Discover Health Systems

Discover

Research

Improving community health volunteers' knowledge on cervical cancer using dialogue-based training in rural Kisumu County

Edwin Onyango Ochomo[1] · **David Masinde**[1] · **Collins Ouma**[1]

Received: 30 April 2023 / Accepted: 11 October 2023
Published online: 30 October 2023

Abstract

Background The global burden of cervical cancer continue to rise with the low- and middle-income countries bearing the greatest burden. East Africa recorded about 54560 cases and 36497 deaths attributed to cervical cancer in 2020 with 5236 cases and 3211 deaths being reported annually. This high burden can be attributed to low screening rates and late diagnosis, which lead to undesirable outcomes. Kenya still has low screening rates with only 16.4% of the eligible women screened against the WHO target of 70% by 2030. Kisumu has a lower screening rate of about 5.7% according to KHIS 2019 data. This low screening rate is due to lack of proper community health education. We evaluated the effectiveness of dialogue-based training in improving community health volunteers' (CHV) knowledge on cervical cancer in Nyando.
Methods The study adopted a pre-and-post, longitudinal study design. The CHVs knowledge was assessed before and after the training. We calculated the proportion net change in the number of CHVs with improved knowledge after the intervention. Statistical significance was assessed at $p \leq 0.05$.
Results The pre-test mean score was 30.1%, this improved to 53.4% at post-test following the dialogue-based training of the CHVs. The knowledge on the various aspects: risk factors ($p < 0.0001$), signs and symptoms ($p < 0.0001$) and screening ($p < 0.0001$) significantly improved at the post-test following the dialogue-based training. The overall score also significantly improved ($p < 0.0001$) following the training among the CHVs. Occupation ($p < 0.0001$) was found to be significantly associated with knowledge on cervical cancer.
Conclusion The CHVs' knowledge was inadequate but significantly improved following the dialogue-based training.

Keywords Cervical cancer · Communitydialogue · Cervical cancer screening · Kenya

Abbreviations

CHV	Community Health Volunteer
WHO	World Health Organization
KHIS	Kenya Health Information System
NCD	Non-communicable Diseases
CU	Community Health Unit
CHEW	Community Health Extension Worker
KNBS	Kenya National Bureau of Statistics

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s44250-023-00047-5.

✉ Edwin Onyango Ochomo, edochomo@gmail.com; David Masinde, dmasinde2004@yahoo.com; Collins Ouma, collinouma@yahoo.com | [1]School of Public Health and Community Development, Maseno University, Private Bag, Maseno, Kenya.

NACOSTI National Commission for Science, Technology & Innovation
MUERC Maseno University Ethics Review Committee
WRA Women of Reproductive Age

1 Background

Cervical cancer is the fourth most common cancer in women with a global burden of 604127 cases and 341831 deaths as at 2020 [1], up from 569847 cases and 311365 deaths in 2018 [2–4]. Eastern Africa region among other low and middle income countries has the highest burden of cervical cancer with 54560 cases and 36497 deaths reported in 2020 [5]. In Kenya, current estimates indicate that every year, 5236 women are diagnosed with cervical cancer and 3211 die from the disease annually, a slight reduction from the 2018 figures of 5250 cases and 3286 deaths [4, 6]. Cervical cancer ranks as the second most frequent cancer among women in Kenya and the most frequent cancer among women between 15 and 44 years of age [7].

The disease burden is significantly higher in the developing countries largely due to lack of screening that allows detection of precancerous and early-stage cervical cancer. Screening, early detection and treatment can prevent up to 80% of cervical cancer deaths [8]. In the developing countries, however, 90% of cervical cancer deaths can be attributed to the poor access and uptake of screening services where an estimated 95% of the women have never been screened for cervical cancer mainly due to lack of awareness amongst the population [8, 9]. This underscores the need for public education, which is undertaken by the community health volunteers (CHVs) under the community strategy arrangement.

