Effect of a Community Health Worker Intervention on Uptake of Breast Cancer Screening Services among Women of Reproductive Age in Kitui County, Kenya

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Summary

INTRODUCTION

While communicable diseases remain the leading killers in many developing countries, the incidence and mortality from non-communicable diseases such as breast cancer and other cancers is rising rapidly. By 2015, estimated 2.4 Million new cases of breast cancer globally was reported. Screening is one way of improving the survival rate by reducing morbidity and mortality of Breast cancer. The annual incidence of cancer in Kenya was close to 37,000 new cases with annual mortality of over 28,000. Cervical and breast cancer were the leading diseases in women occurring at a rate of 40.1/100,000 and 38.3/100,000. The uptake of cancer screening services in Kenya was as low as 13.5%. Engaging CHWs in health service delivery especially in resource poor countries was found to be an achievement [6, 7] .

OBJECTIVES

In many developing countries, Community Health Workers (CHWs) provide a variety of services including outreach, counseling and patient home care services. This study aim was to assess the effect of a CHW led intervention on uptake of breast cancer screening services among women of reproductive age in Kitui County, Kenya.

MATERIALS AND METHODOLOGY

This was a quasi-experiment with one pre-intervention and a post intervention survey conducted in both intervention (Kitui East) and control site (Mwingi West) respectively. The intervention site received Community-Based Health Education (CBHE) aimed at promoting awareness and screening of both breast and cervical cancer. A total sample size of 422 participants were identified in each survey, based on Fisher et al 1998 formula. Purposive and simple random sampling method was used in identifying study area and respondents similarly. Data was collected using a research assistant administered questionnaire. Data analysis was done using frequencies and percentages, Z score tests, and ODDs Ratios. The study was subjected to the KNH-UoN Ethics Review committee (ERC) for ethical review and approval.

RESULTS

The intervention of CHWs increased the proportion of women seeking facility-based breast cancer screening services significantly by 38% in the intervention site. A Difference in Differences(DiD) statistic indicated 33.3% net increase in the proportion of women seeking the services within the 8-month of intervention period. The odds of seeking breast cancer screening services were higher (4.5 times higher) [(crude OR=3.604: 95%CI of OR=2.698-4.813, P<0.05)

(Adjusted OR=4.458: 95%CI of OR=3.204-6.202, P<0.05)] in intervention site compared to control site.

CONCLUSION AND RECOMMENDATIONS

Conclusively, the CBHE intervention improved breast cancer screening among women of reproductive age in Kitui County. To reduce the high prevalence of breast cancer and the economic burden of treating breast cancer cases in Kenya, we recommend adoption of Community based strategies like CBHE's help in promoting early screening and treatment of breast cancer among women of reproductive age.

Keywords: Community Health Workers, CBHE, Breast Cancer, Screening

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Introduction

Cancer is one of the major non-communicable diseases (NCDs) that together with cardiovascular diseases, diabetes and chronic respiratory diseases cause over 60% total global mortality yearly.

It was estimated that cancer kills over 7.9 million people annually constituting close to 13% of total deaths worldwide. While communicable diseases remain the leading killers in many developing countries the incidence and mortality from non- communicable diseases was rising rapidly. That has resulted in a 'double burden' of diseases imposing strain on existing health systems [16]. Cancer was an increasingly crucial public health problem in developing countries, including Africa.

As public and professional awareness of the cancer problem expanded, so has interest in the pattern of disease presentation, its epidemiology and treatment outcome [3]. Breast cancer was the most common cancer among women of reproductive age worldwide then. Between 2010 and 2012 over 1.6 - 1.67 million new cases of breast cancer were reported globally[8]. By 2015, the estimated number of new cases of breast cancer escalated and was reported to have reached 2.4 Million cases [1]

A recent study conducted to establish the incidence rate of breast cancer in Africa affirmed a growing incidence of breast cancer in the continent. Observed crude incidence rate of breast cancer in the study was 24.5 per 100 000 person yearly. [1]

Control of modifiable breast cancer risk factors such as maintaining a healthy weight, regular exercise and reducing alcohol intake could eventually have an impact in reducing the incidence of breast cancer. However, these strategies cannot eliminate majority of breast cancers.

