Effectiveness of Community Health Workers in Promotion of Maternal Health Services in Butere District, Rural Western Kenya

Caroline Akinyi^{1,*}, Jeremie Nzanu², Dan Kaseje³

¹Department of Measurements in Health, Great Lakes University of Kisumu (GLUK), (40103) 6683, Kisumu, Kenya

²Department of Information Technology, Great Lakes University of Kisumu, (40100) 2224, Kisumu, Kenya

³Department of Tropical Institute of Community Health and Development, Great Lakes University of Kisumu, (40100) 2224, Kisumu, Kenya

*Corresponding Author: akinyicaroline12@yahoo.com

Copyright © 2015 Horizon Research Publishing All rights reserved.

Abstract In Kenya, Maternal Mortality Rate remains high at 488 deaths per 100,000 live births and the scenario is even worse in rural areas. Community Health Workers (CHWs) are integral in community mobilization to reduce maternal mortality, which is far more dependent on specific facility based interventions. This study's main objective was to determine effectiveness of CHWs in promotion of maternal health services in Butere District (intervention site) and Mumias District (non intervention site) in Kenya. This was a quantitative nested study with quasi-experimental study design for the secondary data collected in 2011. Statistical Package for Social Sciences 16 was used for data analysis. Inferential Statistics were used to estimate effectiveness of CHWs. There was a significant increase in the proportion of women who had Focused Antenatal Care (FANC) from 53% to 66% and Health Facility delivery from 35% to 48% and a moderate positive relationship between these indicators in Butere District. A woman in Butere was three times likely to deliver in a Health Facility with higher odds as compared to a woman in Mumias. CHWs are effective in promotion of maternal health services and their utilization should be up scaled especially in rural population with poor health seeking behaviours.

Keywords Effectiveness, Community Health Workers, Maternal Health Services

1. Introduction

More than half a million women die annually worldwide due to pregnancy related complications with 90-95% of these deaths occurring in developing countries. Maternal Mortality Rate in developing countries ranges from 300-1000 in contrast with 2.9 in the developed countries [1, 2]. In Kenya, maternal mortality remains high at 488 deaths per 100,000

live births and the scenario is even worse in rural areas [3]. It was on this basis of poor health indicator trends that Community Health Strategy (CHS) was introduced in Kenya, a strategy which supports existence of Community Health Workers (CHWs).

In the Kenyan setting, the operational unit for the CHS is the Community Health Unit (CHU) which is the administrative unit known as the Sub location each serving a population of about 5,000 households. Each sub location consists of several villages and each village is served by a Community Health Worker (CHW), volunteers who are supervised and supported by the Community Health Extension Workers (CHEWs). Thus there can be as many as 50 CHWs in one CHU. The CHU directly links to the rest of the health system through the first referral facility referred to as the link health facility for the community. The CHEWs are attached to these link health facilities and thus establish a direct link for CHWs with the first referral level. For most CHUs, the link health facility is a dispensary or a health centre. The link of the Community Health Committee (CHC) to the link health facility is the Health Facility Committee whose membership includes some from the CHCs for which it is the link facility [4, 5]. In scaling up, the Community Strategy invites the participation of all stakeholders in the health sector and other sectors, including Non-Governmental Organizations (NGOs), Faith Based Organizations (FBOs) and other development partners to improve the maternal health services towards the achievement of Vision 2030 and Millennium Development Goals (MDGs).

Community Health Workers (CHWs) should be members of the communities where they carry out health care delivery related functions, trained in some way in the context of intervention, should be answerable to the communities for their activities, should be supported by the health system but not necessarily a part of its organization, and have no formal professional or paraprofessional certified or degreed tertiary education training as professional health workers [6].

Many safe motherhood analysts, such as policy makers and academicians, consider CHWs as integral in community mobilization, a peripheral component of a package to reduce maternal mortality, which is far more dependent on specific facility based interventions [7]. However, the evidence supports a more central role for community mobilization. Numerous interventions such as family planning, nutritional support for women and treatment of haemorrhage, sepsis, and unsafe abortion are all potentially amenable to interventions in the community [8].

