International Journal of Medical and Health Research
ISSN: 2454-9142
www.medicalsciencejournal.com
Volume 2; Issue 2; February 2016; Page No. 04-20

Performance of community health workers in Njiru District, Nairobi County, Kenya

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Abstract
In 2006, World Health Organization report recognized shortages of health workers as an ingredient in primary health services. In mitigation the Alma-Ata declaration of 1978 promoted the use of Community Health Workers (CHWs) to provide selected services at level one of health care services. In Kenya, CHWs workforce were adopted as a component of cost effective strategies however the performance of CHWs as change agents has been called into question. The study aimed at describing the factors which influence performance of CHWs in Njiru District, Nairobi County, Kenya through a descriptive cross-sectional survey. Mixed methods (quantitative and qualitative methods) and systematic sampling method were applied. Data was analyzed using Statistical Package for Social Science (SPSS) version 20.0. Findings showed that performance of CHWs was low (34.7%). The performance of CHWs was low in four key monthly targets (referral of patients; number of houses visited; CHWs meetings; number of *Baraza* but average in health education. Age, gender, marital status, community reception, religious practices, cultural norms, use of feedback, period of training, field allowance and social class were key factors in CHWs performance. From this study the implementation and realization of the key CHWs targets in Peri- urban setting is challenging, there is need therefore to develop a clear contextualized CHWs guideline tailored for Peri- urban settings.

Keywords: Performance, Community health worker

Introduction

General Introduction

The World health report 2006 titled Working together for Health recognizes the shortage of professional health workers as one of the key ingredients in primary health services. This was the pathway to achieving the Alma-Ata Declaration of 1978- that is "health for all by the year 2000" (WHO, 2006). One way of achieving the Alma-Ata declaration, is through community-based approach, which is the mechanism through which households and communities take an active role in health and health-related development issues (MOH 2006). This community health strategy aims at building the capacity of households not only to demand services from all providers, but to know and progressively realize their rights to equitable, good quality health care. The overall goal is to enhance community access to health care in order to improve individual productivity and thus reduce poverty, hunger, and child and maternal deaths, as well as improve education performance (Ibid).

A community unit is designed to provide basic health service; promotive, preventive and simple curative services to the community serves up to 500 people and operationalized by CHW (NHSSP II 2005-10). The CHW is identified by the community as Community's Own Resource Persons (CORPS) and trained by the community health extension workers (CHEWs). These CHWs are supported by the CHEWs who are based at level 2 (Dispensaries/clinics) and level 3 (Health centres, maternities, nursing homes) but are assigned duties to support the CHWs (KEPH, 2006). It is in this context that the concept of using CHWs has been adopted in low-income countries (WHO, 2007). However, there have been innumerable experiences throughout the World on both large and small scale community-based initiatives (WHO, 2007).

In Kenya, several efforts have been made to achieve these Alma Ata declarations through efficient and effective health management systems and reforms. The efforts made in Kenya under the First Health Sector Plan (NHSSP-I) did not contribute much towards improving Kenya's health status (MOH 1999). Despite these efforts, there has not been a breakthrough in improving the situation of households entrapped in the vicious cycle of ill health (Opiyo & Njoroge, 2009) but deteriorating trends in health status throughout the country with unacceptable disparities between and within provinces (MOPHS, 2008; MOH, 2007). The worsening health status indicators includes but not limited to infant mortality rates, under-five mortality rates, maternal mortality rates, malnutrition rates which have continued to rise (Ibid.).

In 2005, the Second Health Sector Strategic Plan which ran until 2010 was developed (NHSSP-II). The goal of the NHSSP II was to reduce inequalities in health care services and reverse the downward trend in national health indicators, hence the theme: "Reversing the downward trends in the national health indicators" (NHSSP-II 2005-2010). Key among the stated purposes of NHSSP II was to strengthen CHWs Performance through the implementation of the Kenya Essential Package for Health (KEPH) through a number of strategies, one of them is the community strategy (Opiyo R, & Njoroge P, 2009).

Community Health Strategy

The Community Health Strategy service empowers the household to take charge of improving their own health since households are the foundation of affordable, equitable and

effective health care (MOH, 2006). The overall goal of the Community Strategy is to enhance community access to health care in order to improve individual productivity and thus reduce poverty, hunger, child and maternal deaths, as well as improve education performance. According to the KEPH, Norms and Standards for health service delivery, level 1 health services should include the basic community health services of promotive, preventive and simple curative health care. The community health strategy establishes a level one health care unit (community unit) to serve a local population of 5,000 people. Each community unit has a cadre of well-trained CHWs who each provide services to 20 households (Mars group Kenya, 2010). The CHW is a Community's Own Resource Persons(CORPS), trained and supported by the Community Health Extension Workers (CHEWs) who are based at level 2 (Dispensaries/clinics) and level 3 (Health centres, maternities, nursing homes) (MOH, 2006).

CHWs are particularly important in areas where there is inadequate accessibility of facility-based health services (MOH, 2006). For example, CHWs can increase access, use of health services and have played a role in primary health care, tuberculosis, immunization and family planning programmes (Rahman *et al*., 2010). CHWs have promoted the implementation of packages of interventions to reduce neonatal mortality such as improving antenatal visits, promotion of immediate and exclusive breastfeeding, appropriate care of the skin and umbilical stump, recognition and treatment with antibiotics of sick newborns (Rahman *et al*., 2010). Services provided by CHWS are expected to be more appropriate to the health needs of the local populations. However the use, efficiency, performance and reliability of CHW programmes is a global debate (WHO, 2007). What functions individual CHWs can effectively perform is a key question of concerns (WHO, 2006). According to World Health Organization report-2007, there is little scientific evidence as to the optimal number of functions and tasks a CHW can perform (WHO, 2007). Since its adoption, the roll out of community based health services has taken different dimension, acceptance and accessibility at different communities (UNICEF, 2010). For instance, Njiru District has been implementing the community health strategy however performance of CHWs is lower (55%) compared to the general Nairobi rates (64%), (MOH 2011). Morbidity burden in the District remain high; flu 23%, diarrhea 20%, tuberculosis 12%, respiratory diseases 8%, unskilled deliveries 26% and HIV prevalence 10%. This is in spite of the fact that it has formed 33 community units out of the proposed 60 (NCMO 2013).

