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Influence of Health Promotion Provider Initiated Calls on Perception and Knowledge on Cervical Cancer among Women in Kirinyaga County, Kenya

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ABSTRACT

Cervical cancer is a major cause of death among women in the world with majority of the deaths occurring in developing countries like Kenya. Developed countries have organized screening that has helped in the early detection and screening of cervical cancer, in turn reducing mortality from the disease. There is a need to assist the women at risk to enroll into a routine cervical cancer screening program. This study assessed the influence of health promotion provider initiated calls on individual perception and knowledge on cervical cancer and screening among women at risk in Kirinyaga Central sub-county in Kirinyaga County, Kenya. The study adopted a randomized control study design with a sample size of 206 women aged between 25- 69 years, who were proportionately distributed within the 4 wards of the study sub-county. Respondents were randomized into control and intervention arms. Both qualitative and quantitative data were collected. Analysis was done using, thematic content for qualitative data; descriptive statistics were used to summarize categorical variables. Bivariate analysis using the Fisher exact and Chi-square was also applied. Factors with a $p<0.05$ were further analyzed in multivariate analysis. Respondents who had a high perception of being susceptible to cervical cancer were 4.26 times most likely to attend cervical cancer screening than those who did not. Respondents who had a high perception of cervical cancer being a serious disease were 3.46 times more likely to adhere to cervical cancer screening compared to those who did not. The researcher recommends that health education through provider-initiated calls using mobile phone technology should be adopted by the managements' of Kirinyaga County and Kerugoya County Referral Hospital.

Key words: Cervical Cancer, perception, Knowledge and Screenin

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I. INTRODUCTION

Cervical cancer is the second most frequent malignancy affecting women worldwide (Diana et al., 2020). It is the leading genital tract cancer in the less developed nations and a major contributor to cancer deaths in these countries (Solomon et al., 2019). Cervical cancer is of Public Health concern because it interferes with the infected woman's quality life years and causes many deaths, despite it being preventable (Finocchario-Kessler et al., 2016) There is an estimated 570,000 new cases of cervical cancer worldwide and over 311,365 annual deaths (WHO, 2019). Cervical cancer is caused by the Human Papilloma Virus (HPV) which is sexually transmitted. The World Health Organization has recommended organized screening for cervical cancer as a preventive measure for adult women. This promotes early detection and treatment of precancerous lesions. However, many women continue to appear in the health facilities when the cancer has advanced, making it difficult to treat (Humariya et al., 2019). This has been attributed to lack of adequate knowledge and low or negative perception (Bruni et al., 2019). There is urgent need to devolve ways of increasing knowledge level and to change the perception on cervical cancer and screening. This bridged gap of knowledge and perception is likely to increase uptake of cervical cancer screening and in turn reduce morbidity and mortality from the disease.

A. The problem

Cervical cancer screening uptake in Kenya is low at an average of 3.2% for all women, 4.0% in the urban areas and 2.6 % in the rural areas (Njuguna et al., 2020). Most (92%) cervical cancer patients in Kirinyaga County seek treatment when the disease is in the final stages making it difficult to treat (Ng'ang'a, 2019). This can be attributed to the fact that the county follows the guidelines set up by the National Cervical Cancer Screening Strategy, where most of the health education and promotion is concentrated on women attending reproductive health clinics and HIV care (Ng'ang'a 2016). This leaves out the larger population of women at risk within the communities. The purpose of this study was to assess the influence of Health promotion Provider-initiated calls on level of knowledge and individual perception on cervical cancer and screening with the aim of bridging the already noted gap on knowledge and perception.

B. Objective of the study

- To determine the influence of Health Promotion provider-initiated calls on level of knowledge and individual perception on cervical cancer and screening.