Participation in health care was a key principle in the Alma-Ata Declaration. In developing countries, antenatal care, delivery, and postnatal experiences for women usually take place in communities rather than health facilities. Antenatal care (ANC) coverage is a success story in Africa, since over two-thirds of pregnant women 69% have at least one ANC contact. However, to achieve the full life-saving potential that ANC promises for women and babies, four visits providing essential evidence based interventions – a package often called focused antenatal care – are required. Essential interventions in ANC include identification and management of obstetric complications such as pre-eclampsia, tetanus toxoid immunisation, intermittent preventive treatment for malaria during pregnancy (IPTp), and identification and management of infections including HIV, syphilis and other sexually transmitted infections (STIs). ANC is also an opportunity to promote the use of skilled attendance at birth and healthy behaviours such as breastfeeding, early postnatal care, and planning for optimal pregnancy spacing. It is on this basis that this study focuses more on Focused Antenatal Care (FANC) rather than regular ANC visits.

In Kenya, as in most of sub-Saharan Africa, 88% of women attended antenatal clinic at least once during pregnancy in 2003 which has increased significantly to 92% in 2008 to 2009 from a medical professional. Moreover, there has been a shift away from use of nurses and midwives (70% in 2003 down to 63% in 2008-09) towards doctors (18% in 2003 and up to 29% in 2008-09). Increasing the proportion of babies that are delivered in health facilities is an important factor in reducing health risks both to the mother and the baby. Proper medical attention and hygienic conditions during delivery can reduce the risks of complications and infection that can cause morbidity and mortality to either the mother or the baby. 43% of births in Kenya are delivered in a health facility, while 56 % of births take place at home [3]. This decline requires a call for interventions that will encourage more women to have regular focused antenatal care visits and health facility delivery throughout their pregnancy period.

Strategies to improve maternal health should therefore involve the community as a complement to any facility-based component [9]. Progress towards MDGs 4 and 5 in the poorest countries has remained slow in high-mortality settings [2, 8]. The evident ineffectiveness of existing programmes and conclusion that this may in part be due to the lack of community involvement has led to a

renewed focus on community mobilization strategies for maternal survival [8]. Far fewer studies have investigated the effectiveness of utilization of CHWs for community mobilization interventions, either on their own or in combined packages with other interventions [9]. Clear knowledge of effectiveness of utilization of CHWs is extremely important in the initiation or implementation of such programmes especially in developing countries such as Kenya, where there is little information about this aspect and double burden of disease is dominant.

The use of community health workers (CHWs) has been in existence for a long time. However, their demand increased after the Alma Ata Declaration of 1978 and their utilization was at the peak in 1980s [10]. More recently, this practice has been revitalized in some developing countries due to the increased double burden of disease associated by poverty and ill-health associated with lifestyle change, and has been identified as one of the strategies to address the crisis of shortage of skilled health professionals [11, 12]. It is also argued that the increasing recognition of lay people participating in their own health agenda instead of being viewed as passive recipients, which is upheld as an ethical requirement for public health and health care interventions [13] has also contributed to the re-emerging demand for CHWs programmes and Community Based Health care interventions. There have been innumerable experiences throughout the world with utilization of CHWs programs ranging from large-scale (national programs) to small-scale (community-based initiatives).

A systematic review done by Uta Lehmann and David Sanders indicate that of 86 articles discussing the use of CHWs in developing countries, 30 focused on maternal and child health (including reproductive health and family planning), 19 on the treatment of TB, 9 on malaria control, 8 on ARIs, 7 on HIV/AIDS, 13 on other intervention areas, [14].

Lewin et al. conducted a Cochrane review to “assess the effects of CHWs interventions in primary and community health care on health care behaviors, patients' health and wellbeing, and patients' satisfaction with care” [15]. Based on 43 RTCs included in the study they concluded that: CHWs show promising benefits in promoting immunization uptake and improving outcomes for acute respiratory infections and malaria, when compared to usual care. For other health issues, evidence is insufficient to justify recommendations for policy and practice. There is also insufficient evidence to assess which CHWs training or intervention strategies are likely to be most effective. Therefore, while effectiveness of use of CHWs is clearly a crucial benchmark for programme planners and managers, it is important to note that it cannot be discussed in general, but needs specific definition – not only regarding impact on what, but also impact over what time period. There is adequate evidence on effectiveness of CHWs in relation to a range of impacts, of which mortality and morbidity rank prominently, not only due to their obvious importance, but also because they are quantifiable much more easily than measures such

as client satisfaction or community mobilization and are also mostly relatively short-term, i.e. over one- to five-year periods.

