

Barriers and Facilitators to Integrating Clinical Breast Examinations With Cervical Cancer Screening Programs in Outpatient Clinics in Western Kenya

Prisca C. Diala, BA¹; Magdalene Randa, MBChB²; Jackline Odhiambo, MSc³; Gregory Ganda, MBChB, MMed⁴; Craig R. Cohen, MD, MPH⁵; and Chemtai Mungo, MD, MPH⁶

PURPOSE Nearly half of Kenyan women with breast cancer present with advanced disease—owing partially to limited patient education and screening limitations in low- and middle-income countries. With increasing access to nurse-led cervical cancer screening (CCS) in government clinics in Kenya, we investigated provider-perceived barriers and facilitators to integrating clinical breast examinations (CBEs) with ongoing CCS programs in Kisumu County, Kenya.

METHODS CCS providers within the Ministry of Health Clinics in Kisumu County, Kenya, were recruited to participate in a two-phase, sequential, mixed methods study. Knowledge of CBE guidelines was assessed with a questionnaire. Providers with significant CCS and CBE experience then completed a one-on-one interview discussing barriers and facilitators to integration.

RESULTS Sixty-nine providers from 20 randomly selected facilities participated in the survey. Providers all agreed that breast cancer screening was very important. Although 93% said that they routinely offered CBEs, only 22% of these providers screened at least eight of their last 10 patients. Forty-four percent identified four or more of five signs and symptoms of breast cancer, and 33% identified four to five risk factors. Although providers showed enthusiasm for integration of CBEs into their practices, barriers were identified and grouped into four themes: (1) fragmentation of services, (2) staffing shortage and inadequate on-the-job training, (3) limited space and referral system challenges, and (4) limited patient awareness on need for cancer screening.

CONCLUSION Addressing providers' concerns by providing routine on-the-job clinical training, improving staffing shortages, strengthening the diagnostic and treatment referral pathway, and increasing patient education are some of the first steps in facilitating integration of CBEs with CCS services in primary care clinics in Kenya.

JCO Global Oncol 7:1722-1729. © 2021 by American Society of Clinical Oncology

Creative Commons Attribution Non-Commercial No Derivatives 4.0 License 

INTRODUCTION

Breast cancer leads cancer incidence and mortality among women with more than 2 million new cases and nearly 630,000 deaths annually.¹ Although the incidence is higher in high-income countries, the mortality burden falls disproportionately on low- and middle-income countries (LMICs).² Nearly half of affected women in LMICs die annually of breast cancer compared with 21% of affected women in high-income countries.¹ In Kenya, breast cancer is the most common cancer for women with nearly 6,000 new cases and approximately 3,000 reported deaths annually.³ More than 50% of Kenyan women are diagnosed at advanced stages.⁴

Mammography screening is recognized as the most effective early diagnostic tool.⁵ However, uptake in LMICs is limited⁶ in part by weak health care systems⁷ and insufficiencies in diagnosis.² Clinical breast examinations

(CBEs), shown to be cost-effective,⁸ are thus recommended as an alternative to mammography-based screening in LMICs.⁵ Although not meant to replace mammography, the Kenyan government considers CBEs as an opportunity to educate women on breast health.⁹

Despite efforts to increase mass screening, uptake of breast cancer screening in Kenya remains low.⁹ Screening rates among Kenyan women are estimated to be about 5%⁷ as compared with around 70% in the United States.⁸ In Western Kenya, it is estimated that only 45% of women are aware of available breast cancer screening opportunities and only 8% of these previously had CBEs.¹⁰ Studies looking at patient barriers to screening uptake highlighted limited patient education,¹¹ women's busy schedules, perceived low personal risk, long queues, and cost of transportation.^{10,12,13}

Although these studies explored patient barriers to uptake of CBEs, little is known about provider-perceived

Author affiliations and support information (if applicable) appear at the end of this article.

Accepted on November 19, 2021 and published at ascopubs.org/journal/go on December 22, 2021; DOI <https://doi.org/10.1200/GO.21.00272>

CONTEXT

Key Objective

Do providers see integration of clinical breast examinations with cervical cancer screening as means to address the low screening rates and high morbidity and mortality from breast cancer in Western Kenya?

Knowledge Generated

Providers demonstrated an eagerness to integrate the two services, noting that the merger is long overdue and a necessity to empower and save women. Yet, despite their eagerness, there is a call to first address challenges with staffing, provider and patient education, and treatment and referral pathways for such a system to be sustainable.

