 FGDs were conducted, 1 from each county (with the CHC's). A total of 6 KII, 2 from each county were conducted (1 county community strategy coordinator; and one sub county community strategy focal person (CHEW).

Document review was done to inform literature review. Quantitative data was collected using an interviewer administered questionnaire administered to all sampled CHVs, supplemented voice recording of specific interviews and also focus group discussions and note taking during these processes. Qualitative data was collected through focus group discussions and KIIs. The CHCs formed respondents for the FGDs while CHEWs and county coordinators were the key informants that helped elaborate on the reasons of use and disuse, usage patterns and to validate findings made via quantitative methods.

Quantitative data was analyzed using computer based software, with preference being the SPSS version 23 package of data analysis. The key analysis done in this study were test of normality of the data, test of hypothesis, significance test of variables through use of p values. P<0.005 level of significance, Chronbach alpha was also utilized to test reliability, f test statistics were considered as a measure of model validity and Pearson (r) for bivariate correlation analysis. Results were presented in form of tables, figures and narration.

Table 1: Sample size determination.

County	Est CUs	Fully functional (FF) CUs	Sample calculation for CUs	Total CUs per county	Sample calculation for respondents (CHVs)	Respondents CHVs per CU (purposive sampling)
Kiambu	79	64	$nf = (1+n/N) = 384/1 + (384/156)$ =384/3.462 =110.933 =111 CUs (10% attrition rate (11)) =122 CUs	$(64/156) \times 122 = 50$	$nf = (1+n/N)$ $N = 156 \times 50 = 384/1 +$	$50 \times 3 = 150$
Kajiado	56	33		$(33/156) \times 122 = 26$	$(384/7800)$	$26 \times 3 = 78$
Nairobi	140	59		$(59/156) \times 122 = 46$	$= 384/1.05 = 365.7$	$46 \times 3 = 138$
Total	275	Target population 156 CUs		122 CUs	=366	366 CHVs (respondents)

Qualitative data was analyzed using manual content analysis based on key themes generated from objectives. Some key themes were reported as said by the key informants. Multiple manual coding was done to create coding categories which were capable of reflecting the content of the data. The coding categories extracted from the transcripts were used to systematically analyze commonalities and apparent perceptions reflected in the data by focusing on issues which were repeatedly mentioned or strongly emphasized by the informants. Responses were compared across the region of respondents (CHCs of Kiambu, Kajiado and Nairobi).

Ethical clearance to conduct the research was obtained from Kenya methodist university science, ethics and research committee (SERC). Letter of permission was also obtained from Kiambu, Kajiado and Nairobi county health office. Protocol was also ensured in the field and permission from the county health management was sought. Informed consent was obtained from the study participants before interviews were conducted. The participants were not identified by name either in the questionnaire or during data reporting to ensure confidentiality. Interviews were conducted in a secluded place, which ensured privacy.

RESULTS

Influence of organizational factor on CbHMIS use

Descriptive analysis on organizational factors

This factor was measured using four key indicators. They were resource availability, information culture, leadership structure and communication. On resource availability, the respondents disagreed with the statements that we are able to finance most of our operations as a community unit (composite mean score 1.95). Our community unit assists its volunteers with material resources (composite mean score 2.25). On information culture, CHVs interview agreed that their CU leaders acts swiftly and

solve problems with ease (3.46). Our CU empowers its volunteers to make decisions regarding their community (composite mean score 3.56). Our CU has developed good culture which defines and guides our activities (composite mean score 3.63). On leadership structure, the respondents agreed with the following statements, that we have a clear chain of command from top to bottom in leadership (composite mean score 3.74). Our CU has a clear organizational chart showing who does what and when (composite mean score 3.44). Our leaders are friendly to our clients (composite mean score 4.10). Our leaders are tolerant on various issues and acts as role models to all the stakeholders (composite mean score 3.65). On communication: the CHVs agreed with the statement that information flows well back and forth in our CU (composite mean score 3.76) as shown in Table 2.

Resource availability

On resource availability in the community units, the respondents were asked if they are able to finance most of their operations as a community unit, 39% strongly disagreed and only 5% strongly agreed as shown in Figure 1. Subsequently, in an FGD, respondents said that “we struggle to finance our operations, including materials to support our work is a major problem”. A KI as well backed this up by saying “CHVs are not anchored anywhere in the Kenya’s cadres of services as such they are just volunteers hence, they really struggle to deliver their work even when they are willing to work for their communities, they struggle to even sustain their operations and logistics acrossboard. We also as sub-counties lack basic materials to support them including IEC materials and even finances”.