C. Hypothesis of the study

- Level of knowledge and individual perception on cervical cancer is not significantly influenced by health promotion

II. METHODOLOGY

This study adopted a double blind randomized controlled trial (RCT) study design where computer-based randomization was conducted at baseline. This allocated participants into the control and intervention arms at a ratio of 1:1. The intervention arm received a health promotion call with education on cervical cancer and screening. The health education comprised of (Awareness, predisposing factors, prevention and treatment, complications, screening and enrollment into routine screening program). The control group received calls with other health messages that were not cervical cancer related which acted as a placebo. The study was conducted in Kirinyaga County, Kenya. The dependent variable was knowledge and perception on cervical cancer and screening while the independent variable was health promotion on cervical cancer and screening. Eligible participants were women aged 25- 69 years with access to a mobile phone and consenting. A 'Two-stage' random sampling technique was used. In the first stage, households within the four Wards of Kirinyaga –Central Sub- County study were randomly selected from the total households which were 5084, 3762, 6192 & 4534. The second stage random sampling was used to select eligible women from household. Quantitative data was collected using interviewer administered questionnaires. Key informant interview guides were used to collect qualitative data. The data collection took place at baseline and end line which was one month after intervention.

Data management & analysis was done using SPSS software version 17. Descriptive statistical analysis was used to determine the level of knowledge and perception of cervical cancer and screening and logistic regression analysis was used determine associated factors at a 95% confidence interval with $P<0.05$ considered significant. Knowledge of cervical cancer and screening was measured with 12 items which were dichotomized as (0 =No,1=Yes). ''A total score ranging from 0-2 for poor knowledge and 3-5 for good knowledge''. Perception was measured using the Health Belief Model which included perceived susceptibility, perceived seriousness, perceived barriers and perceived screening benefits. Each perception was measured using 5 items. These tools achieved acceptable reliability **Cronbach's alpha** result of 0.856, 0.611 and 0.712 for knowledge and perception on cervical cancer and screening respectively.

III. RESULTS

A. Participants' perception of cervical cancer at baseline

Figure 1 shows participants perception of cervical cancer at baseline. Respondents with high perceived susceptibility to cervical cancer were few at 21 (12.1%), while those who highly perceived the diseases to be serious were 58 (33.5%). Perception that cervical cancer screening was beneficial was low at 27 (15.6%), while majority 93 (53.8%) of the respondents highly perceived the existence of barriers to the uptake of cervical cancer screening.

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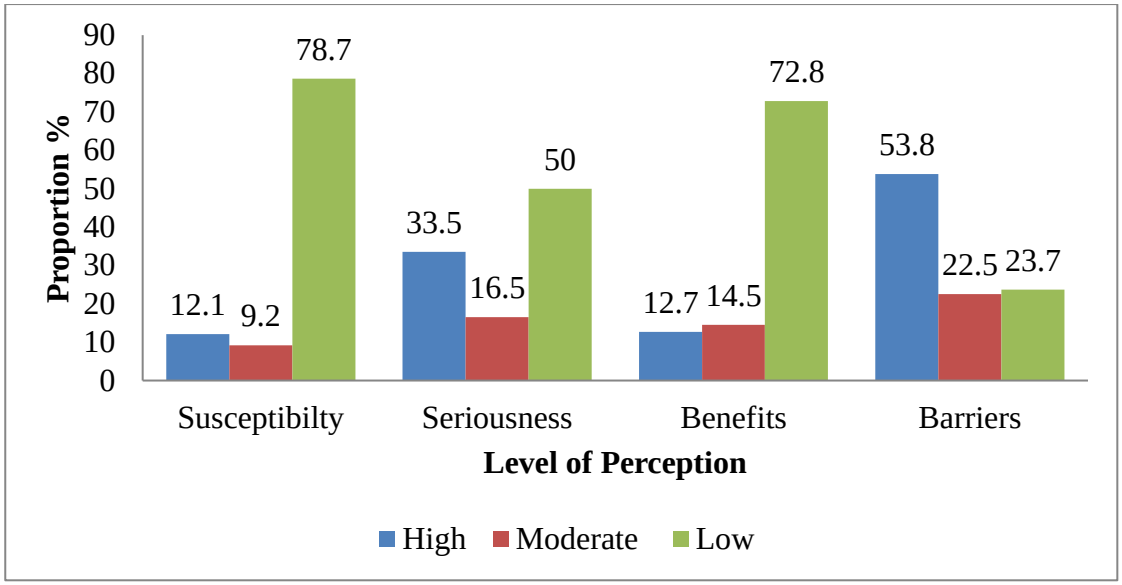

Cut-off points: Perceived susceptibility, seriousness and benefits – **Low (poor):** 0-2, **Moderate:** 3-5 **High (good)**: 6-8 Perceived Barriers –High (Poor): 5-4 moderate:3-2 Low (good): 1-0

Figure 1: Participant's perception of cervical cancer at baseline

B. Relationship between perception on cervical cancer and uptake of cervical cancer screening at baseline.

Table 1 shows the relationship between perception on cervical cancer and uptake of cervical cancer screening at baseline. There was no significant association between participants' perception on cervical cancer and uptake of cervical cancer screening (P< 0.05) at baseline.