1.1. Research Objective

To calculate the effectiveness of Community Health Workers in promotion of maternal health services using specific indicators (Focused Antenatal Care and Health Facility Delivery) in Butere Sub-county, rural western Kenya.

1.2. Research Hypothesis

Null Hypothesis (H_0): There is no statistically significance difference in the proportion of women who had focused antenatal care and delivered in a health facility in the intervention site (Butere District).

Alternative Hypothesis (H_1): There is a statistically significance difference in the proportion of women who had focused antenatal care and delivered in a health facility in the intervention site (Butere District).

1.3. Problem Statement

Despite the enormous efforts by Ministry of Health in Kenya and donors to provide maternal health services in Health Facilities at subsidized rates, comparing trends since the 2003 KDHS, the analysis shows a continuing decline in the proportion of women who attend focused antenatal care visits, from 52% in 2003 to 47% in 2008-09 and 56% of births still take place at home with no assistance of a skilled attendant. This scenario is even worse in rural areas compared to urban areas, [3] and hence maternal mortality levels still remains a perennial problem in Kenya and remains high at 488 deaths per 100,000 live births. This declining trend in crucial maternal health indicators demands promotion of uptake of maternal health services in Health Facilities through promotion at the community level through utilization of CHWs an intervention supported by Community Health Strategy in Kenya.

However effectiveness of CHWs is yet to be determined especially within the Kenyan rural community setting due to the interface between the community level and the health care system. This causes concern as studies have indicated that rural populations have poor health seeking behaviours in terms of health facility services uptake due to travel cost and poverty and yet they form majority of those who do not access maternal health services. Utilization of CHWs is vital in such areas especially with the current shortage of health care workers if equity and up scalability issues are to be addressed.

1.4. Purpose of Study

Low maternal health services uptake which leads to high maternal mortality rates is still a problem in the western

region of Kenya. This leads to an important unanswered question, what is the effectiveness of utilization of CHWs to promote uptake of maternal health services? There is lack of information on this aspect especially in a rural setting in Kenya. The purpose of this study is to determine effectiveness of CHWs to maternal health services in a rural setting in order to make informed decisions in healthcare interventions, promotion and provision.

To enhance the effectiveness of CHWs there is need to cater for the influencing factors such as: long distance to work, inconsistent medical supplies, inadequate stipends, lack of career development structure, selection, training and supervision, and the allocation of an optimal population and volume of duties so that CHWs can be in position to execute them with minimal work-related tension [16]. These influencing factors should always be put in place in the implementation process of the Community Health Strategy as CHWs play a big role in its successful utilization.

1.5. Study Limitations

A major limitation of this study is that it is entirely based on reports by health facilities and CHWs, hence there may be an aspect of miss-reporting and recall bias as well. Moreover, this study was carried out in a rural setting and more research should be done in a different context to confirm whether same results will be identified.

2. Materials and Methods

2.1. Study Design

A quasi experimental study design was used in selected sites in Butere District (intervention site) and Mumias District (non intervention site) respectively.

The intervention was utilization of CHWs to promote maternal health services in Butere District. The selected CHWs were trained on the general structure of CHS. To be more effective and efficient, these CHWs further underwent an intensive 10-day basic training covering the following modules:- Introduction to Community Health and Development, Communication, Advocacy and Social Mobilization, Community Governance and Coordination, Basic Health Promotion and Disease Prevention, Basic Case Management and Life-Saving Skills and Community Health Information Management (CHIM).

Following the basic training, CHWs are taken through the technical training on the following modules: - Water, Sanitation and Hygiene, Community Nutrition, Integrated Community Case Management (iCCM), Maternal and Newborn Health, Family Planning, HIV/AIDS, Tuberculosis, Malaria and Non-communicable Diseases. Finally, these CHWs were supervised to ensure the carried out these activities: - dialogue days, action days, outreaches, health education and promotion, household registration, visits and updates as these are the key elements of CHS.

2.2. Study Site

The study was conducted in selected sites in Butere (Bubala, Mutoma, Shitari and Shibembe Community Health Units) and Mumias (Malaha, Emakhwale, Lusheya and Shianda Sub-locations) Districts respectively of Kakamega County, in Western Kenya.

2.3. Study Population

This composed of all the mothers of reproductive aged 15-49 years who sought maternal health services (focused antenatal care and health facility delivery) in the year 2011, either on their own initiative or through referral by CHWs in sites.