Since the community members select the CHVs, they have confidence in them. More so, they undergo training on basic public health matters e.g. control and prevention of some communicable and non-communicable diseases (MOH, 2016). Involvement of CHVs has proved to be effective in passing health information and promoting good health practices in the community [10, 11] and can be improved through training and supervision [12], however, their ability to create demand for cervical cancer screening services depend largely on their ability to pass the right information to the community members. This will ensure the WRA are enlightened, have access to information about their health thus are able to make informed decisions, and are therefore more likely to seek cervical cancer screening [13, 14]. A high level of knowledge about cervical cancer is also a key predictor of screening intent [15]. To enhance cervical cancer screening and early detection, it is important that the women access the most critical information on cervical cancer, that is risk factors, signs and symptoms and where the screening services can be accessed [16].

According to the CHVs' handbook and training manual on non-communicable diseases, the CHVs are supposed to be trained on the risk factors, and signs and symptoms of cervical cancer. However, the manual does not comprehensively cover the risk factors and completely leaves out the screening options available in the local health facilities further contributing to the inadequate knowledge on risk factors, signs and symptoms and screening services among the CHVs [17]. This important omission needed to be address in order to create demand for cervical cancer screening. Therefore, there was need to bridge the knowledge and content gap identified to enable the CHVs to effectively carry out public education and create demand for cervical cancer screening and improve the screening rates. The current study therefore addressed the knowledge gap and the inadequacies of the training manual to enable the CHVs effectively pass the information to the community.

Most community interventions do not take into consideration the interests of the stakeholders and the partners which include the target groups [18]. The traditional method of CHV training is the formal classroom model where the facilitator of the training serves as the teacher with the CHVs being the students; this is replicated in the community when the CHVs visit the households, this has not yielded the expected results. We therefore evaluated the effectiveness of dialogue-based training in improving CHVs' knowledge on cervical cancer in rural Kisumu County with the larger aim of replicating this in the community. The aim of the current study was to evaluate the effectiveness of dialogue-based training in improving CHVs' knowledge on cervical cancer using a modified training guide in a rural sub-county of Nyando in Kisumu County. The training was part of a larger intervention to address gaps identified from previous studies [19, 20], focusing on public health education targeting women of reproductive age to improve cervical cancer screening uptake.

2 Methods

2.1 Study area

The study was carried out in one of the rural sub-Counties of Kisumu County, that is Nyando (Fig. 1). Nyando Sub-County covers an area of 413.20 square kilometres with an estimated population of 161508 according to the 2019 Kenya national census [21]. The major economic activities are small scale farming and fishing with poverty level at 43% [22]. The Sub-County has functional community health units, making it ideal for this study.

2.2 Study design

This study adopted a longitudinal design in which data was collected pre-intervention (baseline) and post-intervention (endline) among the CHVs. The CHVs' knowledge was assessed before the training and reassessed after completing the training. The CHVs were trained on the risk factors, signs and symptoms and on the availability of the cervical cancer screening services in the local health facilities using a hybrid-training guide adopted from the CHV handbook and the NCD facilitator's guide with modifications (Supplementary file 1.docx). The training was in form of dialogues with the CHVs at their respective health facilities for a period of 6 weeks.

2.3 Target population

The study targeted CHVs working in health facilities offering cervical cancer screening, in Nyando Sub-County, Kisumu. There are nine health facilities offering cervical cancer screening services in the sub-County. The nine health facilities have 13 community units (CU) attached to them with each CU having 10 CHVs.