Table 1: Relationship between perception on cervical cancer and uptake of cervical cancer screening at baseline

Variable	Category	Control n (%)	Intervention n (%)	Odds Ratio	95% CI	p-value
Perceived susceptibility	High	15(12)	13 (14)	0.689	0.40-1.51	0.062
	Moderate	6 (7)	10 (11)	1.221	0.92-3.84	
	Low (Ref)	75 (83)	70 (75)			
Perceived seriousness	High	31(33)	31 (39)	0.876	0.34-2.60	0.071
	Moderate	14 (15)	11 (12)	0.821	0.71-1.32	
	Low (Ref)	48 (52)	44 (49)			
Perceived Benefits	High	10(10)	14 (15)	1.267	0.96-1.89	0.077
	Moderate	16 (18)	10 (11)	0.851	0.67-1.32	
	Low (Ref)	67 (72)	67 (74)			
Perceived barriers	High	43 (50)	49 (52)	1.018	0.98- 2.13	0.092
	Moderate	21 (23)	21 (23)	0.958	0.67-1.02	
	Low (Ref)	23 (21)	23 (25)			

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C. Relationship between perception on cervical cancer and uptake of cervical cancer screening at end line

Table 2 shows the relationship between perception on cervical cancer and uptake of cervical cancer screening at end line. Provider initiated calls significantly increased participants perception on susceptibility and seriousness by up to 2.9 times and perceived screening benefits by up to 2.3 times (P = 0.001, P =0.001 & P =0.000).

Table 2: Relationship between perception on cervical cancer and uptake of cervical cancer screening at end line

Variable	Category	Control n (%)	Intervention n (%)	Odds Ratio	95% CI	p-value
Perceived susceptibility	High	15(17)	56(64)	0.889	0.40-1.70	0.001
	Moderate	22(26)	16 (18)	1.321	1.02-3.84	
	Low (Ref)	49(57)	15 (17)			
Perceived Seriousness	High	37(43)	62 (71)	0.876	0.51-2.60	0.001
	Moderate	15(17)	8 (9)	0.931	0.81-1.98	
	Low (Ref)	34(40)	17 (20)			
Perceived Benefits	High	16(19)	60 (69)	1.267	0.96-2.89	0.000
	Moderate	14 (16)	11 (13)	0.851	0.67-2.32	
	Low (Ref)	56 (65)	16(18)			
Perceived barriers	High	43 (50)	46 (53)	1.018	0.98- 1.93	0.092
	Moderate	17(20)	20 (230	0.958	0.67-1.02	
	Low (Ref)	27 (31)	21 (24)			

D. Effects of Health Promotion on perception of cervical cancer and screening

The table 3 shows the effect of provider initiated calls on participants' perception of cervical cancer and screening in the intervention arm. This study showed a significant positive change in participants' perception of cervical cancer, characterized by a significant difference in the means before and after provider-initiated calls; Perceived susceptibility (t=8.46, df=86, p=0.001), Perceived seriousness (t=8.93, df= 86, p=0.001), Perceived benefits (t=8.13, df=86, p=0.001), Perceived barriers (t=3.46, df=86. p=0.001).