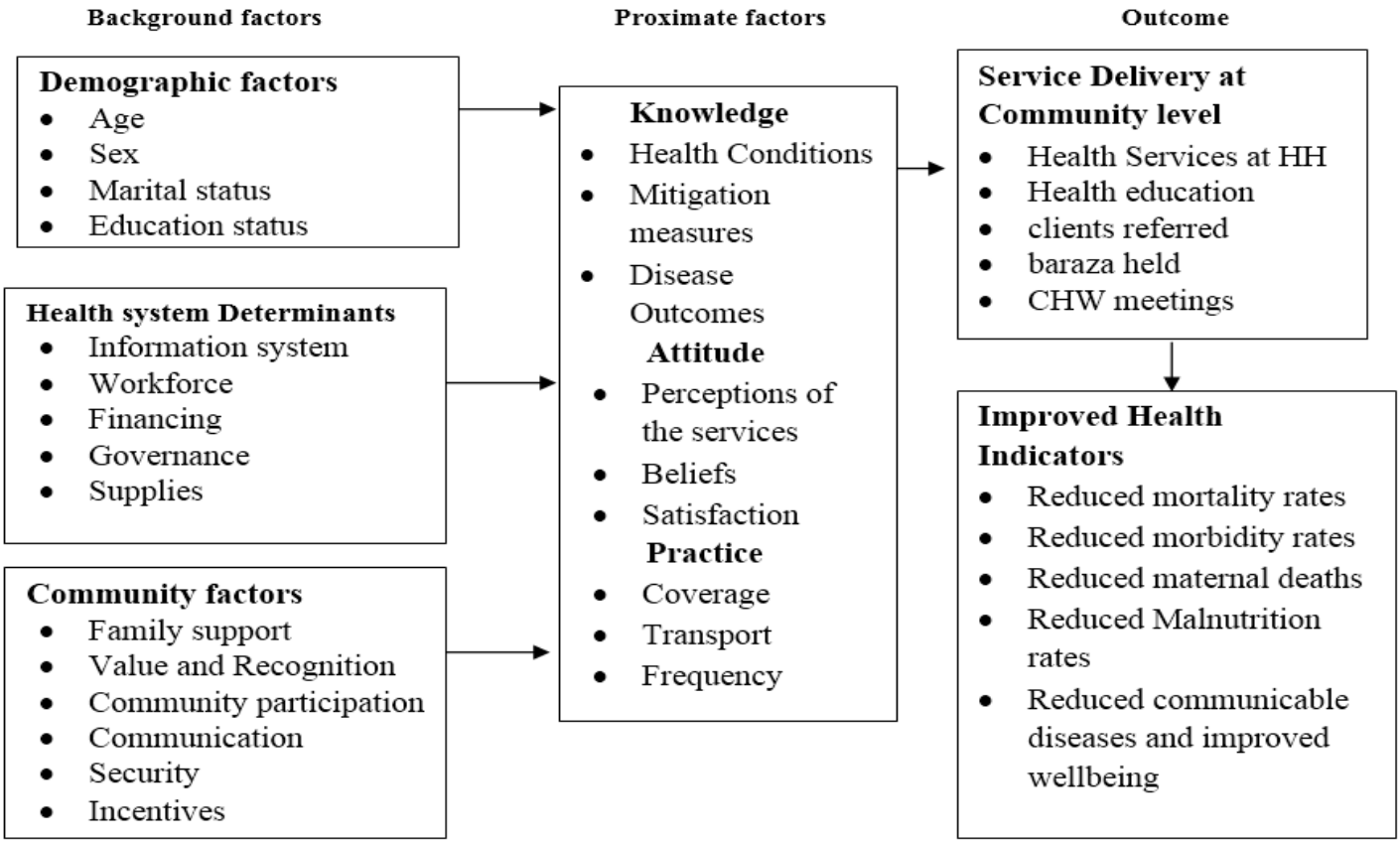
Furthermore, there reigns confusion about the sustainability of level one workforce, services and resources (Friedman, 2004). There is less comprehensive research about the CHW workforce (HRSA, 2007). The limited research available has focused on level of education, residences and source of income, accessibility, availability of drugs, norms and beliefs. There are also few other studies on community based health care financing, scope covered by a CHW, governance at level one; supervision of operations at community level and monitoring and evaluation (Ndedda, 2012). In addition social cultural issues such as recognition of community health services and service provider, cultural diversity/dynamics in urban settings, perception of level one health services and client-provider relation have not been fully explored (Haines and Lagarde, 2007). On the other hand, the community's role in the implementation of the strategy is also not clear (UNICEF, 2010). Therefore, it is timely to assess the evidence that such health workers can perform the necessary tasks and describe the determinants influencing their performance at level one.

Therefore, as the demand to scale up Community Health Service increases in Kenya there was need to conduct a study with the objective of identifying the factors that influence performance of Community Health Workers in order to delineate provider characteristic, health systems factors and community factors that influence the performance of CHWs. The findings can act as a basis for remodeling the implementation of community strategy.

Performance of CHWs

Performance is made up of different but closely inter-linked elements: use of services, impact performance and financial performance or cost-performance (WHO 2007). Often use of services is linked to the community introduction strategy, the structures set up under a new regime or preference for formal, established health services. Use of services can be influenced and improved through training, support and supervision. Attrition is common in many programmes. Retention is affected by central concerns of governance and management, such as sources and sustainability of financing, community ownership and selection practices.

Operational framework of Performance of CHW



Source: Adopted from WHO (2007) and modified from literature review

Materials and Methods

The study was cross-sectional survey in which both quantitative and qualitative methods of data collection were applied. On the quantitative dimension, structured questionnaires were used to survey economic, socio-cultural, demographic attributes, knowledge, attitudes and practices of CHWs. The approach was considered most appropriate for the study because of its ability to elicit a diverse range of baseline information (Mugenda, 2008). On the qualitative dimension, key informants interviews obtained opinion of the DHMTs, public health officers, CHEWs and the District Community Focal person on the factors affecting the performance of CHWs. The approach was applied because of its ability to elicit in-depth opinion that qualified quantitative data source from the CHWs.

Target population

The target population was all CHWs however the study population comprised CHWs based in eleven operational community units in Njiru Districts six months preceding the study.

Sampling Techniques and Sample size determination

The eleven (11) community units each with 50 CHWs were selected through cluster sampling from the thirty three formed community units The CHWs were diversified in demographic characteristics and economic status. The sample size was calculated using a formula for determining sample size for single population not exceeding 10,000 as used by fisher *et al* as explained by Mugenda & Mugenda (2003).

To determine the sample size

$$n = \frac{Z^2pq}{d^2}$$

Where;

n = desired sample

Z = Standard normal deviate at the required confidence level

(Usually set at 1.96).

p = the proportion of the CHWs practicing.

q = Characteristics of no interest 1-p

d = the level of statistical set usually at (0.05)

$$= \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = \frac{1.96 \times 1.96 \times 0.5 \times 0.5}{0.05 \times 0.05}$$

$$= \frac{0.9604}{0.0025} = 384.16$$

Therefore, 384 was the calculated sample size.

But because the target population was less than 10,000 that is 550 CHW the above formula is used where the population is greater than10, 000 therefore the below formula was used to determine the sample size.

$$nf = \frac{n}{1 + \left(\frac{n}{N}\right)}$$

Where,
NF = desired sample size (when the population is less than 10,000).
N = the desired sample size (when the population is more than 10,000)
N = the estimated of the population target.
1 = a constant

Therefore,

$$nf = \frac{n}{1 + \left(\frac{n}{N}\right)}$$

$$= \frac{384}{1 + \frac{384}{550}}$$

$$= \frac{384}{1 + 0.69}$$

$$= \frac{384}{1.69} = 230 \text{ CHWs}$$

Systematic sampling method was used to identify the respondents. A register of the CHWs was obtained from the DMOH's office. Respondents were equally distributed per the eleven community units.

