

Evaluation of a Health Care Worker Training Intervention to Improve the Early Diagnosis and Referral of Childhood Cancers in Ghana: A Qualitative Descriptive Study

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PURPOSE This study sought to (1) evaluate the perceived effectiveness of an early childhood cancer warning signs and symptoms (EWSS) training intervention on health care worker (HCW) knowledge, attitudes, and clinical practice; (2) evaluate the ease of implementation of training received, including potential barriers and facilitators; and (3) provide insights into program improvements for future iterations of the intervention.

METHOD Using a qualitative descriptive study design, we conducted in-depth, semistructured interviews with 23 purposively sampled Ghanaian HCW recipients of the EWSS training intervention. We undertook iterative thematic analysis of data concurrently with interviews and used a modified version of the theoretical framework of acceptability to guide the evaluation of the training intervention.

RESULTS We identified six themes— affective attitude, burden, intervention coherence, perceived effectiveness, self-efficacy, and quality improvement—that structure participant perceptions of the effectiveness of the EWSS training. Participants generally had a positive attitude to the training intervention, found the content relatively easy to understand, and communicated the positive impacts of the training on their day-to-day practice. However, they also identified patient- and system-level challenges to the real-world implementation of intervention components, including patients' cultural and religious beliefs about illnesses, patients' financial constraints, and inadequately funded health systems.

CONCLUSION Our findings suggest that although an HCW-focused training intervention has the potential to improve timely diagnosis and referral for childhood cancers in Ghana and comparable health system contexts, complementary interventions to address patient- and system-level implementation challenges are required to translate improvements in HCW knowledge to sustained impact on health outcomes for children with cancer.

JCO Global Oncol 8:e2200151. © 2022 by American Society of Clinical Oncology

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INTRODUCTION

In high-income countries, the past few decades have witnessed dramatic improvements in the prognosis for most childhood cancers, with survival now exceeding 80%.^{1,2} However, low- and middle-income countries (LMICs) have not realized comparable improvements in childhood cancer outcomes, with survival ranging between 10% and 60%.^{3,4} Unlike adult cancers, many of which have clear lifestyle or environmental associations, the etiology of childhood cancers remains largely unknown, precluding effective prevention strategies.⁵ Attempts to optimize childhood cancer outcomes thus depend on timely diagnosis and prompt initiation of treatment.⁶ A major bottleneck in the effective care of children with cancer in LMICs is lack of awareness of the disease and its manifestations in children among both the public and health care providers, resulting in either missed or delayed diagnosis.⁷⁻⁹ This results in presentations at advanced

stages of disease and significant disease morbidity, compromising the chance of cure.

Few published reports exist documenting the epidemiology of childhood cancers across sub-Saharan Africa. In Ghana, estimates from simulation-based analysis suggest that approximately 4,700 children develop cancers annually.¹⁰ Yet, a combination of lack of access to primary care facilities, inadequate diagnostic capacities at health care centers, and lack of awareness among health care workers means that many cases go undiagnosed.^{4,10} As part of broader efforts to improve childhood cancer outcomes in Ghana, World Child Cancer, an international non-governmental organization, in close collaboration with Ghanaian childhood cancer and health system partners, developed a package of interventions targeting early recognition and referral of childhood cancers. The Childhood Cancer Early Warning Signs and Symptoms (EWSS) program was adapted from an

ASSOCIATED CONTENT

Appendix

Data Supplement

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

Accepted on August 2, 2022 and published at ascopubs.org/journal/go on September 14, 2022; DOI <https://doi.org/10.1200/GO.22.00151>

CONTEXT

Key Objective

We undertook an evaluation of a childhood cancer early warning signs and symptoms (EWSS) intervention in Ghana to understand the perceived effectiveness and feasibility of implementing EWSS training among health care workers (HCWs).

Knowledge Generated

HCWs endorsed the effectiveness of the EWSS intervention, citing its apprehensible content and the positive impacts of the intervention on their clinical practice. Identified challenges to its implementation included financial impediments, health system issues, and cultural and religious attitudes toward illness among patients.

Relevance

Our findings suggest that although the EWSS intervention was deemed acceptable and effective by trained HCWs, the importance of design tailored to health system and cultural context is essential to address real-world implementation challenges and ensure the impacts of EWSS interventions are fit to context and sustainable.

awareness campaign developed in South Africa, using the Saint Siluan early warning signs (Table 1). The Ghanaian EWSS intervention adapted the Saint Siluan approach, on the basis of engagement with local stakeholders, to include a training-of-trainers (ToT) approach, with subsequent cascade training of primary health care workers (HCWs) across Ghanaian regions.