Table 3: Effects of health promotion on perception

VARIABLE	MEAN	N	MEAN DIFF.	T	DF P-Value
PERCEPTION					
Perceived susceptibility	Before 18.17 After 19.14	87 87	0.97	8.47	df=86 P<0.001
Perceived Seriousness	Before 23.94 After 26.20	87 87	2.26	8.93	df=86 P<0.001
Perceived Benefits	Before 20.39 After 21.89	87 87	1.50	8.13	df=86 P<0.001
Perceived Barriers	Before 20.57 After 21.54	87 87	0.96	3.46	df=86 P<0.001

3.5: *Participants' knowledge on cervical cancer and screening at baseline*

Table 4 shows participants knowledge on cervical cancer at baseline. Majority 126 (73%) had not heard about cervical cancer and most 120 (69%) did not know that cervical cancer can be treated. Majority 156 (90%) did not have knowledge on the recommended screening schedule for cervical cancer. Most of the participants did not have knowledge of the risk factors associated with cervical cancer. There was no significant difference of respondents' knowledge on cervical cancer between the two study arms at baseline.

Knowledge		Control n (%)	Intervention n (%)	Total N (%)	χ^2/Exact 95% CI
Heard about Cervical Cancer	Yes	24 (28)	23 (25)	47 (27)	OR=1.378
	No	62(72)	64 (75)	126 (73)	P=0.456
Cervical cancer can be Prevented	Yes	25(29)	28 (32)	53 (31)	OR=2.555
	No	61(71)	59 (68)	120 (69)	P= 0. 531
Importance of cervical Cancer screening	Yes	21 (24)	26 (30)	47 (27)	OR=0.901
	No	65(72)	61 (70)	126 (73)	P=0.452
Recommended age to begin screening	Yes	12 (13)	15 (19)	27 (16)	OR=1.324
	No	75 (87)	72 (81)	147 (85)	P=0.684
Recommended screening Schedule	Yes	7 (8)	10 (11)	17 (10)	OR=0.165
	No	79 (92)	77 (89)	156 (90)	P=0.001
Risk factors Age of sexual debut	Yes	13 (15)	15 (17)	28 (16)	OR= 0.676
	No	73 (85)	72 (83)	145 (84)	P= 0.401
Age of first delivery	Yes	20 (23	20 (77)	40 (23)	OR=0.948
	No	66 (77)	67 (23)	133 (77)	P=0.876
Parity	Yes	16 (19)	19 (22)	35 (20)	OR =0.969
	No	70 (81)	67 (78)	137 (79)	P=0.542
Multiple sexual partners	Yes	11 (13)	13 (15)	24 (14)	OR= 1.244
	No	75 (87)	74 (85)	149 (86)	P=0.476
Cigarette smoking	Yes	17 (20)	15 (19	32 (18)	OR=1.452
	No	69 (80)	72 (81)	141 (82)	P=0.216
Oral contraceptives	Yes	21 (24)	24 (28)	45 (26)	OR=0.562
	No	59(76)	60 (76)	119 (69)	P=0.476
HIV	Yes	19 (78)	18 (21)	40 (23)	OR=0.787
	No	67 (78	69 (79)	136 (79)	P=0.242

Table 4: Participants' knowledge on cervical cancer and screening at baseline

3.6 Respondent's knowledge on cervical cancer and after health promotion

Table 5 shows the respondents knowledge on cervical cancer after health promotion calls. This was measured using eleven items, where a positive response and a negative response were coded as with knowledge and no knowledge respectively.

Most >70% had a significantly high knowledge on cervical cancer at end line, from 46(53%) to 86 (99%), (OR= 1.378; P= 0.003); (OR =2.571; P= 0.001); (OR =1.094; P= 0.001); (OR = 1.063; P= 0.017); (OR= 0.165; P =0.001); (OR -1.486; 0.001); (OR- 0.787; P= 042).