$\frac{230}{11}$ = 21 respondents per unit

The 21 CHWs were derived from their register and were randomly selected
A table of random numbers was used to identify the first respondent and thereafter every 2nd CHW from the register was interviewed until the 21th respondent per community unit

Sampling Criteria

No.	Community unit	Trained CHW	Selected Sample size
1	Canaan	50	21
2.	Gitarimarigu A	50	21
3.	Hdd	50	21
4.	K/south	50	21
5.	Kibarage	50	21
6.	Kinyago	50	21
7.	Kwa mbao	50	21
8.	Maili Saba	50	21
9.	Mowlem	50	21
10.	Gitarimarigu C	50	21
11.	Silanga	50	21
Total		550	230

Research Instruments
A structured questionnaire was developed for collection of quantitative data. The questionnaire was pre tested in Embakasi district before actual data collection to verify the validity and reliability before the actual study was done. The questionnaire was administered in English as most of the CHW could read and write. FGD guide was developed for the CHWs who did not participate in the quantitative survey and was open ended. Five research assistants were recruited and trained on the research instruments and data collection procedures.

Data Collection Techniques
The quantitative data was collected using a structured questionnaire administered to CHWs. The questionnaire covered Health system determinants, community factors as well as demography, knowledge, attitudes and practices of CHWs towards the effective delivery of health care services at level one. The interviews were conducted in a relaxed atmosphere and the returns checked daily for consistency. A focus group discussion guide was used to gather information on CHWs attitudes and practices towards delivery of health services they offer to the community. One FGD was made of 6-12 CHWs who did not participate in the quantitative. The selection of FGDs discusants considered issues of gender, age, experience and level of education for homogenicity. Each FGD was facilitated by one moderator (the researcher) two observers (public health officers) and three note takers (research assistants). For freedom of expression, FGDs were held in a private settings. One FGD was held in each community unit but stopped upon saturation. Key Informant Guide used to complement FGDs. The key informants included Community Health Extension Workers, District community strategy focal person, District Health Management Team members and selected community members. The Key Informant Guide captured cultural and economic factors as wells as confirm the service rendered by CHWs and client satisfaction.

Data analysis
The quantitative data was cleaned, entered and analyzed for significance at $p<0.05$ using the version of statistical package for social scientists (SPSS) version 20. The results are presented descriptively and inferentially. Chi square, multinomial and logistic regression analysis using the backward conditional method were used for inferential statistics. Qualitative data was analyzed manually into trends, sub themes and themes in which conclusion was inferred.

Rating of performance of CHWs
The study used five key indicators that measure overall performance of CHWs at level one; number of clients referred, number of health education forums conducted, number of *barazas* addressed, number of CHW meetings attended and number of households visited. A code of one was allocated to every service offered above the given targets (yes=1) and zero for services delivered below given targets (no=0). A dichotomous outcome (performance of delivery of level one health services) was done by scoring five target variables where one meant yes and zero meant no for delivery of level one health services as illustrated in table below.

Rating scale for delivery of level one health services

Service	Achieved or not	
	Yes	No
Achieved targeted HH visit	1	0
Addressed expected no. of *Baraza's*	1	0
Conducted expected of no. health education	1	0
Referred expected no. of patients	1	0
Attended over half of CHW meetings	1	0

The overall results were computed for all the questionnaires and aggregate average results in percentage for yes meant delivered services while no meant no delivery of services.

Ethical Considerations

All code of ethics and ethical review were observed in the process of protocol development, data collection and report writing. This included explaining the purpose and objective of study to respondents before seeking informed consent through signing and confidentiality. Authorization to carry out the study was obtained from authorities in Kenya (Ministry of Health and education).

Findings and Discussions

Demographic characteristic of the respondents

The results are from 225 CHWs against 230, because five questionnaire were inconsistent and incomplete during data cleaning. The demographic characteristics of the study population are as shown in Table 4.1. The median age for CHWs was 35years (IQR 30-39). Twelve percent (29) of the respondents were less than 20 years and over 50 years respectively while the age bracket of 20-29, 30-39 and 40-49 were 22%, 27% and 25% respectively. The majority of the study participants 179 (80%) were females and on marital status, 123 (55%) were married, 71 (32%) were single while 31 (14%) were either widowed or separated. One hundred and ninety nine of the respondents (88%) were Christians while Muslim, Hindu, and the Indigenous were minority 14 (6%), 9 (4%), and 3 (1%) in descending order. In education, 126 (56%) had completed secondary education while 74 (33%) had completed primary and Only 25 (11%) had tertiary education as illustrated in table below.

Demographic characteristics of study respondent (n=225)

Characteristics	No. (n)	Percentage (%†)
Age		
<20yrs	29	12.9
20-29 yrs	50	22.2
30-39yrs	60	26.7
40-49yrs	57	25.3
>50 yrs	29	12.9
Gender		
Male	46	20.4
Female	179	79.6
Marital status		
single	71	31.6
married	123	54.7
widowed/separated	31	13.8
Education		
Primary	74	32.9
Secondary	126	56.0
Tertiary	25	11.1
Religion		
Christian	199	88.4
Muslim	14	6.2
Hindu	9	4.0
Indigenous	3	1.3
Occupation		
None	89	39.6
Business	78	34.7
Employed	18	8.0
Farmer	40	17.8

Abbreviations: n- Number of respondents per category; † Column percentages

Only 18 (8%) of the respondents were employed while the majorities were not. Among the non-employed 40 % were business people, 18% were farmers while 40% hustle. While the majority of the respondents were independent, a significant 46 (20%) of the respondents were supported by their families.

Demographic factors in relation to CHWs Performance at level one

Gender was statistically significant in relation to the performance of CHW in delivery of level one of health services ($\chi2$=7.619, df=1, p=0.006). Only 8 (17.4%) male respondents were associated with performance compared to 72 (40.2%) females

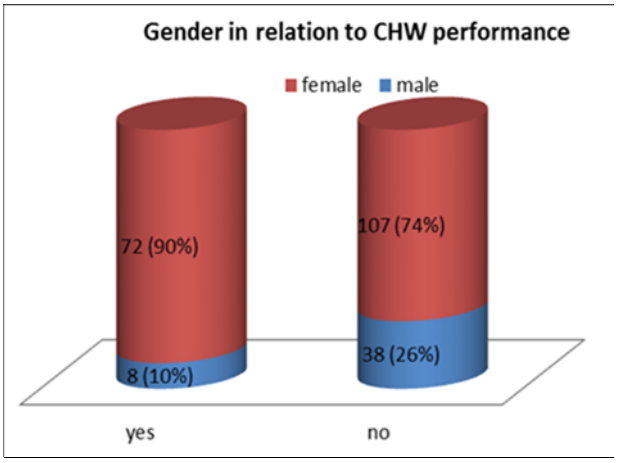


Fig: Gender in relation to performance (n=225)

Age was not statistically significant ($\chi2$=0.665, df=4, p=0.956) however a third of respondents in the age brackets of less than 20 years, 20-29 years and above 50 years were associated with performance. The other demographic factors: Marital status ($\chi2$=3.905, df=2, p=0.142) education ($\chi2$=3.452, df=2, p=0.178), occupation ($\chi2$=0.9723, df=3, p=0.808), religion($\chi2$=2.093, df=3, p=0.553) and main source of income ($\chi2$=6.222, df=4, p=0.183) were not statistically significant but there was parity among Muslims respondents in performance. Most 199 (88%) of the respondents were nominated by the community to be CHW while 14 (6%), 12 (5%) were nominated by community health committee and the Ministry of health respectively. Whereas there was no association ($\chi2$=1.858, df=2, p=0.395) in nominating a person in relation to respondent's performance, (50%) among those CHWs nominated by MOH performed while 68 (34%) and 6 (43%) performed among those selected by community and community health committees respectively.