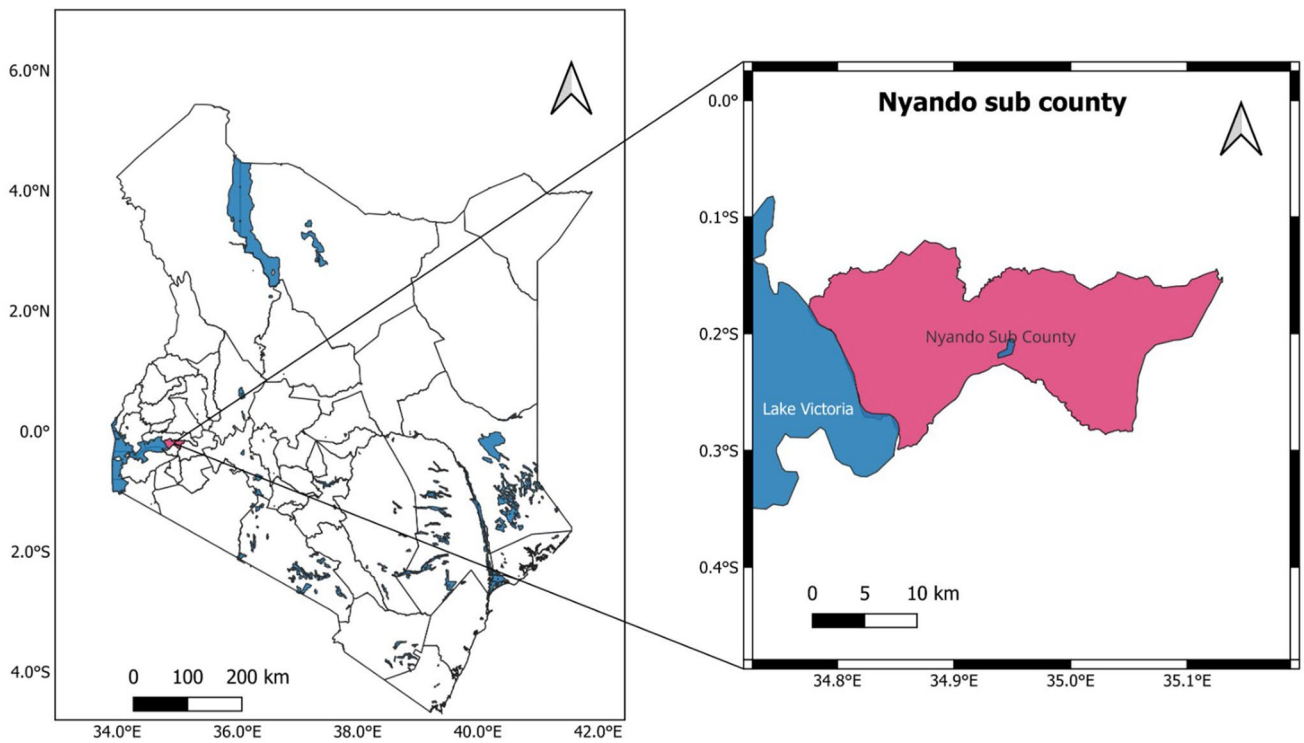

Fig. 1 Map of Nyando Sub-County where the study was conducted

2.4 Data collection

The CHVs in the participating health facilities underwent training for 6 weeks. The training sessions were conducted on a weekly basis and lasted about 1–2 h in the morning and were made up of 20 CHVs per session. The training sessions were held at the respective health facilities and for the small health facilities with just one CU, adjacent CUs were paired and the sessions conducted in one health facility. A trained research assistant with basic formal training in community health conducted the training sessions. This involved going through the modified training guide and discussing the content with the guidance of the research assistant followed by issuing of handouts for reference. Before the start of the training, the CHVs filled a pre-test questionnaire to gauge their knowledge on cervical cancer. The questionnaire was adopted from the University College London Health Behavior Research Centre's cervical cancer awareness measure tool [23]. The training sessions covered various topics from risk factors of cervical cancer to signs and symptoms and screening for cervical cancer. The training also reviewed the roles of the CHVs as stipulated in their initial training manual. Lastly, training ended with practical sessions on how to conduct a dialogue session.

2.5 Data analysis

To determine the change in knowledge among the CHVs, the responses were scored and proportions calculated for each category of knowledge assessment (risk factors, signs and symptoms and service availability). Overall knowledge was calculated as an average score for the knowledge assessment categories and the percentage scores calculated. Percentage overall knowledge score was calculated at pre-test and post-test. Further, overall knowledge was categorized as: Poor (0–35%), Average (36–75%) and Good (greater than 75%) based on categorization proposed by Vidhya [24].