Relevance

Integrating both services can leverage the resources in place for preventing cervical cancer for the purpose of curbing the high mortality rates from breast cancer in Kenya.

barriers to CBE uptake or its incorporation with cervical cancer screening (CCS). Current efforts by the WHO toward elimination of cervical cancer in LMICs through facility-based screening provide an opportunity to couple breast and cervical cancer prevention efforts at the primary care level during the same clinic visit.^{14,15} Using a mixed methods approach, we explored provider-perceived barriers and facilitators to integration of CBEs with ongoing CCS programs in outpatient clinics in Kisumu County, Kenya. Understanding provider-perceived barriers can help address gaps in breast cancer screening and facilitate interventions to enable successful integration of CBEs with CCS programs in LMICs.

METHODS

Between June 2020 and August 2020, CCS providers were recruited from 20 facilities within the seven subcounties in Kisumu County, Kenya (Fig 1). A list of active facilities was obtained from the County Director of Health's office. Facilities were divided into their subcounties using cluster sampling, and participating facilities were randomly selected. Two subcounties each had one eligible facility, which was automatically included in the study. The remaining 18 facilities were randomly selected from the other five subcounties.

We used a sequential, two-phase, mixed methods design. The design and implementation of the qualitative sample was independent of results from data analysis of the quantitative study.^{16,17} The point of integration occurred at sampling of the qualitative study, where participants were recruited on the basis of a specified criterion from the quantitative study with the intention of highlighting challenges with CBE provision.¹⁶⁻¹⁹

The survey was based on the 2018 Kenya National Cancer Screening Guidelines⁹ and administered in-person by two trained research assistants via Research Electronic Data Capture to all available providers from each of the 20 sampled facilities. We conducted a pilot study in the first week to test local comprehension of our study instruments, willingness to participate, and feasibility of protocol and safety measures against COVID-19. Data from the pilot study were not

included in the final analysis. Ten providers offering regular CCS and CBEs (defined as offering CBEs to > 5 of their last 10 female clients, see Table 2) were randomly recruited and interviewed until theoretical saturation was reached.²⁰

The study was approved by the institutional review boards of the University of California, San Francisco, and the Jaramogi Oginga Odinga Teaching and Referral Hospital in Kisumu, Kenya. Informed consent was obtained before study participation.

Quantitative data were analyzed using Stata 13.0 (Stata-Corp, College Station, TX). Frequencies and percentages of categorical answer choices were summarized. Interviews were conducted and recorded on Zoom using a standard interview guide with five core questions and probes, transcribed by P.C.D., and checked against the audio recordings by M.R. and Amelea M. Atieno All identifying information was removed from the transcripts, imported, and managed using QSR Nvivo (QSR International Ltd, Doncaster, Australia). P.C.D. and J.O. independently reviewed and coded the transcripts using an inductive approach.^{21,22} Frameworks were developed iteratively using the grounded theory approach.^{21,23,24}

RESULTS

Quantitative Findings

Sixty-nine CCS providers participated in this study (Fig 1). Of the providers, 71% were female and 29% were male, with a mean age of 39 years (Table 1). Eighty-six percent were nurses with 13 mean years of service.

Table 2 summarizes the providers' attitudes toward CBEs. All 69 providers agreed that breast cancer screening is very important. Of providers, 93% said that they offer CBEs to their female patients. However, of these, only 22% said that they screened eight of their last 10 patients.

Of the five risk factors and five signs and symptoms of breast cancer, 33% of providers were able to identify four to five risk factors, whereas 44% were able to identify four to five signs and symptoms (Table 3).