2.3.1. Inclusion Criteria

- CHEW, CHC chairpersons or any CHW that were considered to have been responsible for the meeting were interviewed about the proceedings of a given meeting or training to get the amount spent in the implementation of Community Health Strategy.
- Mothers aged 15-49 who had focused antenatal care and health facility delivery in the year 2011.

2.3.2. Exclusion Criteria

- Any training or meeting held that did not tackle something on community health strategy, which includes the utilization of CHWs, was not captured. Only those with relevance to community health strategy were considered relevant to the study.
- Mothers aged 15-49 who did not attend focused antenatal care services and did not have health facility delivery in the year 2011.
- Mothers aged 15-49 who attended focused antenatal care and had health facility delivery in the year 2011 and declined to be interviewed by the CHWs or her records were misplaced at the health facility.
- Mothers aged 15-49 who attended focused antenatal care and had health facility delivery in a different year than 2011.

2.4. Sampling Design

This study was based on multi-stage sampling design. The first stage was purposive sampling of the area because the selection of the site was based on the site being operated on by Great Lakes University of Kisumu (GLUK) as partnership research site and there is implementation of Community Health Strategy (CHS) in Butere District (intervention site) and no operation of GLUK and no implementation of CHS in Mumias District (non intervention site). The study concentrated on the research sites which were the pioneer Community Unit (CU) established and used to implement the community health strategy and they are actively running up to date.

The second sampling stage was a complete enumeration of all the pregnant women aged 15-49 who received focused

antenatal care and had health facility delivery in the year 2011 in the selected sites who meet the inclusion criteria of the study.

2.5. Data Collection

Training of research assistants and supervisors was undertaken. The training content focused on the rationale of the research, process, questionnaire, interviewing skills and research ethical issues. The questionnaires were pre-tested on a small group of clients for clarity, validity and reliability of the questions and appropriate adjustments made before commencement of the actual data collection.

For this study, District Health Management Team (DHMT) trainings and meetings are initially done to initiate the concept of the community health strategy and the CHEW training was meant to train both the CHC and CHWs on household registration. Once this is done then the community health unit is said to be running.

Weekly meetings held were captured first on weekly basis, then interviews conducted weekly by identifying the key informant person who attended the meetings and were able to give details of the number of persons who attended, agenda discusses, time taken, materials used during the meetings and even the most common type of transport used by the attendants to estimate the distance between households and link health facilities.

The tools were in the following sets: a tool capturing mainly the meetings at the DHMT level in relation to the community health strategy, another tool capturing all trainings done by the DHMT level in relation to the community health strategy, a household registration tool which represented the data collected by the CHWs on mothers attending focused antenatal care and had health facility delivery while the last tool captured all the CHC/CHWs meetings running in continuity of the community health strategy.

In all the tools the variables to be captured were the costs of materials to be used during the trainings and meetings, the manpower present, any allowance given if it was, the most commonly used mode of transport, starting time and ending time which were all adding up to how much it costs to have a meeting or training in relation to the community health strategy, number of mothers attending focused antenatal care and having health facility delivery as a result of community health strategy (intervention) and number of mothers attending focused antenatal care and having skilled delivery at the facility at their own initiative (non intervention). The data was collected over a period of one year.

2.6. Data Processing and Analysis

Filled in questionnaires were checked for completeness and consistency of responses. Data collected were cleaned, edited, coded and any errors corrected. Hard copies of all questionnaires were used to counter check information electronically entered.

Data were entered on weekly basis by capturing all activities that had been done the previous week from the key informant person first which were then followed by interviewing the person on details like materials used in the tool. During data entry there were no merging of the tools and each tool was treated on its own.

Statistical Package for Social Sciences (SPSS version 16) and Microsoft excel were used for data analysis and presentation. Inferential Statistics were used to estimate effectiveness of CHWs.

Once the data was entered, cleaned, coded and stripped of individual identifiers, it was made publicly available at no cost, allowing other researchers worldwide a unique opportunity to exploit this unprecedented dataset.

3. Results

The response rate both in the intervention and non-intervention sites was 98%. Identification of confounding factors was carried out through binary logistic regression and test of colinearity. Proximity of health facilities, qualifications of health workers, mother's age, education and number of children in the family were not confounding factors to uptake of maternal health indicators in this study.