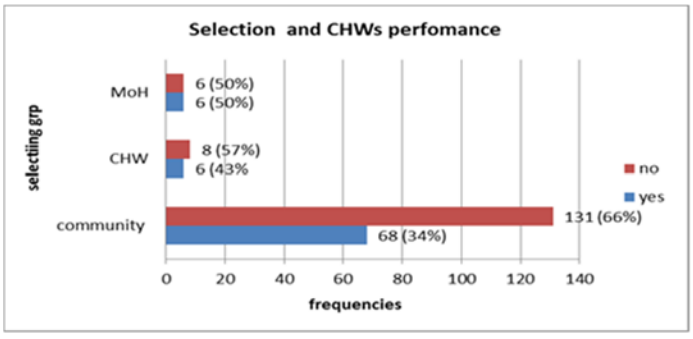


Fig: indicating selection criteria and CHWs performance (n=225)

There was no association in respondent's average monthly income ($\chi 2$=6. 038 df=4, p=0. 196) and performance with majority CHWs who earned between 3501-4500 being associated with non-performance (OR: 4.775, 95% CI 1.038-21 *P*<0.045).

Association of selected demographic factors with performance of CHWs

Demographic Factors	Performance (n=225)		Bivariate analysis	
	Yes n (%)	No n (%)	OR (95% C.I.)	P value
Age				
<20yrs	11 (37.9)	18(62.1)	0.658 (0.186-2.323)	0.516
20-29 yrs	19 (38.0)	31(62.0)	0.959 (0.307-2.298)	0.942
30-39yrs	19 (31.7)	41(68.3)	1.581 (0.531-4.705)	0.410
40-49yrs	19(31.7)	38 (66.7)	1.597 (0.522-4.880)	0.412
>50 yrs	10 (34.5)	19(65.5)	Reference	
Gender				
Male	8 (17.4)	38 (82.6)	**4.593** (1.186- 12.358)	**0.003**
Female	70 (39.1)	109 (60.9)	Reference	
Marital status				
single	20 (28.2)	51 (71.8)	2.312 (0.807-6.625)	0.119
married	43 (35.0)	80 (65.0)	1.678 (0.0.641-4.397)	0.292
widowed/separated	15 (48.4)	16 (51.6)	Reference	
Education				
Primary	22 (29.7)	52(70.3)	0.626 (0.177-2.220)	0.468
Secondary	50(39.7)	76(60.3)	0.477 (0.146-1.559)	0.221
Tertiary	6 (24.0)	19 (76.0)	Reference	
Religion				
Christian	68 (34.2)	131 (65.8)	0.513 (0.024-11.124)	0.671
Muslim	7 (50.0)	7 (50.0)	0.257 (0.010-6.538)	0.411
Hindu	2 (22.2)	7 (77.8)	1.060 (0.040-27.746)	0.972
Indigenous	1 (33.3)	2 (66.7)	Reference	
Occupation				
None	28 (31.5)	61 (68.5)	1.576 (0.569-4.368)	0.382
Business	28 (35.9)	50 (64.1)	1.169 (0.392-3.489)	0.779
Employed	6 (33.3)	12 (66.7)	1.333 (0.323-5.497)	0.691
Farmer	16 (40.0)	24 (60)	Reference	
Source of income				
Salaried	4 (28.6)	10 (71.4)	1.273 (0.382-4.238)	0.694
Farmer	14 (22.2)	14 (77.8)	1.724 (0.708-4.202)	0.231
Self employed	31 (32.9)	64 (67.1)	1.250 (0.545-2.871)	0.598
Casual labor	27 (47.4)	30 (52.6)	2.096 (0776-5.5662	0.144
Family support	12 (29.3)	29(70.7)	Reference	
Average monthly income				
<2500	44(34.9)	82(65.1)	1.510(0.421-5.414)	0.527
2500-3500	13(40.6)	19(59.6)	1.239(0.320-4.788)	0.756
3501-4500	6(19.4)	25(80.6)	4.775(1.038-21.968)	0.045
4501-5500	8(53.3)	7(46.7)	0.506(0.106-2.415)	0.393
>5500	7(33.4)	14(66.7)	Reference	

Abbreviations n; total number of respondents CI; confidence interval;*column percentages, OR; odds ratio, Significant odd ratio values (unadjusted) in bold

One forty four (64%) of the respondents have been CHWs for one year or less than, 45(20%) for one-two years, (24) for three-four years, whereas only 13 (6%) practiced as CHWs for more than five years. There was no significant association with respondents' period of practices as CHWs ($\chi 2$=5.382, df=4, p=0.250) and performance however 7(54 %) among those who have been CHWs for more than five years performed.

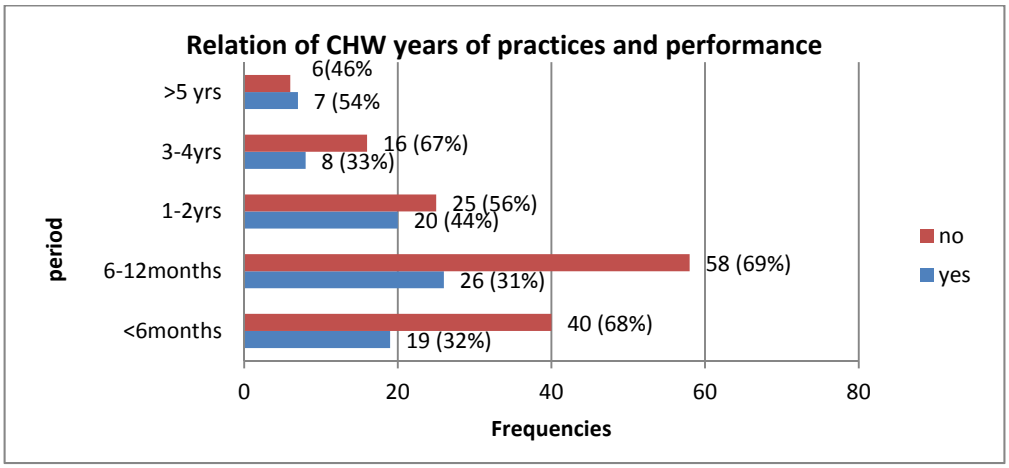


Figure of Relation of CHWs years of practice and performance (n=225)

Overall rates of CHWs Performances at level one

Two hundred and twenty five (225) CHW respondents drawn from two Divisions participated in the study. Dandora and Njiru Divisions had 185 (82%) and 40 (18 %) representatives respectively. On average the overall rate of CHWs Performance at level one in Njiru district was thirty five percent as shown in the table below. All the key targets of CHWs Performance at level one rated below average in Njiru district (number of households visited 40%, number of Baraza's 35%, health education 28% and referral of patients 23%) while the target of attending CHW meetings rated lowest at 19%.