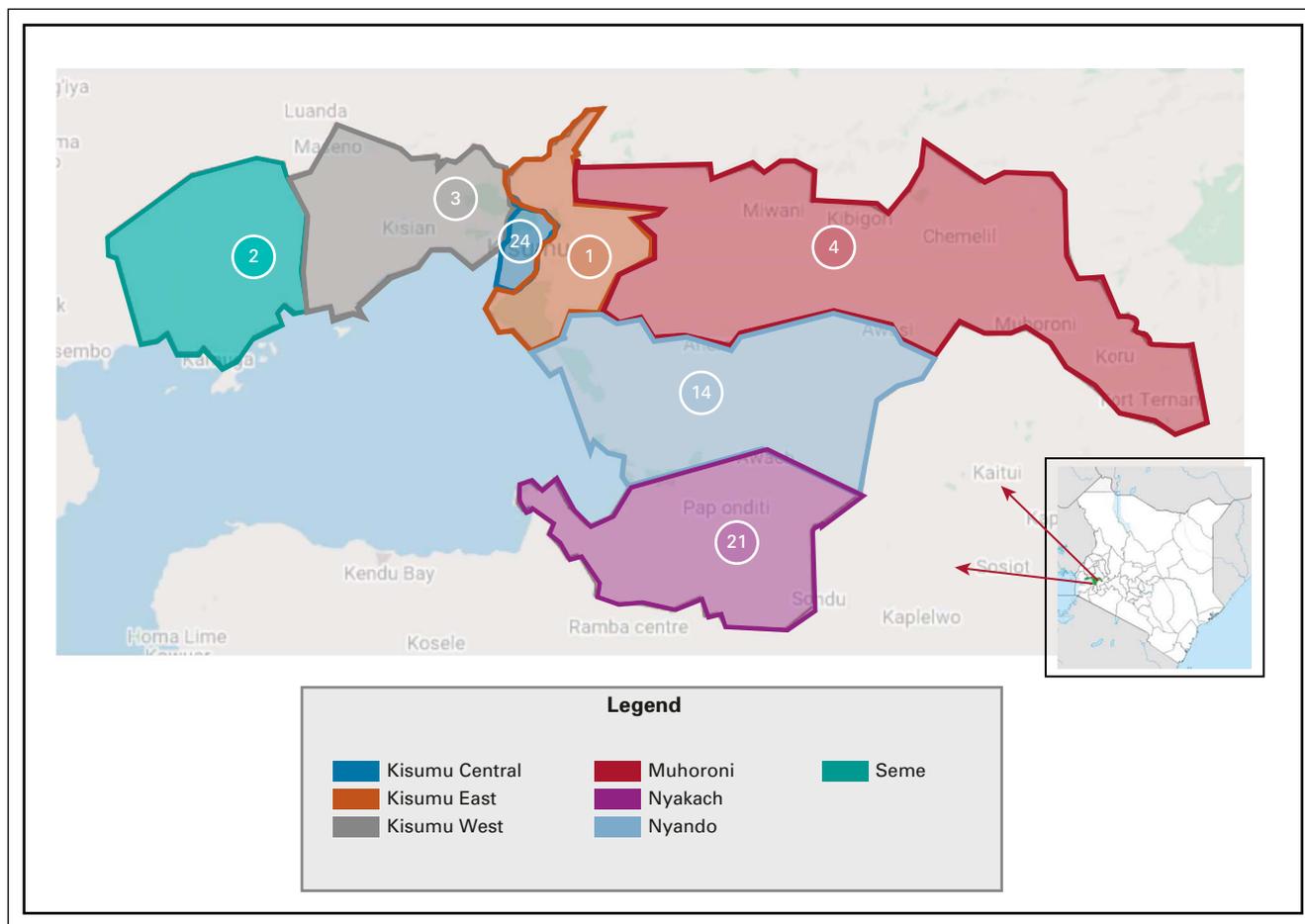


FIG 1. Circled numbers depict the number of providers recruited from each of the seven subcounties in Kisumu County, Kenya. All available providers from each randomly selected site were included in the study. Total number of facilities recruited/active facilities in each subcounty was 20: Kisumu Central, 6/11; Kisumu East, 1/1; Kisumu West, 2/6; Muhoroni, 3/4; Nyakach, 3/7; Nyando 3/6; and Seme 1/1. The figure depicts the number of providers sampled from each subcounty for a total N = 69. Integrating breast and cervical cancer screening in Kenya is overdue, but barriers must be addressed.

Among the providers, 95% identified a need for routine CBE in female clients age 25-55 years; however, that proportion decreased to 25% when considering female clients age 56-74 years (Table 4).

Qualitative Findings

Ten providers participated in the interviews, and their verbatim responses are shown with participants' number in parentheses [Px]. Although providers unanimously showed enthusiasm in integration, several barriers were identified and grouped into four themes: (1) fragmentation of services, (2) staffing shortages and inadequate on-the-job training, (3) limited space and referral system challenges, and (4) limited patient education.

Fragmentation of services and the need for integration.

CBEs and CCS were mainly provided independently during family planning (FP) and maternal child health (MCH) service visits, and the frequency and availability of CBEs varied by facility. Some providers reported that CBEs were offered routinely at their facility to every woman who came for CCS.

[When] a mother walks in for family planning services ... we counsel the mother for both breast and cervical cancer screening and most of them accept and we screen them for both [P1].