There was a statistically significant increase in the proportion of women who had FANC attendance and delivered in a Health Facility. However, more women went for FANC but the proportion reduced in terms of Health Facility Delivery during childbirth even after intervention through Community Health Strategy implementation through utilization of CHWs to promote uptake of maternal health services in Butere Sub-county, where there was

promotion of these services by CHWs (intervention site) as shown in Figure 1 below.

Implementing CHS through utilization of CHWs involved carrying out the following activities: Carrying out community dialogue days, action days, outreaches, household registration, visits and updates.

There was no statistically significant difference in the proportion of women who had FANC attendance and delivered in a Health Facility in Mumias Sub-county where there was no promotion of maternal health services by CHWs (non-intervention site).

At the beginning of the study period (pre-test), a woman in Mumias District who had FANC had higher odds with an Odds Ratio(OR)=5.6 of delivering in a health facility as compared to a woman in Butere District (Intervention Site) with an OR=5.2 as shown in Table 1 and 2 respectively. However, at the end of the intervention period, a woman in Butere District (Intervention site) who had FANC in 2011 was 2.5 times likely to deliver in a Health Facility as compared to a woman in Mumias District (Non-intervention site) who had FANC was 1.7 times likely to deliver in a Health Facility. Moreover a woman in Butere District (Intervention site) who had FANC had higher odds with an OR=12.5 of delivering in the Health Facility as compared to a woman in Mumias District (Non intervention site) with an OR=5.7 as shown in Table 3 and 4 respectively.

There was a significant moderate positive relationship of 0.5 ($p < 0.05$) between attending Focused Antenatal Care and delivering in Health Facility during childbirth in Butere District in 2011. This means that as the proportion of the number of women who had FANC increased so did health facility delivery increase.

Figure 1. A Graph of Focused Antenatal Care Attendance and Health Facility Delivery in Butere Sub-county, January –December, 2011.

Table 1. Logistic Regression for Focused antenatal care attendance and Health facility delivery in Butere District, January 2011(Intervention site) - Pretest

	B	S.E	Wald	df	Sig.	Exp(B)	95% Confidence Interval for	
Focused Antenatal Care	1.659	0.109	231.602	1	0.001	5.256	Lower	Upper
Constant	-0.065	0.059	1.208	1	0.272	0.937	4.245	6.508

Dependent variable is health facility delivery and independent variable is Focused Antenatal care attendance. df refers to the degrees of freedom. Sig refers to the significance level (p- value). Values are significant when p-value<0.05.Exp (B) refers to the odds ratio.

Table 2. Logistic Regression for Focused antenatal care attendance and Health facility delivery in Mumias District, January 2011(Non Intervention site)-Pretest

[illegible]

Table 3. Logistic Regression for Focused antenatal care attendance and Health facility delivery in Butere District, December 2011(Intervention site)-Post test

[illegible]

Table 4. Logistic Regression for Focused antenatal care attendance and Health facility delivery in Mumias District, December 2011(Non-Intervention site)-Post site

[illegible]

Table 5. Paired T-test for difference in means of FANC attendance and Health Facility Delivery in Butere Sub-county, 2011

Focused Antenatal Care and Health Facility Delivery	Mean	Standard deviation	Standard Error of Mean	95% Confidence Interval of the Difference		T statistic	Degrees of freedom	p-value
				Lower	Upper			
	-0.174	0.485	0.008	-0.188	-0.159	-23.011	4136	0.001
Values are significant when p-value<0.05								

Test of Hypothesis

Null Hypothesis (H_0): There is no statistically significance difference in the proportion of women who had focused antenatal care and delivered in a health facility in the intervention site (Butere District)

Alternative Hypothesis (H_1): There is a statistically significance difference in the proportion of women who had focused antenatal care and delivered in a health facility in the intervention site (Butere District)

There was a statistically significance difference in means between Focused Antenatal Care attendance and Health Facility Delivery in Butere District, 2011 hence this study rejects the null hypothesis. The negative t- statistic indicated that while the proportion of women who had FANC was higher, the proportion of women who had Health Facility delivery was relatively lower as shown in Table 5, (i.e. there was an inverse relationship between the two indicators).

It is therefore evident that CHWs are effective in promotion of maternal health services as there is a statistically significance difference in the selected maternal health indicators in the intervention site (Butere District) and no significance difference in the non intervention site (Mumias District).