The data was subjected to Shapiro–Wilk test to check on the normality of the distribution. Since the post-test results were not normally distributed while the pre-test was normally distributed, Wilcoxon rank sum test was used to test the difference between pre and post-test scores.

The change in knowledge was determined based on the percentage scores before and after the intervention. We calculated the proportion net changes in the CHVs with improved knowledge. Statistical significance was assessed at $p < 0.05$. For the demographic characteristics associated with knowledge, chi square test was performed to determine the association between the test scores and the demographic characteristics with the $p \leq 0.05$ showing statistical significance. However, in cases where the demographic variables were continuous, we used the non-parametric tests Kruskal Wallis test. The non-parametric test was preferred since it assumes any distribution hence not affected by non-normality of data.

3 Results

3.1 Demographic characteristics

Of the 130 CHVs invited to participate in the study, 10 did not meet the training attendance threshold of at least two theory training sessions and one practical session thus were not included in the analysis. This gave a response rate of 92.3%.

Of the 120 included in the analysis, majority were women (72.5%) and the mean age was 43.07 (SD 7.65). Majority at 63.3% had secondary level of education and 99.2% were Christians. Those who reported to be having spouses were 80% with 37.5% reporting to have worked as CHV for 4–9 years (Table 1).

3.2 Knowledge change on cervical cancer among the CHVs in Rural Kisumu County following dialogue-based training

The respondents were asked to identify the risk factors, and the signs and symptoms they knew, and various questions regarding the screening services being provided in the local health facilities. For each risk factor, and sign and symptom correctly identified, and each correct question answered about the screening services, a point was awarded. The total score was then converted into percentage and the mean and median scores at pre-test and post-test computed.

Table 1 Demographic characteristics of the respondents

	(n = 120)
Gender	
Female	87 (72.5)
Male	33 (27.5)
Age	
Mean (SD)	43.07 (7.65)
Education level	
Primary	30 (25.0)
Secondary	76 (63.3)
Tertiary	14 (11.7)
Religion	
Christian	119 (99.2)
Muslim	1 (0.8)
Marital status	
Single	2 (1.7)
Married	96 (80.0)
Divorced/widowed/separated	22 (18.3)
Occupation	
Small scale farming	73 (60.8)
Business	33 (27.5)
Formal employment	2 (1.7)
Casual employment	18 (15.0)
Other	2 (1.7)
Duration worked as CHV	
Less than 1 year	
1–4 years	37 (30.8)
5–9 years	45 (37.5)
10–14 years	22 (18.3)
More than 15 years	16 (13.3)

Data are numbers (proportions). n is the total number of respondents who completed both pre and post training knowledge assessment. Age is the mean age (standard deviation)

Table 2 CHV Knowledge Scores in the Pre-test and Post-test

		Pre-test	Post-test	Mean Difference (SE)	p-value (RANKSUM)
Risk factors	Mean (SD)	21.5 (8.7)	42.2 (14.5)	20.7 (1.5)	**< 0.0001**
Signs and symptom	Mean (SD)	24.2 (16.7)	57.5 (28.0)	33.3 (3.0)	**< 0.0001**
Availability of screening services	Mean (SD)	40.0 (28.5)	65.6 (18.8)	25.6 (3.1)	**< 0.0001**
Overall knowledge	Mean (SD)	30.1 (11.4)	53.4 (11.8)	23.3 (1.5)	**< 0.0001**

Data is in percentages. SD is standard deviation. Mean difference is the difference between the pre-test score and the post-test score. Bold means statistically significant

By using the rank-sum non-parametric test, the difference in the scores between pre and post periods was found to be significant ($p < 0.0001$). The post-test mean scores were significantly higher than the pre-test mean scores for both individual section scores and the overall knowledge scores (Table 2).