Communication through Information flow

Slightly above half 56% of the respondents agreed to the statement that information flows well back and forth in community units and only 12% disagreed. This is depicted in Figure 2. In a KII, a respondent said, “we

really try to link with our CHVs through their CUs, however, it is still a challenge in channels of communication because majority of them after training them they are let free and we can only access them through their leaders. So communication to their leaders is ok but to the larger CHV members is a challenge”.

Bivariate analysis: relationship between organizational factor and CbHMIS use

The bivariate correlations showed a positive and significant influence of all organizational factors of CUs personnel on the use of CbHMIS in Kenya ($r=0.511^{**}$, $p=0.001$). Amongst all the indicators investigated under organizational factors, leadership structure and information culture of CUs had the strongest association with the CbHMIS use ($r=0.562^{**}$, $p=0.005$ and $r=0.559^{**}$, $p=0.005$) respectively. On the other hand, resource availability and communication of the CHVs in the community units towards their use of CbHMIS had the weakest association ($r=0.165^{**}$, $p=0.001$ and $r=0.283^{**}$, $p=0.001$) respectively. This implies that the use of CbHMIS by CUs improves significantly when the CUs have better organizational factors as shown in Table 3.

Influence of organizational factor on CbHMIS use

The bivariate correlations in Table 3 indicated that there is a positive and significant influence of organizational factors of CUs personnel on the use of CbHMIS in Kenya ($r=0.511^{**}$, $p=0.001$). This implies that the use of CbHMIS by CUs improves significantly when the CUs have better organizational factors.

These findings were subjected to further analysis where a univariate linear regression model,

$$Y=\beta_0+\beta_3 X_3+\epsilon,$$

was used to determine the influence of organizational factors on use of CbHMIS by CUs. Results in Table 4 shows that the model is valid ($f(1, 363)=240.967$, $p=0.001$) hence the explanatory variable (organizational factors) is good in explaining total variations in use of CbHMIS by community units.

The study further showed that the organizational factors of community units (X_3) explains 39.9% of the total variation in the use of information by community units in CbHMIS ($R^2=0.399$). The value of the constant in the Table 5 shows that the organizational factors of community units will always exist at a certain minimum ($\beta_0=1.375$, $p<0.001$). The organizational factors of community units were found to influence the use of CbHMIS positively and significantly ($\beta_1=0.654$, $p<0.001$). This confirms the findings of the bivariate correlations in Table 4 which indicated that when the organizational factors of the community units improve, the use of CbHMIS will also improve. The univariate

model in Table 4 was found to be significant ($p<0.001$) and therefore, supports this study's objective 3 that the organizational factors of community units positively and significantly influences use of CbHMIS.

Test of hypothesis three

H_{03} : the organizational factor of CU does not influence CbHMIS use in Kenya

This hypothesis intended to test whether there is any influence between the organizational factors and the use of CbHMIS. The hypothesis $H_{03}:\beta_1=0$ versus $H_3:\beta_1\neq 0$ was tested. Results from the bivariate correlation in Table 3 shows a significant and positive relationship between the organizational factors of community units and use of CbHMIS ($r=0.511^{**}$, $p=0.001$). On the other hand, the univariate regression results in Table 5 also show that there is a positive and significant influence between organizational factors of community units and use of CbHMIS ($\beta_1=0.654$, $p<0.001$). This leads to the rejection of the null hypothesis (H_{01}) and the acceptance of alternative hypothesis (H_1). The study, therefore, concludes that organizational factors of community units have a significant positive relationship influence on the use of CbHMIS in Kenya.

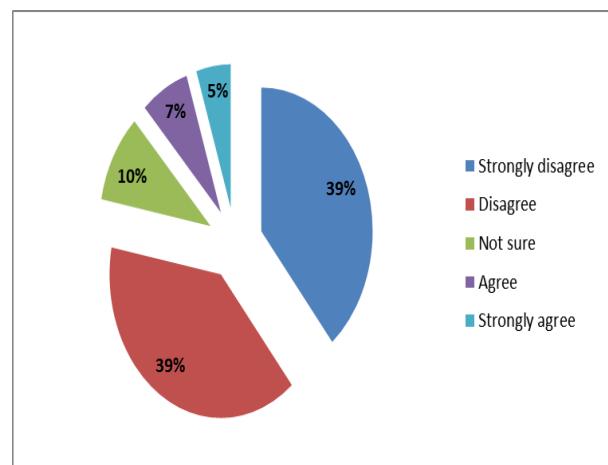


Figure 1: Resource availability for CUs.