Motivation for CHWs was not in actual monetary value. It included training, airtime for mobilization, badges, caps, bags, T-shirts, stipend and consideration of CHWs when hiring subordinate staff in Health Facility. There was also element of CHWs supervision by CHEWs.

4. Discussions

More women had Focused Antenatal Care 53% in January, 2011 and increased significantly to 66% in December, 2011. On the other hand, Health Facility Delivery was lower at 35% and 48% respectively in January 2011 and December 2011. Even with the implementation of Community Health Strategy, Health Facility Delivery was still below 50%. This is because while CHWs are effective in promotion, maternal health services are not the only services promoted hence the uptake is still low.

Community Health Workers were very effective in the promotion of uptake of maternal health services as a woman in Butere District (Intervention) is who had Focused Antenatal Care was thrice likely to deliver in a health facility as compared to a woman in Mumias District (Control) who was twice likely to deliver in a health facility. CHW interventions are shown to have increased the uptake and coverage of Sulphadoxine Pyrimethamine (SP). For instance 67.5% of pregnant women were able to access Intermittent Preventive Treatment for malaria during pregnancy (IPTp) in the second trimester [17] as recommended by WHO and were also able to adhere to the second dose of SP, compared to 39.9% in the control.

Likewise in another intervention the coverage of the two recommended doses of SP in pregnancy increased from 41.5% to 82.9% [18]. These findings were significant as they

demonstrated that CHWs can be effective at increasing coverage and access of SP in their local communities. However, there was an unanticipated effect on ANC attendance reduction in the intervention [18]. Although this was not witnessed in the study by [18] where ANC attendance for the recommended four visits increased from 34.3% to 41.5%, the use of CHWs in provision of SP may require to be cautiously approached because of this potential effect. Focused Antenatal Care attendance and Health Facility delivery have a moderate positive correlation in Butere District. If interventions to upscale Focused Antenatal Care attendance are put in place then Health Facility delivery will be improve.

However, there is statistically significant difference between Focused Antenatal Care attendance and Health Facility delivery even after implementation of Community Health Strategy intervention. Different strategies need to be put in place to enable more women to deliver in Health Facilities as it is still below the 50%. Sustained efforts to scale up coverage of health facility delivery at birth from the 44% Sub-Saharan African countries with high child and adult mortality are therefore crucial to meet the millennium development goals for maternal health [19].

Motivation of CHWs was a major factor attributed to their effectiveness in this study. However, other studies were not very explicit on the factors that may have influenced the effectiveness of CHWs; the following were reported to be responsible for the job stress in 25% of CHWs as reported in one study [20]: long distances to work, inconsistent medical supplies, inadequate stipends, lack of career development structure, inadequate communication skills and low socio-economic status. The selection and training of CHWs, education level and previous experience were also significant. The selection and utilization of CHWs from the very communities in which they lived was found to have increased access to and coverage of the various maternal health interventions (focused antenatal care and health facility delivery) in the included studies, as the CHWs were available most of the time in their service areas whenever they were required. This revelation is synonymous with the findings of [21, 22] where CHWs had great impact on increasing the uptake of health services and other outcomes due to the fact that they were from the very areas they were servicing.

Most studies found that previous experience and some level of formal education were often emphasized as part of the important criteria for selection of CHWs. The reasoning was that past experience of CHWs in similar or quite related interventions could enable them to implement the interventions with confidence while minimizing obvious mistakes that they would have committed during their previous practices, hence affirming the notion that the more practice and experience CHWs encounter the more effective they can become [15]. For CHWs to be effective, they should cover a certain optimal population size with an optimal range of services in order to avoid work overload and fatigue.

Finally, it was found that to enhance the effectiveness of

CHWs there is need to cater for the influencing factors such as: long distance to work, inconsistent medical supplies, inadequate stipends, lack of career development structure, selection, training and supervision, and the allocation of an optimal population and volume of duties so that CHWs can be in position to execute them with minimal work-related tension [14]. These influencing factors should always be put in place in the implementation process of the Community Health Strategy as CHWs play a big role in its successful implementation.

5. Conclusions

Evidence suggests that CHWs are effective in promotion of maternal health services in rural population with poor health seeking behaviours in Butere Sub-county. However there is need for them to promote more specific maternal health services with low uptake, i.e. Health Facility Delivery since they have a general approach in promotion health services to address equity and up scalability issues of Community Health Strategy in Kenya.