Table 3 Knowledge categorization at pre-test and post-test

Knowledge category	Pre-test (n = 120)	Post-test (n = 120)	*p*-value (Chi-square)
Poor	83 (69.2)	4 (3.3)	**< 0.0001**
Average	37 (30.8)	107 (89.2)	
Good	0	9 (7.5)	

Data is in numbers (proportion). Bold means statistically significant

3.3 Knowledge categorization at pre-test and post-test

The percentage of CHVs who recorded poor (0–35%), average (36–75%) and good (> 75%) knowledge was also calculated at pre-test and post-test. Chi-square test was used to measure the test proportion scores between pre- and post-periods. A significant difference was reported between the two periods with a $p < 0.0001$ (Table 3).

3.4 Demographic characteristics associated with knowledge

The demographic characteristics of the study respondents were tested for association with the knowledge on cervical cancer. Only occupation was found to be significantly associated with knowledge on cervical cancer among the CHVs ($p < 0.0001$) (Table 4).

Table 4 Demographic characteristics associated with knowledge

Variables/Scores	Poor (n = 4)	Average (n = 107)	Good (n = 9)	p-value (Kruskal wallis, chi-square)
Gender				
Female	1 (25.0)	79 (73.8)	7 (77.8)	0.093
Male	3 (75.0)	28 (26.2)	2 (22.2)	
Median Age (IQR)	37.5 (33.0, 43.5)	43.0 (38.0, 48.0)	42.0 (38.0, 47.0)	0.457
Education				
Primary	1 (25.0)	29 (27.1)	0	0.181
Secondary	2 (50.0)	65 (60.8)	9 (100)	
Tertiary	1 (25.0)	13 (12.1)	0	
Religion				
Christian	4 (100)	107 (100)	9 (100)	null
Marital status				
Married	4 (100)	85 (79.4)	8 (88.9)	0.482
Separated/divorced/widowed	0	22 (20.6)	1 (11.1)	
Occupation				
Small scale farming	1 (25.0)	63 (62.4)	3 (33.3)	**< 0.0001**
Business	3 (75.0)	21 (20.8)	1 (11.1)	
Formal employment	0	0	2 (22.2)	
Casual labor	0	15 (14.9)	0	
Other	0	2 (2.0)	3 (33.3)	
Duration worked as a CHV				
1–4 years	3 (75.0)	33 (30.8)	1 (11.1)	0.263
5–9 years	1 (25.0)	38 (35.5)	6 (66.7)	
10–14 years	0	21 (19.6)	1 (11.1)	
15 years and above	0	15 (14.0)	1 (11.1)	

Data is in numbers (proportions). IQR is the interquartile range. The p-values calculated using chi-square test except for age where Kruskal Wallis test was used since it is a continuous variable. n is the number of respondents in the category. null means there was only one category of data thus no comparison. Bold means statistically significant

4 Discussion

The study shows that the CHVs knowledge was poor before the intervention but had a significant improvement following the intervention ($p < 0.0001$). The number of CHVs with poor knowledge on cervical cancer significantly reduced at endline while the number of those CHVs with average and good knowledge increased. This is in agreement with previous pilot study in rural Kisumu, Kenya where a training of CHVs focusing on cervical cancer significantly improved their knowledge [19]. Similarly, a systematic review on the global health capacity building initiative revealed that hands-on focused training of community health workers improved their knowledge and ability to effectively carryout community health education [25] while in Nepal, a study to evaluate role-play against lecture kind of training concluded that role play yielded better results which included development of communication skills and active listening, resulted in the learners' enthusiasm and motivation, and better mastery of the content [26]. Similarly, training of volunteers has also been found to improve among other things, their knowledge, confidence in overcoming the difficulties or discouragement to continue to volunteer, and having confidence in explaining their activities [27, 28].