VARIABLE	CATEGORY	CONTROL		INTERVENTION		Logistic
Knowledge		Baseline n (%)	End-line n (%)	Baseline n (%)	End-line n (%)	Regression C.I 95%
Heard about Cervical Cancer	Yes	24 (28)	28 (33)	23 (25)	86 (99)	OR=1.378
	No	62(72)	58 (67)	64 (75)	1 (1)	P=0.003
Cervical cancer can be Prevented	Yes	25(29)	23(27)	28 (32)	75 (86)	OR=2.571
	No	61(71)	63 (73)	59 (68)	25 (14)	P= 0.001
Importance of cervical Cancer screening	Yes	21 (24)	21 (24)	26 (30)	70 (80)	OR=1.094
	No	65(72)	65 (76)	61 (70)	19 (20)	P=0.001
Recommended age to begin screening	Yes	12 (13)	26 (30)	15 (19)	46 (53)	OR=1.063
	No	75 (87)	60 (70)	72 (81)	31 (47)	P=0.017
Recommended screening Schedule	Yes	7 (8)	9 (10)	10 (11)	59 (68)	OR=0.165
	No	79 (92)	67 (90)	77 (89)	28 (32)	P=0.001
Risk factors Age of sexual debut	Yes	13 (15)	21 (24)	15 (17)	62 (71)	OR= 1.456
	No	73 (85)	65 (76)	72 (83)	25 (29)	P= 0.001
Age of first delivery	Yes	20 (23	20 (23)	20 (77)	47 (54)	OR=1.486
	No	66 (77)	66 (77)	67 (23)	40 (46)	P=0.014
Parity	Yes	16 (19)	21 (24)	19 (22)	52 (60)	OR =0.969
	No	70 (81)	65 (76)	67 (78)	35 (40)	P=0.001
Multiple sexual partners	Yes	11 (13)	11 (13)	13 (15)	21 (24)	OR=1.345
	No	75 (87)	75 (87)	74 (85)	66 (76)	P=0.320
Cigarette smoking	Yes	17 (20)	13 (15)	15 (19	16 (18)	OR=1.452
	No	69 (80)	73 (85)	72 (81)	71 (82)	P=0.216
Oral contraceptives	Yes	21 (24)	19 (22)	24 (28)	23 (26)	OR=0.562
	No	59(76)	67 (78)	60 (76)	64 (74)	P=0.076
HIV	Yes	19 (78)	26 (30)	18 (21)	67 (77)	OR=0.787
	No	67 (78	80 (70)	69 (79)	23 (23)	P=0.042

Table 5: Knowledge on cervical cancer and screening after Health Promotion

E. Mean difference of the knowledge level of the control arms

Table 6 shows the mean difference of the knowledge level of the control arms. There was no statistically significant mean difference in knowledge on cervical cancer after provider initiated calls in the control arms.

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VARIABLE		MEAN	N	SD	MEAN DIFF.	T	DF P-Value
Knowledge							
Heard about cervical cancer	Before	3.94	86	2.24	0.21	12.09	DF=85
	After	4.15	86	2.01			P=0.143
Cervical cancer can be prevented	Before	2.88	86	1.04	0.04	2.75	DF=85
	After	2.92	86	1.49			P=0.162
Screening importance's	Before	2.47	86	2.71	0.14	3.21	DF=85
	After	2.61	86	1.22			P=0.891
Recommended age to begin screening	Before	2.82	86	1.01	0.09	3.47	DF=85
	After	2.91	86	0.94			P=0.072
Recommended screening schedule	Before	2.53	86	1.07	0.04	2.37	DF=85
	After	2.57	86	2.14			P=0.112
Risk factors Sexual debut age	Before	12.66	86	1.93	0.31	2.96	DF=85
	After	12.97	86	1.01			P=0.089
Age of first Delivery	Before	12.57	86	1.09	0.01	1.97	DF=85
	After	12.59	86	2.13			P=0.078
Parity	Before	12.64	86	2.07	0.04	4.26	DF=85
	After	12.68	86	2.18			P=1.444
Multiple sexual Partners	Before	12.77	86	0.89	0.09	2.11	DF=85
	After	12.86	86	0.81			P=0.082
Cigarette smoking	Before	12.51	86	2.31	0.94	3.66	DF=85
	After	13.45	86	2.22			P=0.001
Oral contraceptives	Before	12.93	86	1.01	0.02	0.99	DF=85
	After	12.95	86	2.77			P=0.065
HIV	Before	12.46	86	2.19	0.21	2.23	DF=85
	After	14.67	86	1.27			P=0.049

Table 5: Mean difference of the knowledge level of the control arm

F. Mean difference of the knowledge level of the intervention arms

Table 7 shows the mean difference of knowledge on cervical cancer of the intervention arms. There was a statistically significant mean difference of knowledge on cervical cancer before & after provider-initiated calls of p>0.001 in the intervention arms.