Acknowledgements

Our thanks to the many study authors who gave us additional information regarding study designs and interventions.

REFERENCES

- [1] WHO. GENEVA: Department of Human Resources for Health; 2007. Community health workers: What do we know about them? The state of the evidence on programmes, activities, costs and impact on health outcomes of using community health workers Evidence and Information for Policy.
- [2] Hill K, Thomas K, AbouZahr C. (2007). Maternal Mortality Working Group. Estimates of maternal mortality worldwide between 1990 and 2005: an assessment of available data. *Lancet*. 2009; 370: 1311–1319.
- [3] Kenya Demographic Health Survey, 2008-2009.
- [4] Ministry of Health, Taking the Kenya Essential Package for Health to the COMMUNITY: A Strategy for the Delivery of LEVEL ONE SERVICE, 2006.
- [5] Ministry of Public Health and Sanitation, Training Community Health Committees in Kenya, 2010.
- [6] Jowett M. Safe motherhood interventions in low-income countries: an economic justification and evidence of cost effectiveness. *Health Policy*. 2000; 53: 201–28.
- [7] WHO. GENEVA. Health Services Coverage Statistics; 2006. Antenatal care coverage (percentage).
- [8] Bryce J, Daelmans B, Dwivedi A. Countdown to 2015 for maternal, newborn, and child survival: the 2008 report on tracking coverage of interventions. *Lancet*. 2008; 371: 1247–1258.
- [9] Ronsmans C, Graham J. Lancet Maternal Survival Series steering group. Maternal mortality: who, when, where, and why. *Lancet*. 2006 368: 1189–2000
- [10] Costello A, Azad K, Barnett S. An alternative strategy to reduce maternal mortality. *Lancet*. 2006; 368: 1477–79.
- [11] Bhattacharyya K, Winch P, Leban K, Tien M. Community health worker incentives and disincentives: how they affect motivation, retention, and sustainability. Arlington, Virginia: Basic Support for Institutionalizing Child Survival Project (BASICS II) for the United States Agency for International Development. 2001
- [12] JLI. Human resources for health. Overcoming the crisis. Cambridge: Global Health Initiative/Harvard University Press. 2004
- [13] WHO. Geneva; (2006) The world health report 2006: working together for health.
- [14] Lehmann U, Friedman I, Sanders D. Review of the utilization and effectiveness of community-based health workers in Africa. Western Cape, South Africa: School of Public Health, University of the Western Cape, 2004.
- [15] Lewin S, Dick J, Pond P, Zwarenstein M, Aja G, Van B, Bosch-Capblanch X, Patrick M. Lay health workers in primary and community health care. *Cochrane Database of Systematic Reviews* (1)2005; CD0004015.
- [16] Jennings B, Kahn J, Mastrolanni A, Parker L. Ethics and public health: module curriculum. 2003 Available from: http://asph.org/userfiles/drph_Ethics and Public Health Model Curriculum.pdf. [Accessed on 28/02/2009].
- [17] Mbonye et al. Intermittent preventive treatment of malaria in pregnancy: the effect of new delivery approaches on access and compliance rates in Uganda. *Trop Med Int Health*. 2007 Apr; 12(4):519-31.
- [18] Msyamboza K, Savage E, Kazembe P, Gies S, Kalanda G, D'Alessandro U, Brabin B. Community-based distribution of sulfadoxine-pyrimethamine for intermittent preventive treatment of malaria during pregnancy improved coverage but reduced antenatal attendance in southern Malawi. *Tropical Medicine and International Health* 2009; 14 (2): 183-189.
- [19] Adam T, Lim S, Mehta S. Cost effectiveness analysis of strategies for maternal and newborn health in developing countries. *BMJ* 2005; 331: 1107.
- [20] Zaem H, Zafar R, Atif I. Job stress among community health workers: a multi-method study from Pakistan. *International Journal Mental Health* 2008; 2: 15.
- [21] Ruebush T, Weller S, and Klein R. Qualities of an ideal volunteer community malaria worker: a comparison of the opinions of community residents and national malaria service staff. *Social Science and Medicine*. 1994; 39 (1); 123-131.
- [22] Bigirwa P. Effectiveness of Community Health Workers (CHWs) in the Provision of Basic Preventive and Curative Maternal, Newborn and Child Health Intervention: A Systematic Review, 2009.