The low knowledge scores at the pre-test can be attributed to the inadequacies of the training manual for the CHVs that only briefly mentions about non-communicable diseases which includes cervical cancer among other cancers, thus the CHVs are never given adequate information. The current study was able to blend new literature and the ministry training tool and give the CHVs more enriched content reflecting the current developments in cervical cancer screening and diagnosis.

Further, the follow-up trainings like the initial CHV training use the classroom model and tend to cover many areas in a short period of time, which does not allow the CHVs enough time to grasp enough information to take to the communities. The current training apart from focusing on just cervical cancer also afforded the CHVs the opportunity to do mock presentation and get feedback from their peers. This dialogue-based kind of content delivery also ensured that the CHVs got an opportunity to share their understanding of the messages with corrections where necessary.

Knowledge was found to be significantly associated with occupation ($p < 0.0001$) which is consistent with the findings of other studies [20, 29]. This could be because occupation is largely dependent on ones level of education and knowledge in general. The type of occupation determines the kind of information an individual is exposed to, the exposure to cancer risks and the kind of messages they are likely to interact with and take interest in.

This study was, however, limited to only facilities that reported to be actively offering cervical cancer screening services and did not assess knowledge retention among the CHVs in the course of their sensitization. This limits the generalizability of these findings only to the study population.

5 Conclusion

The CHVs knowledge was inadequate but significantly improved following the dialogue-based training. The training provided an opportunity for the CHVs to remember the lessons learnt during the initial training and gather new information not covered by the initial training module. This kind of training is important in keeping the CHVs updated with most recent information and reminding them of lessons learnt in the initial training.

Acknowledgements Special appreciations to the health department of the county government of Kisumu, especially the CHVs in Nyando Sub-County for its cooperation and support during my data collection, and finally to my data collection team (Dinozoff Achoki and Millicent Akinyi).

Author contributions EOO designed and carried out the data collection in the field and participated in the drafting of the manuscript. DM and CO made substantial contributions to the design and interpretation of the data. DM and CO were also involved in revising the manuscript critically for important intellectual content. They also gave the final approval of the version to be published and have agreed to be accountable for all aspects of this work. All authors read and approved the final manuscript.

Funding This study was not funded.

Availability of data and materials All data generated or analysed during this study are included in this published article (Supplementary file 2.xlsx).

Code availability Not applicable.

Declarations

Ethics approval and consent to participate Scientific approval for this study was be obtained from Maseno University's School of Graduate Studies (SGS) while ethical approval was obtained from Maseno University Ethics Review Committee (MUERC) (MUERC/00910/20). Research license was obtained from NACOSTI (Ref# 526448). The authority of the Kisumu County Health Management was also sought (Ref. GN 133 VOL VIII (473)). Before recruitment into the study, the participants' written informed consent was also obtained. Lastly, the confidentially of the information and the identity of the participants was guaranteed by assigning unique identifiers to the participants. Access to data was limited to the principal investigator and the data were kept in locked cabinets and in folders protected with passwords to enhance confidentiality.

Consent for publication Not Applicable.

Competing interests The authors declare that they have no competing interests.