Overall CHWs Performance at level one in Njiru District (n=225)

Targets	Performance in percentage *%	
	Yes	No
Overall performance of CHWs'	78 (34.7%)	147 (65.3%)
Achieved targeted HH to visit	90 (40.0%)	135 (60.0%)
Held expected no. of *Baraza's*	78 (34.7 %)	147 (65.3%)
Conducted expected no. of health education	64 (28.4%)	161 (71.6%)
Referred expected no. of patients	51 (22.7%)	174 (77.3%)
Attended an expected number of CHW meetings	43 (19.1%)	182 (80.9%)

Abbreviations: *Column percentages

The rate of overall performance of CHWs was poor in almost all the eleven community units except in Gitari Marigu C (57.9%), Maili *Saba* and Housing Development Department (HDD) (47%) and Kibarage *(*30%) community units as illustrated in the table 4.5. The trend is replicated in five levels one targets for instance; the rating of a number of households visited was very poor in Gitari Marigu (10%), Mowlem (10%), and Silanga 5% contrastingly respondents from Canaan scored highly 62%. None of the eleven community units achieved the desired number of community barazas with respondent from Njiru and HDD not attending any *baraza*. Similar results were reported in CHW meetings with the majority of the community units scoring below five percent. The rating of number of referred clients was average in HDD (48%) and Maili Saba (10%) but very poor in Kwa Mbao (5%) and Gitari Marigu (10%). Whereas there were average results in a number of health education forums, Kinyago scored very poorly (5%) while Gitarimarigu A and Gitarimarigu C rated 48% respectively.

Rates of CHWS performance per community unit (n=225)

Rates of performances of key level one services as per community unit			
Services	Community unit	Performance Services rate in %(†)	
		Yes	No
Overall performance of CHWs at level one	Canaan	6 (28.6%)	15 (71.4%)
	Gitarimarigu A	5 (23.8%)	16 (76.2%)
	Hdd	10 (47.6%)	11 (52.4%)
	K/south	4 (19.0%)	17 (81.0%)
	Kibarage	6 (30.0%)	14 (70.0%)
	Kinyago	5 (23.8%)	16 (76.2%)
	Kwa mbao	10 (50.0%)	10 (50.0%)
	Maili saba	10 (47.6%)	11 (52.4%)
	Mowlem	5 (23.8%)	16 (76.2%)
	Gitarimarigu C	11 (57.9%)	8 (42.1%)
	Silanga	5 (26.3%)	14 (73.7%)

Abbreviations: † Column percentages

Two hundred and nine of the respondents understood their roles clearly and among this group, 65% (136) did not perform whereas 44% (7) among 16 who could not understand their roles performed. A Significant (50) 22% of the respondents were not satisfied with CHW work, 98 (44%) fairly satisfied. On the other hand 40 (18%) and 37 (16%) were satisfied and very satisfied respectively. Financial constraints (40.4%), lack of supplies (37.3%), lack of transport (11.1%), inadequate support (8%) and lack of supervision were highlighted by the respondents as daily challenges. Constraints had no statistical significance ($\chi2$=1.815, df=4, p=0.770) in relation to performance, with 14.3 % of those who lacked supervision only performing as shown in table.

Community factors associated with CHW performance

From bivariate analysis community incentives ($\chi2$=9.465, df=4, p=0.050), community means of appreciation ($\chi2$=4.835, df=4, p=0.305) and community support ($\chi2$=0.037, df=1, p=0.848) had no statistical significance in relation to performance of CHWs in delivery of level one health services. However communication (P<0.001) was statistically significant with performance increasing with number of baraza's held.

Community Factors in relation to Performance of CHW

Community Factors	Performance (n=225)		Bivariate analysis	
	Yes n (* %)	No n (%)	OR (95% C.I.)	P value
Current Incentives				
Community recognition	26 (37.7)	43 (62.3)	0.996 (0356-2.786)	0.994
Kit supplies	20 (30.8)	45 (69.2)	1.687 (0.570-4.989)	0.345
Clients tokens	9(37.5)	15 (62.5)	0.769 (0.194-3.053)	0.709
Supervision support	7 (18.9)	30 (81.1)	0.439 (0.124-1551)	0.201
Career development	16 (53.3)	14 (46.7)	Reference	
Means of Appreciation				
In kind	43 (32.6)	89 (67.4)	1.878(0.585-6.034)	0.290
Material	5 (55.6)	4 (44.4)	5.041 (0.846-30.046)	0.076
Cash	1(50)	1 (50)	17.261(0.700-425.38)	0.081
Community recognition	24 (40.7)	35 (59.3)	2.684(0.798-9.0300)	0.111
None	5 (21.7)	18 (78.3)	Reference	

Source of support				
Spouse	11(40.7)	16(59.3)	0.998 (0.377-2.639)	0.997
Entire family	11 (39.3)	17(60.7)	1.258 (0.513-3.082)	0.616
Community	14 (24.6)	43(75.4)	0.455 (0.205-1.013)	0.054
Provincial administration	6 (50)	6 (50)	1.562 (0.400-6.101)	0.521
None	36 (35.6)	65(64.4)	Reference	
Communication				
None	37 (32.5)	77(67.5)	**0.405 (**0.188-0.872)	**0.021**
One	9 (26.5)	25 (73.5)	**0.315** (0.111-0.896)	**0.030**
2-4	8 (23.5)	26(76.5)	**0.241** (0.084-0.692)	**0.008**
>5	24 (55.8)	19 (44.2)	Reference	

Abbreviations: n, total number of respondents; CI, confidence interval; *Column percentages; OR, odds ratio; Significant odds ratio values (unadjusted) in bold

Safety and security are key factors to the survival of individual, families and society in cosmopolitan society especially slum setting where there are several competing interest. Reception and acceptance are cross cutting challenges and are common in the community. The entry of CHWs into the estates and people house is skeptically accepted even with badges and security escorts. From several FGDs, safety, security, accessibility and acceptance are critical factors in the performance of CHWs in delivery of level one health services. This was summarized in the discussant quote

One FGD discussant concluded: We are not well received in the community; it appears there are skepticism, discrimination and fear among the community residents on visitors. For instance people accept person who speak their language and invitation inside people rooms is very limited. In fact getting quality attention and time is a big dream".

Secondly the area residents are not permanent and move periodically to different estate subject to the sources of livelihood; rent and some are hardly found in the house especially male residents as was narrated by one discussant.

An FGD discussant said, "*this job is very good, we do a lot of good things but our clients are mobile, rare and enlightened. We are not well received in the community; sometimes you only meet children and house helps in the house. Meeting the decision makers in the estate is very rare and when available they are engaged'.*

The area comprised of cosmopolitan society characterized by diversified Culture, Beliefs and Practices. In a country with liberalized economy and freedom of worship, the community still subscribes to Christianity, Islam and other African churches. From FGD discussions, the practices of the religion were tricky and competed with the implementation of some of the community strategy especially the uptake of child birth notification and family planning. This was elaborated by one informant.

One focal person alluded*: Some practices especially from religious and traditional perspective complicate CHWs work. The uptake of CHWs services especially visiting house hold, uptake of contraception for family planning and feeding practices compete with religious interest."*

The use of traditional medicine and other non-conventional medicine in the management of common illness remains common and wide spread in the informal settings. This may be attributed to cultural values, low income and accessibility. For instance, from qualitative view most FGD discussants advocated for the use of herbs in the treatment of malaria in the community.