Therefore, early detection in order to improve breast cancer outcome and survival remains the cornerstone of breast cancer control. Breast cancer screening is one way of reducing morbidity and mortality while improving the survival rate [9].

The second Kenya National Cancer Control Strategy 2017 - 2022 acknowledged that, Kenya was experiencing a double burden of infectious diseases remaining a significant cause of ill health coupled with a rising incidence and mortality from Non-Communicable Diseases (NCDs) [15]. Cancer was estimated to be the third leading cause of death after infectious and cardiovascular diseases. Among the NCDs related deaths, cancer was the second leading cause of death accounting for 7% of overall national mortality after cardiovascular diseases [15].

The annual incidence of cancer in Kenya was close to 37,000 new cases with annual mortality of over 28,000. Cervical and breast cancer are the leading cancers in women in Kenya occurring at a rate of 40.1/100,000 and 38.3/100,000 [15]. In future cancer deaths can be reduced significantly by early screening, detection and treatment. Breast self-examinations (physical examinations) of the breasts performed by self or examined by medical professionals or mammography were recommendable methods for the early detection of breast cancer [13].

The uptake of cancer screening services in Kenya was low. The 2014 Kenya Demographic and Health Survey (KDHS) indicated that the percentage of women who reported to have had a doctor or a health care provider perform an examination for breast cancer was 13.5% [12]. Low uptake of cancer preventive services in the country justified the need to innovate intervention measures to help increase screening and early detection. Ultimately to reduce morbidity and mortality associated with breast cancer in Kenya. Engaging CHWs in health service delivery especially in resource poor countries was found to be effective [6, 7] . There was a plethora of evidence demonstrating the positive potential of CHWs in improving equitable access to care and health outcomes [20].

In many developing countries, CHWs provide a variety of services, including outreach, counseling and patient home care. In Kenya, CHWs are in level one of the Kenyan healthcare service provision system and thus are a central pillar of primary health care delivery at the community level [14]. The aim of this study was to assess the effect of a CHW led intervention on uptake of breast cancer screening services among women of reproductive age in Kitui County.

Materials and Methodology

The study was carried out in Kitui County which had eight sub- counties namely Kitui rural, Kitui Central, Kitui West, Kitui East, Kitui South, Mwingi North, Mwingi West and Mwingi Central. This was a quasi-experiment with one pre-intervention and a post intervention survey conducted in both intervention and control sites. Kitui East was the intervention site while Mwingi West was the control site. The intervention site received a Community Based Health Education intervention (CBHEI) targeting on promoting awareness and screening of both breast and cervical cancer. The focus of the CBHEI was to raise awareness and promote early screening of both cervical and breast cancer in the intervention site. Therefore the intervention was designed following a validated United Kingdom breast and cervical cancer awareness modules [4] and [19].

The key elements of the intervention included the following: developing a breast and cervical cancer awareness training curriculum and manual which include:

1. Awareness of screening methods and importance of early breast cancer screening.
2. Validation of the training messages and materials.
3. Recruiting voluntary Community Health Workers and training them on breast cancer awareness.
4. Screening.
5. Assigning CHWs to train community members in their areas of jurisdiction (Community Units).
6. Lastly following up to ensure CHWs carry out the trainings.

Purposive and simple random sampling was employed in this study. Purposive sampling was employed to identify the intervention and control sites while simple random sampling was used to identify the study participants. The predicted total population of women in Kitui county by 2018 was 579,230. Total number of women in Kitui East was 10,187 and Mwingi West was 10,639 (Intervention and control site) respectively [11]. This being over 10,000, sample size was determined as 422 participants based on the formula by Fisher et al [10].