[For] all the women of reproductive age who come for cervical cancer screening, I normally do breast examination also to detect for any breast cancer. I don't just concentrate on cervical cancer, I do both [P7].

Yet, some explained that provision of the service was either not done routinely or provider dependent.

We don't really do [CBEs] for each and every mother that comes for cervical cancer screening [P2].

[CBEs] depend on the health care provider who is offering the services or who thinks breast examination is important to our clients. It is a big gap in our facility. It is not done on a routine basis [P5].

Providers unanimously called for integration, emphasizing how the current focus has been on CCS, while breast cancer is the most common cancer among Kenyan women.

TABLE 1. Demographic Characteristics of CCS Providers in Kisumu County

| Characteristic | No. (%) |
|------------------|------------|
| Total | 69 (100.0) |
| Sex | |
| Male | 20 (29.0) |
| Female | 49 (71.0) |
| Age, years | |
| 25-35 | 30 (43.5) |
| 35-45 | 20 (29.0) |
| > 45 | 19 (27.5) |
| Occupation | |
| Clinical officer | 9 (13.0) |
| Nurse midwife | 1 (1.5) |
| Nurse | 59 (85.5) |
| Years of service | |
| < 10 | 31 (44.9) |
| 10-20 | 21 (30.4) |
| > 20 | 17 (24.7) |

NOTE. Data are shown as proportions.
Abbreviation: CCS, cervical cancer screening.

[Both services] *should be integrated ... you may assume the patient is not having breast cancer and yet you are just heading to cervical cancer, and yet the common one again is breast [cancer]* [P9].

I think the integration of breast and cervical cancer screening is long overdue ... [we] have concentrated on one part of the reproductive system, that is your cervix ... So, integration is very important. We must empower [women] if they cannot do for themselves the cervix, they can do for themselves the breast [P1].

TABLE 2. Attitudes of CCS Providers Toward Breast Cancer Screening

| Question | No. (%) |
|---|------------|
| Total | n = 69 |
| How important is breast cancer screening? | |
| Very important | 69 (100.0) |
| Somewhat important | 0 |
| Not as important | 0 |
| Do you offer breast cancer screening to your female clients? | |
| Yes | 64 (92.8) |
| No | 5 (7.2) |
| If yes, how many of the last 10 female clients received this service (n = 64) | |
| < 5 | 32 (50.0) |
| 5-8 | 18 (28.1) |
| > 8 | 14 (21.9) |

NOTE. Data are shown as proportions.
Abbreviation: CCS, cervical cancer screening.

Limited on-the-job training and staffing shortages. Although providers learned how to perform CBEs and CCS during their initial training, many felt that on-the-job training and mentorship to maintain the skills needed to perform these services were lacking. With regard to CCS, one provider described having to learn how to perform cryotherapy without on-the-job training.

I think I need a lot of mentorship in [CBEs] ... there has not been that actual mentorship on breast examination [P8].

Being a family planning service provider, one of the duties was to do cervical cancer screening, so I had to do it without on-the-job training. So, I had to do it from my [college] training, the little knowledge I had and then I did some research on my own. So, that is how I did it. I did it the hard way [P5].

In a month, facilities saw anywhere from 12 to 350 patients. Most of these facilities had fewer than three providers tasked with providing cancer screening services in addition to MCH consultations and/or FP services. The staff shortage affected the ability to provide these services and the quality of services provided.

You see I am one. I see both, sometimes, I run both mother child health clinic as well as outpatient clinic. At the same time, I am also expected to provide maternity and other services. So, sometimes [it is] a challenge when I book a lot [of women for these services because] some have to be rebooked [P8].

If there is only one nurse who is doing the other activities and together with the cervical cancer screening and treatment, with the breast examination, you find that we can't give quality service and then, maybe also we will miss some other clients because maybe of the queue [P2].

When asked the best way to support providers in facilitating integration, addressing staffing shortages and limited on-the-job trainings were identified.

If [CBEs and CCS are] integrated with family planning, there is need for deploying more staff. One staff like this cannot manage to screen and offer family planning services [P1].

The best support we could give to the providers is simply empowering them with knowledge ... some of us are maybe 5, 3, 2 years from college and others have also been in the service as long as 20, 30 years. Others can't remember the latest updates. Maybe, some of us have stopped doing the examinations. Some of us haven't been screening. So, the only resource that I can talk much about that can impact on them is first empowering them with the knowledge and the skills to perform the procedures adequately [P4].