One FGD discussants *said that "Our parents treated the children with medicine from local medicine men due to financial and religious challenges like praying for the sick to get well ".*

The study area was a peri-urban and slum based inhabited by diverse people from all corners of Kenya with the majority being Kikuyu, Kamba, Luos and Luhyas. With this diversity: the lifestyle, customs and interests conflict and compliment another especially in the implementation of social development.

One discussant candidly commented…."*This is a cosmopolitan society. This means interaction and socialization is limited by cultural diversity, language barriers and skepticisms. This complicates the entry of CHWs into the society and endangers lives".*

The influence of health system factors in CHWs performance

Type of training ($\chi2$=0.043, df=1, p=0.835) in general had no statistical significance to performance as shown in table 4.8. However, excerpts from KII suggest that training of CHWs enhances their performances with one key informant summiting as in the caption below.

A member of DHMT (the district surveillance coordinator) reported that "*Since their selection, nomination and training of CHWs, my work was made easy. With their contacts, I am informed of the trends of health issues and challenges in the estates. With their support the births and deaths reports have been enhanced"* reported.

The period of community strategy training was statistically significant ($\chi2$=6.502, df=2, p=0.039) to performance. Refresher course ($\chi2$=7.087, df=4, p=0.131) and period of refresher ($\chi2$=5.22, df=3, p=0.156) were not significant.

Health system factors in relation to performance (n=225)

Factors	Performance of CHWs (n) (%) All * (n=225)		Bivariate analysis		
	Yes (%)	No (%)	$\chi2$	df	P
Day of CHWs training					
1wk	52 (30.6)	118(69.4)	**.502**	**2**	**0.039**
2wks	19 (52.8)	17 (47.2)			
3wks	7 (36.8)	12 (63.2)			
Refresher course					
HBC	12 (35.3)	22 (64.7)			
PMTCT	40 (33.9)	78 (66.1)	7.087	4	0.131
Disability	14 (56.0)	11 (44.0)			
RH	2 (28.6)	5 (71.4)			
None	10 (24.4)	31 (75.6)			
Period of refresher					
<1wk	42 (41.6)	59 (58.4)			
1wk	22 (29.7)	52 (70.3)	5.222	3	0.156
>1wk	4 (44.4)	5 (55.6)			
None	10 (24.4)	31 (75.6)			

Information is power therefore this study looked at how the CHWs write reports, the reporting structure, period of reporting, feedback reports and how the CHWs use the feedback information in relation to the performance of CHWs in the delivery health service at level one. There was no statistical significance with report writing ($\chi2$=3.180 df=1, p=0.075), reporting structures ($\chi2$=5.291, df=4, p=0.259), means of reporting ($\chi2$=8.871, df=5, p=0.114) period of reporting and feedback reports but how the CHW applied the feedback information was significant ($\chi2$=12.429, df=3, p=0.006).

Reporting in relation to performance (n=225)

Factors	Performance of CHWs (n) (%) All * (n=225)		Bivariate analysis		
	Yes (%)	No (%)	$\chi2$	df	P
Report writing					
Yes	69 (37.3)	116 (62.7)	**3.180**	**1**	**0.075**
No	9 (22.5)	31 (77.5)			
Reporting structure					
CHC	22 (31.4)	48 (68.6)			
CHEW	34 (39.5)	52 (60.5)	5.297	4	0.259
Health facility	9 (42.9)	12 (57.1)			
All the above	4 (50.0)	4 (50.0)			
None	9 (22.5)	31 (77.5)			
Feedback reports					
Yes	54 (38.3)	87 (61.7)			
No	15 (34.1)	29 (65.9)	3.442	2	0.17
None	9 (22.5)	31 (77.5)			

This finding was corroborated by FGD session, in which one discussant summed the importance of feedback information in the caption below.

An FGD discussant summed*: We make reports periodically and take it to the PHOs office and then receive summarized feedback recommendation or briefs in meeting on how to address job challenges.*

The above caption which was confirmed by one key informant who added:

A Public health officer reported that: "The CHW reports are very important to my office. They assists me to identify those whose births have not been notified and registered"

The other health systems factors supplies ($\chi2$=0.335, df=1, p=0.563), received supplies timely($\chi2$=2.286, df=2, p=0.319), payment reward($\chi2$=0.490, df=1, p=0.484), supervision ($\chi2$=7.610, df=4, p=0.107) and frequency of supervision ($\chi2$=0.691, df=4, p=0.952) were not statistically associated with the performance of CHWs.

Relation of Health System Factors with CHW Performance

Health System Factors	Performance (n=225)		Bivariate analysis	
	Yes n (%)	No n *(%)	OR (95% C.I.)	**P** value
Type of Training as CHW				
Trained	71 (34.5)	135 (65.5)	0.680 (0.158-2.922)	0.604
Not trained	7 (36.8)	12 (63.2)	Reference	
Seminar as refresher				
Hbc	12 (35.3)	22(64.7)	1.691 (0.621-4.603)	0.304
Pmtct	40 (33.9)	78 (66.1)	1.879 (0.833-4.240)	0.129
Rh	2 (28.6)	5(71.4)	1.240 (0.207-7.142)	0.814
Disability	2(16.7)	10(83.3)	0.620 (0.116-3.317)	0.576
No refresher	10 (24.4)	31 (75.6)	Reference	
Supervision per month				
None	24 (35.3)	44(64.7)	1.746 (0.352-8.646)	0.495
Once	20 (37.7)	33(62.3)	1.182 (0.242-5.779)	0.836
Twice	15 (32.6)	31 (67.4)	2.187 (0.423-11.316)	0.351
Thrice	15(31.2)	33(68.8)	1.570 (0.303-8.149)	0.591
Four plus	4(40. 0)	6 (60.0)	Reference	
Payment				
Salary	13 (34.2)	25(65.8)	0.29 (0.343-2.006)	0.677
Stipend	19 (35.8)	34(64.2)	0.800 (0.374-1.712)	0.566
allowance	2 (66.7)	1 (33.3)	0.810 (0.056-11.656)	0.877
None	45(34.1)	87(65.9)	Reference	
Received any Supplies				
Yes	8 (25.0)	24 (75.0)	1.801 (0.685-4.734)	0.233
No	70 (36.3)	123(63.7)	Reference	
Reporting				
Daily	2(22.2)	7 (77.8)	1.168 (0.107-12.723)	0.898
Weekly	5 (55.6)	4(44.4)	0.145 (0.016-1.340)	0.089
Monthly and plus	63 (38.2)	102 (61.8)	0.394 (0.078-1.991)	0.260
None	8 (21.1)	30 (78.9)	Reference	
Feedback use				
Planning	26 (33.3)	52 (66.7)	0.689 (0.309-5.930)	0.689
Address gaps	37 (48.1)	40(51.9)	0.727 (0.166-3.184)	0.672
All the above	3(13.6)	19 (86.4)	6.097 (0.875-42.48)	0.068
None	9 (23.7)	29 (76.3)	Reference	

Abbreviations: n, total number of respondents; CI, confidence interval; *Column percentages; OR, odds ratio; Significant odds ratio values (unadjusted) in bold

One twenty three (55%) of the CHWSs were trained by ministry of health while (102) 45% by NGOs. There was no significant relation the person who trained the respondent ($\chi2$=1.917, df=2, p=0.383) and respondents' performance with 76 (62%) and 70 (69%) among those trained by G0K and NGOs not performing respectively. Most 194 (86%) of the respondents said they accepted to be CHWs to help the community, 8 (4%) forced by community, 6 (3%) enticed by family members and 14 (6%) fancied the medical profession. One hundred and thirty one (58%) of the respondent reported the training is not adequate and 73 (32%) requested that the training period be increased, another (71) 32% requested the training contents be enhanced while a significant (51) 22% requested for more refresher courses and (30) 13% urged for training on basic curative services training to enable them offer basic care as first aid. There was no significant association in respondents requested area of training ($\chi2$=0.844, df=3, p=0.839); training adequacy ($\chi2$=4.607, df=2, p=0.100) and performance.