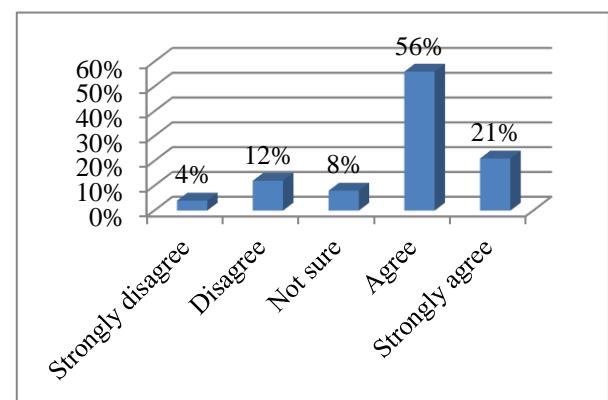


Figure 2: Communication through information flow.

Community units are organized structures at the community level through which health services at level one are delivered. CHVs who are expected to utilize CbHMIS, work in an organizational context, which influences them through organizational rules, values and practices. This organizational context is the community health services system and is basically managed by the community leadership itself but gets a boost of vertical leadership from the ministry of health and other private partners.¹¹ Findings of this study indicated that most community units have good leadership. Proper organizational leadership for small medium sized and large organizations is very important in promoting management support which is a major factor in helping

delivery of services, these findings agree with a study by other researchers that Organizational factors such as inadequacies in human and financial resources, low management support, lack of supervision and leadership affecting RHIS performance are described in the information system literature.¹⁶ Most of the community units have limited resource availability at their disposal for the activities they do undertake for healthcare. In fact many of them are not able to finance their activities and the little they raise from the income generating activities is used to support members and as a means of uplifting their own lives (merry go round, table banking, agricultural and business ventures).

Table 2: Organizational factor indicators.

Indicators	Constructs	N	Mean	Standard deviation
Resource availability	We are able to finance most of our operations as a community unit.	360	1.9583	1.04811
Resource availability	Our community unit assists its volunteers with material resources.	356	2.2528	1.13986
Information culture	Our community unit leaders acts swiftly and solve problems with ease.	364	3.4698	1.15072
Information culture	Our community unit empowers its volunteers to make decisions regarding their community.	363	3.5620	1.12402
Information culture	Our community unit has developed good culture which defines and guides our activities.	363	3.6364	1.08735
Leadership structure	We have a clear chain of command from top to bottom in leadership.	363	3.7493	1.03820
Leadership structure	Our community unit has a clear organizational chart showing who does what and when.	359	3.4457	1.18261
Leadership structure	Our leaders are friendly to our clients.	350	4.1086	0.76431
Leadership structure	Our leaders are tolerant on various issues and acts as role models to all the stakeholders.	364	3.6566	1.03129
Communication	Information flows well back and forth in our community unit.	360	3.7639	1.02467

Table 3: Relationship between organizational factor and CbHMIS use.

Relationships	Resource availability	Leadership structure	Information culture	Communication	Organizational composite	CbHMIS use
Resource availability	1					
Leadership structure	0.289** 0.000	1				
Information Culture	0.196** 0.000	0.589** 0.000	1			
Communication	0.150** 0.004	0.451** 0.000	0.325** 0.000	1		
Organizational composite	0.667** 0.000	0.757** 0.000	0.692** 0.000	0.686** 0.000	1	
CbHMIS use	0.165** 0.001	0.562** 0.000	0.559** 0.000	0.283** 0.000	0.511** 0.000	1

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

Table 4: Organizational factors and CbHMIS use: model validity.

Sr. No.	Model	Sum of squares	df	Mean square	F	Significance
1	Regression	52.618	1	52.618	240.967	0.000 ^b
	Residual	79.265	363	0.218		
	Total	131.882	364			

a=dependent variable: CbHMIS use (Y); b=predictors: (constant), organizational factors (X₃).

Table 5: Organizational factors and use of CbHMIS: regression weights.