Providers also suggested incentivizing staff through motivation. They defined motivation as improved work conditions, increased educational training, and financial incentives. Importantly, motivation was seen as a way to sensitize providers to the importance of integrating these services and encourage them to actively participate in providing care.

TABLE 3. Knowledge About the Risk Factors and Signs and Symptoms Associated With Breast Cancer Among CCS Providers in Kisumu County**No. (%) of Providers Correctly Identifying Risk Factors and Signs and Symptoms of Breast Cancer (N = 69)**

| Question | Yes | 95% CI (%) | |
|---|------------------|------------------|------------------|
| Knowledge of risk factors | | | |
| Lifestyle | 55 (79.7) | 68.3 to 88.4 | |
| Denser breasts | 13 (18.8) | 10.4 to 30.1 | |
| Family history | 64 (92.7) | 83.9 to 97.6 | |
| Early menarche | 19 (27.5) | 17.5 to 39.6 | |
| Radiation exposure | 53 (76.8) | 65.1 to 86.1 | |
| Knowledge of signs and symptoms | | | |
| Breast lump | 68 (98.6) | 92.2 to 100.0 | |
| Breast pain | 54 (78.3) | 66.7 to 87.3 | |
| Nipple discharge | 52 (75.4) | 63.5 to 85.0 | |
| Nipple rash | 20 (29.0) | 18.7 to 41.2 | |
| Nipple inversion | 29 (42.0) | 30.2 to 54.5 | |
| Overall Knowledge of Risk Factors and Signs and Symptoms of Breast Cancer, No. (%) | | | |
| | 0-1 ^a | 2-3 ^a | 4-5 ^a |
| Risk factors | 9 (13.0) | 37 (53.6) | 23 (33.3) |
| Signs and symptoms | 8 (11.6) | 31 (44.9) | 30 (43.5) |

Abbreviation: CCS, cervical cancer screening.

^aOverall knowledge categories are based on the cumulated number (total out of five) of risk factors and signs and symptoms identified by the providers and then stratified as not more than one, between two and three, and between four and five. Risk factors and signs and symptoms were extracted from the 2018 Kenyan National Cancer Guidelines for Breast Cancer.

Yes, it could be true that it could be a challenge to employ more staff, but it could be easy also to engage more staff by motivation ... motivation comes about with one, the work environment should be conducive in terms of cleanliness and supportive mentorship, [two] by availing the resources that are needed to work, [and three,] motivation also comes with terms of money. [P1].

Providers can be motivated in several ways through continuous medical education, through reducing the working hours, and by even adding one or two more staff in the shift" [P3].

Motivation is dynamic. Say that you want a good number of ... our clients who walk into the facility to undergo cervical cancer screening and breast examination, whichever, and then you say, for this month, the nurses in the facility or the medical personnel that does so well, we are giving you some token of appreciation, they could be very happy and that could trigger them to even do it further [P4].

Equipment, space, and systems challenges. Many of the facilities only had one room where they provided FP, MCH, and cancer screening. The interplay of resource limitations and systemic challenges often inhibited the ability of the nurses to provide CBEs and CCS. The lack of space coupled with staff shortage often resulted in long queues and patients subsequently forgoing care. For integration to not exacerbate these long wait times, there is a need to address the lack of space.

In my facility there is [the challenge of] spacing ... the room is just that one, that one we use for cervical and sometimes we use for breast cancer examination ... And there are not any materials that we are using there [P10].

Only one nurse can offer [these screening services and] we have only one room for cervical cancer screening, family planning ... it is only one room, one room in the facility. So, some clients end up giving up on seeking the service because of the long waiting time. So, if you can have at least two rooms for the service, it can be a good thing [P5].

When patients are screened and found to have lesions concerning for either breast or cervical cancer, providers found that the referral system posed additional challenges for patients. Cost subsidization and better organization of the referral pathway were identified as potential solutions to challenges with the higher-level referral and associated diagnosis and treatment process.

The referral system is also not good at all because you can refer client, when you follow up, they tell you they didn't have fare to go to JOOTRH, that is Jaramogi, to be done for the ... test of cervical cancer screening [P10].

Some of the clients are not having insurance to help them get treatment so I don't know how that can be worked on because it is diagnosis and treatment. Diagnosis is well pronounced and nobody is coming out clearly to support with the treatment. So, we are giving a death sentence [P1].