Multivariate analysis

A multivariate logistic regression analysis using the backward conditional method was performed on multiple factors to eliminate confounding factors and examine the effect of the three predictive factors which significantly associated (independently) with performance of CHWs in delivery of level one health services at bivariate analysis as presented in the table twelve. Three factors were found to predict performance of CHW in delivery of level one health services among the CHWs (Table 4.13). Male respondents were 96% less likely to be associated with performance compared with female CHWs in delivery of level one health services practice (AOR 0.968, 95% CI 0.114-1.822).

Variables	Levels	Exp(β)	95%CI for Exp(β)		P value
			lower	Upper	
Gender	Male	0.968	0.114	1.822	0.026
	Female	Ref	-	-	-
Period of training	1 wk	2.207	0.030	4.384	0.047
	2 wks	1.482	-0.818	3.781	0.207
	3 wks	2.489	0.174	4.804	0.035
	4 wks	Ref	-	-	-
Use of feedback Report	Planning	-0.412	-1.332	0.507	0.379
	Address gaps	-1.099	-1.997	0.201	0.016
	All the above	0.685	-.0782	2.152	0.360
	No report	Ref	-	-	-

Multivariate analysis results for independent variables (n=225)

Abbreviations: CI, confidence interval; **Exp (β) (AOR)**, adjusted odds ratio; Significant odds ratio values (adjusted) in bold. Dependent variable: (0 = yes (performer as a CHW),
1= No (non performer as CHW).

Adjusting period of training, CHWs who attended training for one week and three weeks respectively were two times more likely to be non performers as CHWs in the delivery of level one health services at level one (AOR 2.21, 95% CI 0.030-4.384, P=0.047) and (AOR 2.49, 95% CI 0.174-4.804, P=0.035) than respondents who attended training for four weeks and more. Two weeks training was a confounding factor. The use of feedback information was statistically significant and when adjusted for no feedback report, the odds of using the feedback information report to address gaps was highly associated with performance (AOR -1.099, 95%CI -1.997- 0.201, *P*<0.016).

Discussion

In this study the performance of Community Health Workers in Njiru district Kenya in the delivery of level one health service was below average. Against two hundred and twenty five Community Health workers (225) who participated in the study, 34.7% (78 CHWs) were rated as performing in the delivery of level one health services. This trend of poor performance was replicated a cross all the community units which participated in the study. Performance rates were also poor in four level one health services per month (house hold visited, community *barazas*, CHWs meetings and number of referred patients) except health education which the CHWs registered average performance. These poor rates applied to most community units except Canaan which rated well in the household visits. Since CHWs offer more preventive services such awareness during household visit and during *baraza* than curative services this approach may reduce the confidence of the community on CHWs which in-turn reduce effectiveness in attaining targets of referring patients and visiting house. At the same time personal security, accessibility, privacy, diversity and the dynamics of urban life complicates the attainment of these targets whereas health education forums can be achieved through church meetings, social and religious gatherings (Salmen, 2002).

This study found out that female CHWs, age categories of less than 20 and above 50 years, widows and separated CHWs, Muslims were associated with performance. Monthly income, occupation, education, years in services, source of income and nominating party did not influence performance of CHWs. Age in general was statistically significant however young (less 20 years) and elderly CHWs (over 50 years) rated highly in performance than the middle aged. This finding on older age performance concurs with (Yoshito *et al.,* 2012) in a cross sectional survey on factors influencing the performance of community health workers in Kisumu West, Kenya who concluded that older CHWs were likely to perform well. This implies that old people have no competing tasks hence are committed and are respected in the community therefore find it easy to work while young people are enthusiastic and eager to perform in the first job assignments. The middle aged CHWs are busy taking care of their young families, struggling to achieve high ambitions, address social issues and other community demands. However this contradicts with a study by (Ndedda, 2012) in Busia on Social demographic determinants of CHWs performance where CHWs aged 30-40 years were more active.

Gender was related to good performance at level one health services. Majority of the CHWs were females and were more active than males counterparts in all community units except *Silanga* and *Gitarimarigu C*. This finding concurs with (Prasad and Muraleedharan 2007) in a systematic search of literature review of concepts, practice and policy on Community Health Workers reports that female CHW workers are able to deliver care more effectively than male workers at community level in both developing and developed countries. This is probably because females are passionate about family and children welfare despite having many other tasks in the households and community level than males. On the other hand gender factors may facilitate the entry of female CHWs into the society since they are trusted, believed and welcomed than their male colleagues (Pariyo, *et al.*, 2006). This contrasts with the Uganda study (Kallander *et al*., 2006) which found that sex had no relationship with performance. CHW's level of education had no statistical association with CHWs performance. CHWs with tertiary education and above were less performing compared to those with secondary level of education and below. The trend was the same across all community units and divisions. This conforms with a study from Uganda which showed education is inconsequential on CHWs ability to perform (Kallander, *et al*., 2006 in studies which have explained that CHWs with higher educational qualifications have dreams for alternative higher employment and therefore their commitment may not be hundred percent. On the other hand CHWs with lower education could learn and enhance their skills in the management of common illness (Ande, Oladepo, & Brieger, 2004) and thereby deliver better care to the community. Therefore career prospects for CHWs and their aspirations do influence their performance. However this contrast Ballester, (2000) which reported a significant drop out

of CHWs due to lack of career prospects. This finding implies that low literacy or illiterate community members should not be discriminated against during selection agreeing with the Saridid study (Kaseje *et al*., 1987) in which education was not a selection criterion for CHWs.

Despite marital status being not significant in relation to CHWs performance, widows and separated CHWs were more associated with performance than singles and married. This finding concurs with Ndedda, (2012) in a Cross-Sectional Study in Busia District, Kenya on "Effects of Selected Socio-Demographic Characteristics of Community Health Workers on Performance of home Visits during Pregnancy" which did not find any relationship of marital status with performance.

Religion was not a significant factor however CHWs who were Muslims were rated better in performance than Christians. The importance of religion was also discussed by Gilson *et al.,* who found that, although religion was a significant factor, it was difficult to keep track of the direct role of CHWs religion in performance (Gilson *et al.,* 1989). Affiliation to institution nominating the CHWs for recruitment was not significant but those selected by government of Kenya performed more than those nominated by NGOs. This concurs with Ofosu-Amaah (1983) who found in her study of the literature available in 1983 that "turn-over of CHWs is high for a number of reasons, the most important being poor selection and affiliation".