Sr. No.	Model	Unstandardized Coefficients		Standardized coefficients Beta	R ²	t	Significance
		B	Std. error				
1	Constant	1.375	0.144			9.564	0.000
	Organization factors (X ₃)	0.654	0.042	0.632	0.399	15.523	0.000

The findings show that culture in an organization forms an integral part in determining the success of an organization. This concurs with a study by Naikal that culture plays an important role in the performance of the organization and in how potential employees perceive the company as an employer or the leadership.¹³ Part of indicators of organizational culture considered in this study were community unit empowerment, the community units culture of collecting data and using the information generated for decision making and the swiftness with which the community units respond to various issues derived from the information generated from their activities. The findings evidently show that the swift culture of responding to issues by the community units leaders is poor and is almost ignored. Communication is an important factor measured through vertical and horizontal information sharing and/or dissemination. The study revealed that vertical and horizontal communication that was tested through information sharing and feedback flow was good back and forth in the community units and as well as from the top offices.

DISCUSSION

The implementation of CbHMIS system would be affected by the cultural systems in the counties. Organizational aspects, resource constraints, good governance, transparency and accountability have recently become the mantra of development and consequently more attention is given to strengthening evidence-based decision-making and information systems.²

According to Odhiambo-Otieno the main weaknesses of the system included poor utility of information where the data was collected (those who collected data had no practical use for it) and very little feedback getting back to the districts after sending data to the line ministry headquartered in Nairobi.¹⁶

Recognizing and utilizing the local available resources in the communities such as expertise, materials, finance and assets like indigenous knowledge in transport and medicine a recognizing individual/family/household initiatives to their own health improvement, a beneficial/better practice to be emulated.

For CHVs to be able to make an effective contribution, they must be carefully selected, appropriately trained and very important adequately and continuously supported. Majority of the community units staffs were of the feeling that direct analysis and use of health data/information were left for higher tiers and their duty were only collecting and channeling it upwards to other tiers, this however is bad culture because each user has their own unique needs and community tier requires the data and information to better their health outcome.¹

The current devolved system of government in Kenya is a key factor in the implementation of a CbHMIS. The county governments are now the final units of authority when it comes to the management of health services.⁸ Before this, districts were the main decision making level for health services, but they were under the control of the ministry of health. There is wide expectation that the new devolved structures will lead to better management of healthcare services that will be more responsive to local demands. An understanding of local social, cultural and political processes in Kiambu, Nairobi and Kajiado counties is essential to the understanding of how the CbHMIS works.⁸

This study showed that the use of CbHMIS by CUs improves significantly when the community units have better organizational factors. Organizational factor is good in explaining total variations in use of CbHMIS by CUs.

The general findings on organizational factors indicated that there is a positive and significant influence between

organizational factors of community units and use of CbHMIS. This leads to the rejection of the null hypothesis (H_0) and the acceptance of alternative hypothesis (H_1). The study, therefore, concluded that organizational factors of community units have a significant positive relationship influence on the use of CbHMIS in Kenya. Findings also indicated that most community units have good leadership.

Most of the community units have limited resource availability at their disposal for the activities they do undertake for healthcare. In fact many of them are not able to finance their activities.

The findings evidently show that the swift culture of responding to issues by the community units leaders is poor and is almost ignored. This is therefore a very strong indicator of the poor running of most community units by the leadership which in-turn affects the operations of a community unit. This concurs with a study by Abajebel et al done in 2011, the organization and support supervision was an important component that was not taken seriously.¹

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 findings on his study 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.¹⁶

Communication is an important factor measured through vertical and horizontal information sharing and/or dissemination. The study revealed that vertical and horizontal communication that was tested through information sharing and feedback flow was good back and forth in the community units and as well as from the top offices.

Improved communication between those that generate research data and those that use research data in decision making is paramount.³ Overemphasis on trying to change the behavior of health practitioners to use data is resulting in a failure to consider other stakeholders in the research and data use processes. There is need to promote a multidisciplinary approach to improve understanding of the environment in which research is generated and the policy process and context that puts it into practice.¹⁴

CONCLUSION

Organizational factors are good in explaining total variations in use of CbHMIS by community units. Sustainable resource mobilization strategies to help the community units finance their activities or add to the little they get through partners and the government.

The swift culture of responding to issues by the community units leaders is poor and is almost ignored. Reinforcement of report submission from the CHVs needs to be emphasized.

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.

Recommendations

This study recommends that the community health units be assisted with capacity to come up with sustainable resource mobilization strategies to help them finance their activities or add to the little they get through partners and the government. CUs leadership is trained on leadership skills and that community units support supervision is also done consistently by the sub-county teams. Reinforcement of report submission from the community health workers need to be emphasized.

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