At baseline, a sampling frame of 5320, and 6415 households with a woman of reproductive age was established in intervention and control sites. 422 women were randomly identified from each sampling frame. Data was collected from 402 and 404 women in control and intervention sites, respectively. In end term survey a sampling frame of 6124 and 5397 women were identified. After selecting 422 households in both intervention and control, data was collected from 405 and 409 respondents in control and intervention sites, respectively. Data was collected using a research assistant administered questionnaire.

The quasi-independent variable in this study was the CHWs led intervention. The dependent variable was uptake of breast cancer screening services. Data analysis was done using frequencies and percentages, Z score tests, and ODDs Ratios. The study was subjected to the KNH-UoN Ethics Review committee (ERC) for ethical review and approval.

Results

Socio-Demographic Characteristics

The following table ***(Table 1***) is a table representing a summary of the sociodemographic characteristics of the study population.

Table 1: *Social - Demographic Characteristics of the Study Participants*

Variables	Categories	Baseline Survey				End term Survey (8 months)			
		Control		Intervention		Control		Intervention	
Age		**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
	16-20 years	12	3.0	0	0	20	4.9	21	5.1
	21-25 years	63	15.7	31	7.7	76	18.8	64	15.6
	26-30 years	134	33.3	106	26.2	117	28.9	112	27.4
	31-35 years	139	34.6	149	36.9	138	34.1	132	32.3
	36-40 years	50	12.4	113	28.0	54	13.3	80	19.6
	41-45 years	4	1.0	5	1.2	0	0	0	0
	Total	**402**	**100**	**404**	**100**	**405**	**100**	**409**	**100**
Parity		**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
	1 Child	23	5.7	12	3.0	30	7.4	13	3.2
	2 children	22	5.5	15	3.7	13	3.2	19	4.6
	3 children	58	14.4	60	14.9	67	16.5	64	15.6
	4 children	124	30.8	105	26.0	89	22.0	122	29.8
	5 children	89	22.1	93	23.0	99	24.4	99	24.2
	6 children	70	17.4	63	15.6	82	20.2	65	15.9
	7 and above	16	4.0	56	13.9	25	6.2	27	6.6
	Total	**402**	**100**	**404**	**100**	**405**	**100**	**409**	**100**
Education Level		**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
	No education	10	2.5	33	8.2	5	1.2	27	6.6
	Primary level	80	19.9	138	34.2	112	27.7	96	23.5
	Secondary level	227	56.5	143	35.4	167	41.2	206	50.4
	College/ University	85	21.1	90	22.3	121	29.9	80	19.6
	Total	**402**	**100**	**404**	**100**	**405**	**100**	**409**	**100**
Occupation		**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
	Not working	10	2.5	7	1.7	15	3.7	29	7.1
	Peasant Farmer	227	56.5	201	49.8	222	54.8	223	54.5
	Business	114	28.4	102	25.2	101	24.9	99	24.2
	Employment	51	12.7	94	23.3	67	16.5	58	14.2
	Total	**402**	**100**	**404**	**100**	**405**	**100**	**409**	**100**
Marital Status		**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
	Single	31	7.7	18	4.5	34	8.4	33	8.1
	Married	344	85.6	297	73.5	327	80.7	310	75.8
	Widowed	17	4.2	65	16.1	26	6.4	48	11.7
	Separated/ Divorced	10	2.5	24	5.9	18	4.4	18	4.4
	Total	**402**	**100**	**404**	**100**	**405**	**100**	**409**	**100**

Facility Breast Cancer Screening Proportions: Baseline Vs. End Term

Baseline data indicates that proportion of women who ever sought breast cancer screening services from health facilities was 29.5% and 31.8% at intervention and control sites respectively. At end term survey data shows that 67.5% and 36.5% of women sought breast cancer screening services at the facilities in intervention and control sites. ***Table 2:*** below represents a summary of these data.