Respondent's main source of income, occupation and monthly average income were not important statistically with middle income CHWs' earners associated with non performance. This can be attributed to the fact that the study was carried in urban setting where all CHWs have source of income or are supported by families for their upkeep or do other tasks to supplement their livelihoods. Majority of the respondents' had served for less than one year in this profession and despite years of services having no statistical value on performance, those who had been in the service for more than five years were associated with performance. This concurs with Ndedda, (2012) study which reported that experienced CHWs were most effective at establishing client satisfaction and client enablement's both of which are very important for behaviour change and demand creation for services.

In regards to health systems factors, supplies elicited significant statistics with delivery of level one health services. Training and type of training in general had no statistical value in the performance of CHWs but the period of training was important. Performance increased with period of training. Those who had attended refresher courses for more than three weeks were six percent less likely to perform compared to those who had trained for more than four weeks. The argument is supported by another study done in Malawi and Uganda on non-randomized community trials (WHO 2007). Refresher courses was not important however those who attended Infant and Young Child Feeding (IYCF) course as refresher course performed better than those who had not attended any refresher course. This findings contrast with a national survey on CHWs in the US which suggested that on job-training help CHWs overcome difficulties in understanding illnesses (Kash, May, & Tai-Seale, 2007).

Payment as an incentive to performance was not statistically significant; however functional allowance induced the CHWs to perform than salary and stipend. Two thirds of those who received functional allowance scored highly in the delivery of level one health services. This agrees with a WHO (2012) which reported that motivation was a key challenge hindering the delivery of level one service among the CHWs. However this contrasts a study in Nigeria by (Khan *et al*., 2006) on reasons for high CHWs turnover as due to; low salaries, lack of support for personal development and poor supervision. The issue of motivation may be the reason why CHWs scored poorly in targets requiring personnel input and scored highly in targets with public input such as health education forums.

Constant receipt of supplies had no statistical significance in delivery of level one health services with equal proportion of those who received constant supplies and those who did not, not performing. This may justify the poor rate of performance since supplies facilitate service delivery and at the same time explain why services based on knowledge dissemination are rated highly than supply based. This may be because the CHWs use of home visits to deliver personal and private services while public messages are relayed through different channels. Submitting monthly reports to supervisors was not statistically significant but the use of feedback information was; with those who reported weekly performing well than those who reported daily or monthly. Those who reported weekly performed probably because the feedback they received was frequent and addressed individual challenges encountered in the course of their work whereas those who reported monthly delivered poorly due to delay of feedback which would have addressed their challenges and those who reported daily were mainly committed to the reports rather than delivery of services. This feedback information assisted the respondents to address gaps within their mandates. Studies for example in Columbia have also shown that "feedback and rewards from the community" are more significant in the overall motivation and performance of CHWs (Robinson & Larsen, 1990). However this feedback was technically based since it was reported to supervisors and not community. The role of community rewards in this study could not be conclusively addressed due to methodology challenges and scope of the study. Supervision and number of supervisory visits per month had no significant value in relation to delivery of level one health services. Both none supervised and supervised CHWs rated equal in performance However support supervision increased CHWs morale and confidence. This concurs with a study on Community based Distributors of contraceptives in Ethiopia (WHO, 2009).

Community factors included were: support, norms, values and recognition, community appreciation, incentives and security. The majority of the respondents reported receiving community support with most being appreciated in kind. There was a similar performance among those who received support and those who did not. Appreciation by community, incentives; means of appreciation and source of support had no positive impact with CHWs performance at level one. This agrees with another study done in Bangladesh where CHWs felt that they are needed and appreciated by the community (Rahman *et al.,* 2010). It however contrasts with Antia & Bhatia, (1993) in the Parinche experiment (FRCH-PUNE Project) which reported that sustaining the motivation of CHWs to function with commitment and effectiveness within a community, remain a critical challenge and Bang *et al.,* 1994; Gryboski, Yinger, Dios, Worley, & Fikree, 2006) which reported that it is the degree of trust and confidence of the community members that CHWs have gained over a period of time that propel them to work.

Communication is crucial in the performance of CHWs; for instance performance rate increased with number of *barazas* one attended in a month. This concurs with the acknowledgement and emphasizes in the literature that the success of CHW programmes hinges on regular and reliable support and communication (Bhattacharyya *et al.,* 2001). It is equally acknowledged, however, that improper communication is often among the weakest links in CHW programmes (Ofosu-Amaah, 1983). Reception, acceptance and safety are central factors in service delivery issues which directly translate to CHWs performance. This can be attributed to the fact the delivery of services relies on some other factors not only community appreciation. Badges and security escort are sufficient but enhanced cordial reception through awareness would facilitate easier and faster entry to the community. Secondly people are enlightened and skeptical of CHW services. Accessibility and security are cross cutting challenges reported by the respondents. Keeping track of clients for a long season was a big hindrance in this study with most of the clients relocating periodically probably due to change of employment status, transfers, increased house rent and just change of estates/houses. Meanwhile, finding clients within their houses during the day is a nightmare since most are out hustling and visiting them in the night is unrealistic unless it is communally announced and done in groups.

The language barrier and nepotism is common with clients accepting and inviting CHWs from their own community/tribe. Religious practices and perceptions are a big challenge in adoption of a basic community health strategy such as family planning and use of latrine. For instance some traditions religion restricts the sharing of latrines by elders and children while others complicate adoption of feeding practices. This study reports that the use of alternative medicine is common and wide spread in informal areas of this study. These practices and subscriptions to alternative medicine may compliment and at the same complicate the uptake of CHWs services. This may be because the community will resort to or consult community health workers when they do not respond to their first line treatment (alternative medicine). The study was carried out in a cosmopolitan and diverse society characterized by different lifestyles, customs and livelihoods. These factors limit the community interaction and complicate the entry of CHWs in the society.

Conclusions

The study findings indicate that the performances of community health workers in Njiru district Kenya in the delivery of level one health service was below average. The performance was low in four parameters that is- referral of patients; number of houses visited; CHWs meetings; number of *Barazas*. There was however positive results in the target of health education. From this study, CHWs of young and old age; female gender; Muslims religion; those widowed/separated and long serving performed. In Community factors- communication, community reception, acceptability, accessibility, safety, clients' stability, nepotism, religious practices and perceptions, cultural norms & beliefs, complimentary medicine, diversity, lifestyle and social class were positively associated with CHWs' performance in this study. The Period of training, type of refresher course, field allowance as motivation, reporting weekly and use of feedback information were found to be key health factors in the performance CHWs in the study.

Recommendations

From this study the implementation and realization of the key CHS target in Peri- urban setting is challenging. This may be because the CHWs or the clients are not permanent residents of the area. In this regards a clear contextualized CHWs guideline tailored for Peri- urban settings needs to be developed. Where possible the strategy to be developed may incorporate landlords, caretakers, small businessmen. Since accessibility, acceptability and safety are cornerstones in attaining CHS set targets in the district and the majority of the clients are migrants from rural areas, this study proposes enhancing partnership with local religious leaders, security groups, welfare team, NGOs and landlords in the implementation of CHS. Joint work plans need to be developed to facilitate liaison. This study was based on both peri-urban set up. There is need to conduct a similar study in an upper class area and compare findings with those found in this study. Since the use of alternative medicine is prevalent in Njiru district, it's worth assessing the trend, practices and the results of this alternative medicine and to establish the extent to which this has affected community health decision among the Njiru residents.

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