TABLE 4. Knowledge and Perception of Kenyan National Breast Cancer Screening and Referral Guidelines by Health Providers in Kisumu County

| Question | No. (%) ^a |
|--|----------------------|
| Total | 69 (100.0) |
| Assessment of provider awareness of national breast cancer screening guidelines | |
| Know the needs and frequency for breast cancer screening by age of female clients | |
| Correctly identifies the recommended frequency of CBE for females age 25-34 years | 36 (52.2) |
| Correctly identifies the recommended frequency of CBE for females age 40-55 years | 31 (44.9) |
| Correctly identifies the recommended frequency of CBE for females age 56-74 years | 12 (17.4) |
| Not sure about the guidelines | 18 (26.1) |
| Correctly identifies how often SBE is recommended for all females of reproductive age | |
| Yes | 47 (68.1) |
| No | 22 (31.9) |
| Knowledge of national CBE guidelines and referral protocol | |
| What age group(s) of female clients should receive CBE? | |
| Know that female clients 25-55 years of age should receive routine CBE | 66 (95.0) |
| Know that female clients 56-74 years of age should receive routine CBE | 17 (24.6) |
| Believes that female clients > 75 years of age should receive routine CBE | 8 (11.6) |
| What should you do if your CBE is concerning for breast cancer? | |
| Refer for mammography | 55 (79.7) |
| Refer to higher level facility | 30 (43.5) |
| Refer for ultrasound | 10 (14.5) |
| Not sure | 1 (1.5) |
| What should you do if you find an ulcerating lesion during a CBE? | |
| Refer for biopsy or higher-level facility | 69 (100.0) |
| Not sure | 0 (0.0) |
| Knowledge of mammography guidelines and referral protocol | |
| What age group(s) of female clients should be referred for routine mammogram? | |
| Know that female clients 40-55 years of age should be referred for routine mammography | 46 (66.7) |
| Know that female clients 56-74 years of age should be referred for routine mammography | 23 (33.3) |
| Believe that female clients > 75 years should be referred for routine mammography | 7 (10.1) |
| Where would you refer clients for mammography? | |
| JOOTRH | 64 (92.7) |
| Not sure | 4 (5.8) |
| Other (West Kenya Diagnostic Centre) | 1 (1.5) |

Abbreviations: CBE, clinical breast examination; JOOTRH, Jaramogi Oginga Odinga Teaching and Referral Hospital; SBE, self-breast examination.

^aThe proportions in each question represent the percent of providers who perceived the option to be accurate and thus do not necessarily add up to 100.0.

costs have to be subsidized in terms of the requirements for the diagnostic aspect like the mammogram and other things ... and then a clear referral system. [P8].

Limited patient education. Providers felt that some of the challenges to uptake of CBEs arose from patients choosing to forgo the services. For one, providers felt that patients were not well educated on the signs and symptoms of breast cancer and the importance of CBEs and CCS.

Most of [the women] need to be educated on the signs and symptoms of early breast cancer or cervical cancer and the importance and the age group ... You know, most of them,

because they say that it's 30 years and above, is when most of them come for this cervical cancer. [P10].

In addressing the difficulties with patient uptake of cancer screening services, providers called for a more robust community education and sensitization on the importance of cancer screening. They believed that this could be achieved with the assistance of community health volunteers, who usually conducted household visits to community members.

Our community health volunteers who usually do household visit to our community members can also give the information to [women] and also do posters and brochures for

[women] to read at home and really know the importance of having cervical screening and breast exam done [P3].

DISCUSSION

Our study assessed knowledge of CBE guidelines and perception of barriers and facilitators to integrating CBEs with CCS in a cohort of CCS providers in Western Kenya. Although providers unanimously agreed that breast cancer screening was important, understanding of screening guidelines and frequency of CBEs can be strengthened. Although 93% of providers said that they provided CBEs to their patients, only 22% offered CBEs to at least eight of their last 10 patients, highlighting an opportunity for improved integration of both services. Furthermore, providers had difficulties in identifying the risk factors and signs and symptoms of breast cancer and discerning physiologic breast lumps from pathologic breast lumps, indicating a benefit of on-the-job training to improve their confidence in providing screening and referral services.

In the semistructured interviews, providers explained that barriers like limited on-the-job training for CCS and CBEs, along with staff, space, and resource shortages, made it challenging to provide both services in addition to the FP and MCH services. These findings are comparable with studies in Kenya that independently explored low CCS²⁵ and CBEs,²⁶ indicating a need to improve on-the-job training, staffing, space, and resource shortages in primary care clinics in LMICs to support adequate provision of these services both as independent and integrated services.