Table 2: *Proposition of Uptake of Facility Breast Cancer Screening Services*

Survey	**Intervention site:** Have you ever sought breast cancer screening services?		**Control Site:** Have you ever sought breast cancer screening services?	
	Frequency	%	Frequency	%
Baseline	119/404	29.5	128/402	31.8
End-Term (8 months)	276/409	67.5	148/405	36.5

Z-Score Tests Testing Significance between Baseline and End Term Proportions

A further analysis established that uptake of breast cancer screening services increased by 38% in the intervention site. A Z-score test performed to test this difference established that, the change in proportions was statistically significant. The following (***Table 3***) represents a summary of this data.

Table 3: *Z-Score Tests Testing Change in Breast Cancer Screening Proportions*

Study Site	**Base line**	**End term**	**Z-Score test and P values (Baseline Vs. End term)**
Intervention	119/404 (29.5%)	276/409 (67.5%)	Z score = 10.8466, P<0.05 (38% difference is significant)
Control	128/401 (31.8%)	148/405 (36.5%)	Z score =1.3829, P>0.05, (4.7% difference is not significant)

Difference in Differences (DiD) Statistic

DiD Statistic established that in a period of 8-month intervention, there was a 33.3% net increase in women who sought facility-based breast cancer screening in that site. The following is a demonstration of how DiD statistic was calculated: (67.5%-29.5%) - (36.5% - 31.8%) = 33.3%. Odds of Seeking Facility-Based Breast Cancer Screening Services in Intervention Site Compared to Control Site

Binary logistic regression analysis revealed that at baseline, there was no significant difference in the odds of seeking health facility breast cancer screening services between intervention site and control site [(crude OR=0.894: 95%CI of OR=0.062-1.206, P>0.05) (Adjusted OR=0.884: 95%CI of OR=0.615-1.270, P>0.05]. The following (***Tables 5 and 6***) indicate summary of these findings

Table 5: *ODDS of Facility Breast Cancer Screening at Baseline (Crude)*

Variables in the Equation								95% C.I. for EXP(B)	
Study Phase		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Lower
Baseline Step 1a.	Have you ever sought breast cancer screening services?	-.112	.153	.539	1	.463	.894	.662	1.206
	Constant	.039	.085	.216	1	.642	1.040		

a. Variable(s) entered on step 1: *Have you ever sought breast cancer screening services?*

Table 6: *ODDS of Facility Breast Cancer Screening at Baseline (Adjusted)*

Variables in the Equation								95% C.I. for EXP(B)	
Study Phase		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Baseline Step 1a.	Have you ever sought breast cancer screening services?	-.123	.185	.443	1	.506	.884	.615	1.270
	Age of respondent	.924	.160	33.185	1	.000	2.518	1.839	3.448
	Number of children of respondent	-.523	.115	20.647	1	.000	.593	.473	.743
	Level of education of respondent	-.860	.143	35.962	1	.000	.423	.320	.561
	Primary Occupation of respondent	.225	.161	1.961	1	.161	1.252	.914	1.716
	Marital status	.599	.158	14.334	1	.000	1.820	1.335	2.482
	Total monthly household income	.000	.000	21.857	1	.000	1.000	1.000	1.000
	Constant	-1.718	.532	10.435	1	.001	.179		

a. Variable(s) entered on step 1: *Have you ever sought breast cancer screening services?*

A comparison of end term survey results with baseline survey results indicated that the odds of seeking health facilities for breast cancer screening services were higher in intervention sites compared to control site. Women in the intervention site were 3.6 and 4.5 times more likely to seek health facility breast cancer screening services than control site in the crude and adjusted odds respectively [(crude OR = 3.604: 95% CI of OR = 2.698 - 4.813, P < 0.05) (Adjusted OR = 4.458: 95% CI of OR = 3.204- 6.202, P < 0.05)]. The following ***Tables (7 and 8)*** indicate summary of these findings

Table 7: *ODDS of Facility Breast Cancer Screening at End Term Survey (Crude)*

Variables in the Equation								95%C.I. for EXP(B)	
Study Phase		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
End-term (8 Months) Step 1a	Have you ever sought breast cancer screening services?	1.282	.148	75.416	1	.000	3.604	2.698	4.813
	Constant	-.659	.107	38.030	1	.000	.518		

a. Variable(s) entered on step 1: *Have you ever sought breast cancer screening services?*