References

1. Stelzle D, Tanaka LF, Lee KK, et al. Estimates of the global burden of cervical cancer associated with HIV. Lancet Glob Heal. 2021;9:e161–9.
2. Arbyn M, Weiderpass E, Bruni L, et al. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. Lancet Glob Heal. 2020;8:e191-203.
3. Sung H, Ferlay J, Siegel RL, et al. GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2020. https://doi.org/10.3322/caac.21660.
4. Bray F, Ferlay J, Soerjomataram I, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68:394–424.
5. GLOBOCAN. Cervix Uteri. 2020.
6. GLOBOCAN. Kenya: cancer fact sheets. 2020.
7. IOC. Complementary data on cervical cancer prevention. 2018.
8. WHO. WHO|Comprehensive cervical cancer control. World Heal Organ 2014.
9. WHO. Cervical cancer|WHO|regional office for Africa. 2021.
10. Wangalwa G, Cudjoe B, Wamalwa D *et al.* Effectiveness of Kenya's Community Health Strategy in delivering community-based maternal and newborn health care in Busia County, Kenya: non-randomized pre-test post test study—PubMed. Pan Afr Med J. 2012.
11. Panday S, Bissell P, Van Teijlingen E, et al. The contribution of female community health volunteers (FCHVs) to maternity care in Nepal: a qualitative study. BMC Health Serv Res. 2017. https://doi.org/10.1186/S12913-017-2567-7.
12. Woldie M, Feyissa GT, Admasu B, et al. Community health volunteers could help improve access to and use of essential health services by communities in LMICs: an umbrella review. Health Policy Plan. 2018;33:1128–43.
13. Interis EC, Anakwenze CP, Aung M, et al. Increasing cervical cancer awareness and screening in Jamaica: effectiveness of a theory-based educational intervention. Int J Environ Res Public Health. 2015. https://doi.org/10.3390/ijerph13010053.
14. Shakya S, Karmacharya BM, Afset JE, et al. Community-based health education has positive influence on the attitude to cervical cancer screening among women in Rural Nepal. J Cancer Educ. 2016;31:547–53.
15. Rosser JI, Njoroge B, Huchko MJ. Knowledge about cervical cancer screening and perception of risk among women attending outpatient clinics in rural Kenya. Int J Gynecol Obstet. 2015;128:211–5.
16. Wongwatcharanukul L, Promthet S, Bradshaw P, et al. Factors affecting cervical cancer screening uptake by Hmong hilltribe women in Thailand. Asian Pacific J Cancer Prev. 2014;15:3753–6.
17. Ochomo EO, Atieli H, Gumo S, et al. Assessment of community health volunteers' knowledge on cervical cancer in Kadibo Division, Kisumu County: a cross sectional survey. BMC Health Serv Res. 2017. https://doi.org/10.1186/s12913-017-2593-5.
18. Seven M, Marie MA. Community-based interventions designed to optimize health behaviors among cancer survivors: an integrative systematic review. Support Care Cancer. 2022;30:8405–15.
19. Ochomo EO, Ndege S, Itsura P. Focused Training of Community Health Volunteers on Cervical Cancer in Rural Kisumu. J Cancer Educ. 2020. https://doi.org/10.1007/s13187-020-01839-6.
20. Ochomo EO, Atieli H, Gumo S, et al. Assessment of community health volunteers' knowledge on cervical cancer in Kadibo Division, Kisumu County: a cross sectional survey. BMC Health Serv Res. 2017;17:675.
21. KNBS. 2019 Kenya population and housing census. Naiorobi, 2020.
22. KNBS. Republic of Kenya Kenya demographic and health survey 2014. 2015.
23. UCL. Cervical cancer awareness measure toolkit version 2. 2011.
24. Vidhya K, Gupta S, Lekshmi R, et al. Assessment of patient's knowledge, attitude, and beliefs about cancer: an institute-based study. J Educ Health Promot. 2022. https://doi.org/10.4103/jehp.jehp_733_21.
25. Naal H, El Koussa M, El Hamouch M, et al. A systematic review of global health capacity building initiatives in low-to middle-income countries in the Middle East and North Africa region. Global Health. 2020;16:1–16.

26. Vizeshfar F, Zare M, Keshtkaran Z. Role-play versus lecture methods in community health volunteers. Nurse Educ Today. 2019;79:175–9.
27. Taguchi A, Murayama H, Arakawa M, et al. Efficacy of a training program designed to help address challenges faced by health promotion volunteers. Nihon Koshu Eisei Zasshi. 2017;64:207–16.
28. Kienen N, Bittencourt L, Pelloso SM, et al. Cervical cancer screening among underscreened and unscreened Brazilian women: training community health workers to be agents of change. Prog Community Heal Partnerships Res Educ Action. 2018;12:111–9.
29. Getachew S, Getachew E, Gizaw M, et al. Cervical cancer screening knowledge and barriers among women in Addis Ababa. Ethiopia PLoS One. 2019;14: e0216522.