Among studies looking at barriers to uptake of CBEs in Kenya, limited patient education on breast cancer, long queues, and cost of treatment were previously identified.^{10,12,13} These barriers were similar to those raised by providers in our study.

In addition, concerns with diagnostic and treatment cost after identification of a suspicious lesion on a CBE were something that the providers felt was a deterrent to screening. Without access to treatment, screening and diagnosis was tantamount to a death sentence, which providers were hesitant to deliver.

Providers called for the utilization of community health volunteers, who have been shown to increase patient awareness and willingness to participate in cancer screening in Kenya.²⁷ In addition, providers raised the need for clear referral pathways and financial support. Although Kenya is on a path to adopting universal health coverage via the National Hospital Insurance Fund, which substantially covers a portion of cost in government hospitals, there is a need for more enrollment⁷ and more robust coverage of cancer screening, diagnostics, and treatment costs.¹³

Our study had several limitations. Our small sample size may limit the generalizability of our findings. However, the sample size was not chosen on the basis of a power analysis as the intention was to identify providers who could discuss barriers and facilitators to integration in depth. The use of cluster sampling introduces the possibility of sampling error, which we mitigated by increasing the number of diverse facilities (HIV clinics, MCH, and FP clinics) from each subcounty that we randomly surveyed.

Despite these limitations, our study adds to the body of literature exploring the barriers to uptake of breast cancer screening in LMICs. We explore the possibility of integrating CBEs with CCS programs in Western Kenya as means of increasing screening. Our findings indicate provider interest in an integrated cancer service system and highlight barriers and facilitators that should be further explored and considered.

AFFILIATIONS

¹University of California, San Francisco, School of Medicine, San Francisco, CA

²Family AIDS Care and Education Services (FACES), Kisumu, Kenya

³School of Public Health and Community Development, Maseno University, Kisumu, Kenya

⁴Jaramogi Oginga Odinga Teaching and Referral Hospital, Kisumu, Kenya

⁵Department of Obstetrics, Gynecology and Reproductive Sciences, University of California, San Francisco, San Francisco, CA

⁶Department of Obstetrics and Gynecology, University of North Carolina, Chapel Hill, NC

CORRESPONDING AUTHOR

Prisca C. Diala, BA, University of California, San Francisco, School of Medicine, 513 Parnassus Ave, Suite S-245, San Francisco, CA; e-mail: priscacdiala@gmail.com.

PRIOR PRESENTATION

Previously presented at the NCI/CGH 9th Annual Symposium on Global Cancer Research on March 10-11, 2021, virtual.

SUPPORT

Supported by funding from the Inquiry Funding Office at the University of California, San Francisco, School of Medicine and by a grant from the University of North Carolina Lineberger Comprehensive Cancer Center.

J.O. was supported by NIH FIC 1D43TW011306-01A1, and C.M. was supported by NIH NIMH 2T32MH019105. Publication was made possible in part by support from the UCSF Open Access Publishing Fund.

AUTHOR CONTRIBUTIONS

Conception and design: Prisca C. Diala, Magdalene Randa, Gregory Ganda, Craig R.Cohen, Chemtai Mungo

Administrative support: Magdalene Randa, Gregory Ganda, Craig R.Cohen

Provision of study materials or patients: Gregory Ganda, Craig R.Cohen

Collection and assembly of data: Prisca C. Diala, Magdalene Randa, Gregory Ganda

Data analysis and interpretation: Prisca C. Diala, Magdalene Randa, Jackline Odhiambo, Gregory Ganda, Chemtai Mungo

Manuscript writing: All authors

Final approval of manuscript: All authors

Accountable for all aspects of the work: All authors

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

The following represents disclosure information provided by authors of this manuscript. All relationships are considered compensated unless otherwise noted. Relationships are self-held unless noted. I = Immediate Family Member, Inst = My Institution. Relationships may not relate to the

subject matter of this manuscript. For more information about ASCO's conflict of interest policy, please refer to www.asco.org/rwc or ascopubs.org/go/authors/author-center.

Open Payments is a public database containing information reported by companies about payments made to US-licensed physicians ([Open Payments](http://openpayments.org)).

Craig R. Cohen

Stock and Other Ownership Interests: Osel Inc, Evvy Inc

No other potential conflicts of interest were reported.