Table 8: *ODDS of Facility Breast Cancer Screening at End Term Survey (Adjusted)*

Variables in the Equation								95%C.I. for EXP(B)	
Study Phase		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
End-term (18 Months) Step 1a.	Have you ever sought breast cancer screening services?	1.495	.168	78.695	1	.000	4.458	3.204	6.202
	Age of respondent	.516	.171	9.063	1	.003	1.675	1.197	2.345
	Number of children of respondent	-.371	.131	8.074	1	.004	.690	.534	.891
	Level of education of respondent	-.420	.134	9.826	1	.002	.657	.506	.854
	Primary Occupation of respondent	-1.329	.203	42.779	1	.000	.265	.178	.394
	Marital status	.212	.152	1.962	1	.161	1.236	.919	1.664
	Total monthly household income	.000	.000	45.003	1	.000	1.000	1.000	1.000
	Constant	.408	.425	.924	1	.336	1.504		

a. Variable(s) entered on step 1: Have you ever sought breast cancer screening services? Age of respondent, Number of children of respondent, Level of education of respondent, PrimaryOccupation of respondent, Marital status, Total monthly household income.

Discussion

The key highlights in this data suggest that there was a significant increase in intervention site compared to control site by the end of the 8 months CBHE intervention. Data showed that. the proportion of women seeking facility-based breast cancer screening services significantly increased by 38% in the intervention site. A DiD statistic also reported a net increase in the same proportion by 33.3%.

Incidentally, there was no significant difference in the odds of women who sought health facility-based

breast cancer screening services between intervention and control at baseline. However, in the end term survey the odds of seeking facility-based breast cancer screening services were still higher (4 times higher after adjusting for potential confounding factors (social-demographic characteristics)) in intervention site compared to the control. This affirms only one possibility that, the health education intervention led by Community Health Workers (CHWs) was effective by increasing awareness on the importance in Kitui thus, resulting to increased uptake of health facility-based breast cancer screening services.

These findings are supported by a study conducted in South Korea which established that a community-based intervention improved knowledge on breast cancer and increased uptake of breast cancer screening services [17]. A recent systematic review published in the European Journal of Public Health in which evidence from 22 studies was reviewed also established that community based health promotion interventions helped in improving breast cancer knowledge and increasing uptake of breast cancer screening services [2]. Another study conducted in Iran revealed that health education intervention was effective in improving utilization of breast cancer screening services among women of reproductive age [18]

A study in southern Dallas which evaluated a Community based intervention aimed at promoting breast cancer awareness and screening also established higher odds in uptake of breast cancer screening services in intervention groups compared to control groups [5]. All these findings provide adequate evidence suggesting that community-based health promotion interventions targeting cancer prevention are more likely to be effective in promoting uptake of breast cancer screening services within the communities they are implemented. These reports support the findings in this study.

Conclusion and Recommendations

The Community Based Health Education Intervention (CBHEI) increased the proportion of women seeking facility-based breast cancer screening services significantly by 38% in the intervention site. A Difference in Differences statistic indicated 33.3% net increase in the proportion of women who sought breast cancer screening services within the 8-month intervention period. Regression analysis indicated that the odds of seeking breast cancer screening services were higher (4.5 times higher) [(crude OR=3.604: 95%CI of OR=2.698-4.813, P<0.05) (Adjusted OR=4.458: 95%CI of OR=3.204-6.202, P<0.05)] in intervention site compared to control site. In overall, the CBHE intervention improved breast cancer screening among women of reproductive age. To reduce the high prevalence of breast cancer and the economic burden of treating breast cancer cases in Kenya, we recommend adoption of Community-based strategies like CBHE that help in promoting early screening of breast cancer among women of reproductive age.

Competing Interests

The authors declare no competing interest.

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