VARIABLE		MEAN	N	SD	MEAN DIFF.	T	DF P-Value
Knowledge							
Heard about Cervical cancer	Before	3.42	87	4.25	4.01	15.25	df=86
	After	7.43	87	2.21			0.001
Cervical cancer can be prevented	Before	2.69	87	3.04	2.10	9.62	df=86
	After	4.79	87	1.49			0.001
Screening Importances'	Before	2.32	87	2.71	2.83	9.21	df=86
	After	5.35	87	1.22			0.001
Recommended age to begin screening	Before	2.78	87	1.01	1.54	7.47	df=86
	After	4.32	87	1.94			0.001
Recommended screening schedule	Before	2.52	87	1.01	1.07	6.37	df=86
	After	3.89	87	2.14			0.001
Risk factors Age of sexual debut	Before	2.63	87	1.23	0.69	0.44	df=86
	After	3.32	87	0.75			0.041
Age of first delivery	Before	2.59	87	1.09	2.63	8.97	df=86
	After	5.22	87	2.13			0.001
Parity	Before	2.61	87	2.07	0.83	15.76	df=86
	After	3.44	87	2.18			0.001
Multiple sexual Partners	Before	2.78	87	0.89	1.44	7.11	df=86
	After	4.22	87	0.81			0.001
Cigarette smoking	Before	2.57	87	2.31	2.82	14.66	df=86
	After	5.39	87	2.22			0.001
Oral contraceptives	Before	2.91	87	1.01	3.30	12.99	df=86
	After	6.21	87	2.77			0.001
HIV	Before	2.46	87	2.19	2.55	2.78	df=86
	After	5.01	87	1.27			0.001

Table 7: Mean difference of the knowledge level of the intervention arms

IV. DISCUSSION

A. Perception on cervical cancer and screening

In this study perception on cervical cancer and screening was initially low with very few 27% women having perception of being susceptible to cervical cancer and a fewer 25.6% of participants' perceiving cervical cancer as severe disease. This finding is in concordance with the findings of a desk top systematic review of 12 studies which reported that, the uptake of cervical cancer screening was directly associated with high scores of perceived susceptibility, seriousness and benefits (Bayu *et al.*, 2016). This indicated that there was urgent need to devolve ways to change the women's perception on cervical cancer and screening, and to enroll and retain women into a regular screening schedule for cervical cancer.

B. Perception level of cervical cancer after health promotion

The study reported an increase in participants with high perceived susceptibility 50% after health promotion. This is higher than Ghana 35.6% (Binka et al., 2019), similar to Ethiopia 59.3% (Bayu et al., 2016) and lower than Nigeria 89.1% (Adedokun et al., 2018). This study reported an increase of participants with high perceived seriousness of cervical cancer 31.5%. This was lower than Ghana 21% (Binka et al.,2017) and consistent with Ethiopia 36.5% (Bayu et al., 2019).

The study reported an increase in participants with high perception on cervical cancer screening benefits by a high 53.3%. This was higher than Ethiopia 27% (Bayu et al., 2016). The positive change in participants' perception was attributed to the effectiveness of the health promotion call.

C. Knowledge on cervical cancer and screening after health promotion

In this study, there was low knowledge on cervical cancer at baseline. This was in concordance with a study conducted in Thika, Kenya that reported a low knowledge level of risk factors for cervical cancer (Wanyoro et al., 2017). Knowledge on cervical cancer increased after health promotion to a high of 67.6%. This was consistent with studies done in Ghana where the pre-post-test scores for the intervention group showed a statistically significant difference (t=6.22, df=780, p=0.001) (Ebu *et al.*, 2019). This was an indication that the existing knowledge gap which contributed the non-uptake of cervical cancer screening was bridged by the health promotion calls.

D. Recommendation for further studies

The researcher recommends:

- A study on optimal number of voice calls on health promotion necessary an optimal attendance of scheduled cervical cancer screening.
- A study on cost effectiveness of health promotion calls on cervical cancer and screening.

E. Conclusion and implications for translation

- Most women at risk of cervical cancer, have poor knowledge and perception on cervical cancer and screening and therefore are likely not to uptake cervical cancer screening.
- Knowledge level and perception on cervical cancer and screening significantly increased after health promotion. There was a statistically significant mean difference before and after health promotion

Conflicts of Interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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Ethics Approval

The study was approved by Kenyatta university ethical review committee
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