ACKNOWLEDGMENT

We thank the Inquiry Funding Office at the University of California, San Francisco, School of Medicine for funding this work. We thank Amelea M. Atieno and Patience Darline for assisting with the implementation of the survey questionnaire. We also thank Jaramogi Oginga Odinga Teaching and Referral Hospital and health facilities across Kisumu County who participated in the study.

REFERENCES

1. 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* 68:394-424, 2018
2. de Sanjose S, Tsu VD: Prevention of cervical and breast cancer mortality in low- and middle-income countries: A window of opportunity. *Int J Womens Health* 11:381-386, 2019
3. Global Cancer Observatory. <http://gco.iarc.fr/>
4. Othieno-Abinya NA, Musibi A, Nyongesa C, et al: Report on breast cancer care (BRECC) registry at the Kenyatta National Hospital, Nairobi, Kenya. *J Clin Oncol* 36, 2018 (suppl; abstr e12546)
5. World Health Organization (WHO): WHO Position Paper on Mammography Screening. Geneva, WHO, 2014
6. da Costa Vieira RA, Biller G, Uemura G, et al: Breast cancer screening in developing countries. *Clinics (Sao Paulo)* 72:244-253, 2017
7. Antabe R, Kansanga M, Sano Y, et al: Utilization of breast cancer screening in Kenya: What are the determinants? *BMC Health Serv Res* 20:228, 2020
8. Sankaranarayanan R, Ramadas K, Thara S, et al: Clinical breast examination: Preliminary results from a cluster randomized controlled trial in India. *J Natl Cancer Inst* 103:1476-1480, 2011
9. Ministry of Health Kenya: National Cancer Screening Guidelines, 2018
10. Wachira J, Chite AF, Naanyu V, et al: Barriers to uptake of breast cancer screening in Kenya. *East Afr Med J* 91:391-397, 2014
11. Busakhala NW, Chite FA, Wachira J, et al: Screening by clinical breast examination in Western Kenya: Who comes?. *J Glob Oncol* 2:114-122, 2016
12. Sayed S, Ngugi AK, Mahoney MR, et al: Breast cancer knowledge, perceptions and practices in a rural community in Coastal Kenya. *BMC Public Health* 19:180, 2019
13. Gakunga R, Kinyanjui A, Ali Z, et al: Identifying barriers and facilitators to breast cancer early detection and subsequent treatment engagement in Kenya: A qualitative approach. *Oncologist* 24:1549-1556, 2019
14. World Health Organization (WHO): A Global Strategy for Elimination of Cervical Cancer. <https://www.who.int/activities/a-global-strategy-for-elimination-of-cervical-cancer>
15. 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* 17:675, 2017.
16. Schoonenboom J, Johnson RB: How to construct a mixed methods research design. *Kolner Z Soz Sozpsychol* 69:107-131, 2017 (suppl 2)
17. Teddlie C, Tashakkori A: Foundations of Mixed Methods Research: Integrating Quantitative and Qualitative Approaches in the Social and Behavioral Sciences. Los Angeles, CA, SAGE, 2009
18. Morse JM: Mixed Method Design: Principles and Procedures. London and New York, Routledge, 2016
19. Greene JC: Mixed Methods in Social Inquiry. San Francisco, CA, John Wiley & Sons, 2007
20. Morse JM: The significance of saturation. *Qual Health Res* 5:147-148, 2016
21. Glaser BG: Basics of Grounded Theory Analysis: Emergence vs. Forcing. Mill Valley, CA, Sociology Press, 1992
22. Miles M, Huberman A: Qualitative Data Analysis: An Expanded Sourcebook. Thousand Oaks, CA, SAGE, 1994
23. Bradley EH, Curry LA, Devers KJ: Qualitative data analysis for health services research: Developing taxonomy, themes, and theory. *Health Serv Res* 42:1758-1772, 2007
24. Glaser B, Strauss A: The Discovery of Grounded Theory: Strategies for Qualitative Research. Chicago, Aldine, 1967
25. Rosser JI, Hamisi S, Njorge B, et al: Barriers to cervical cancer screening in rural Kenya: Perspectives from a provider survey. *J Community Health* 40:756-761, 2015
26. Gutnik LA, Matanje-Mwagomba B, Msosa V, et al: Breast cancer screening in low- and middle-income countries: A perspective from Malawi. *J Glob Oncol* 2:4-8, 2015
27. Choi Y, Oketch SY, Adewumi K, et al: A qualitative exploration of women's experiences with a community health volunteer-led cervical cancer educational module in Migori county, Kenya. *J Cancer Educ* 35:36-43, 2020