We undertook an evaluation of the EWSS intervention to (1) evaluate the perceived effectiveness of the EWSS training intervention on HCWs knowledge, attitudes, and clinical practice; (2) evaluate the ease of implementation of training received during training sessions (including potential barriers and facilitators); and (3) provide insights into program improvements for future iterations of the intervention.

METHODS

Study Design

We adopted a modified version of the theoretical framework of acceptability (TFA) to guide study design and evaluation of the EWSS intervention¹¹ (Appendix Fig A1). The TFA reflects the extent to which people delivering or receiving a

health care intervention consider it appropriate, on the basis of anticipated or experienced cognitive and emotional responses to the intervention. It evaluates interventions in seven component constructs, including affective attitude, burden, perceived effectiveness, ethicality, intervention coherence, opportunity costs, and self-efficacy. Development of the study interview guide was informed by the TFA,¹¹ and review of studies focused on the evaluation of training interventions in LMICs^{12,13} (see the Data Supplement for interview guide). Our study used a qualitative descriptive approach to data collection and analysis.^{14,15}

Data Collection

We recruited a purposive sample of HCWs who took part in either the ToT session or the regional HCW training sessions. A maximum variation sampling approach was used to ensure representation across rural and urban training locations, health care professions, and sexes. In-depth, semistructured interviews were conducted by two team members (A.F. and G.M.A.) from June to August 2021. Iterative data analysis during the data collection process informed ongoing assessment of thematic saturation, at which point no further interviews were undertaken. A total of 23 interviews were conducted across the two stakeholder groups (HCWs = 12, ToT = 11).

Data Analysis

Qualitative interviews were audio-recorded with consent and transcribed verbatim. Data analysis was guided by the TFA and conducted using NVivo 11. To enhance coding reliability, two members of the research team independently coded an initial sample of interviews, compared codes, and established a consensus coding structure with input from the study team. Codes were both deductively derived on the basis of the conceptual domains of the interview guide and inductively generated from interview transcripts.¹⁶ Codes were analyzed to draw out themes that were subsequently reviewed and refined to generate integrated insights into the perceived effectiveness, implementation feasibility, and future adaptations of the EWSS intervention.

TABLE 1. Saint Siluan's Warning Signs of Childhood Cancer

Acronym	Symptoms
S	Seek medical help early for any persistent symptom
I	Eye symptoms including a white spot or bulging
L	Lumps
U	Unexplained fever, weight loss, bleeding, or bruising
A	Aching bones
N	Neurologic signs and prolonged headache

NOTE. The Saint Siluan campaign, which addressed lack of knowledge about both the clinical presentation and appropriate referral pathways for childhood cancers, resulted in a statistically significant increase in the number of children with cancer referred to specialist care.²¹

Ethical Approval

Ethical approval was provided by the Hospital for Sick Children Research Ethics Board (application number: 1000075378) and the Ghana Health Services Ethics Review Committee (application number: GHS-ERC 020/09/21). Participants were sent a copy of the consent form by e-mail to review, and informed consent was obtained verbally from all participants before the commencement of the interviews.

RESULTS

Table 2 provides an overview of the characteristics of study participants and pretraining and post-training knowledge scores, which demonstrate a significant change in knowledge after the training intervention ($P < .001$).

We identified five themes relating to the TFA constructs. These include affective attitude, burden, intervention coherence, perceived effectiveness, and self-efficacy. An additional theme not captured by the TFA, quality improvement, emerged during data analysis. Table 3 provides a description of themes and subthemes with representative quotes from study participants.

Affective Attitude

Attendance motivations and attitude toward intervention invitation. The attitudes in both stakeholder groups toward the intervention were generally positive. Some participants saw this as an opportunity to improve the quality of service provided to their communities. Others expressed their passion for children as a motivator for wanting to attend the training intervention. Despite acknowledging the potential

positive impacts of the intervention, a few participants expressed mixed feelings about attending training because they perceived it as obligatory or because of the associated time burden.

Attitude upon intervention completion. Overall, there was a palpable sense of appreciation from participants about attendance at the training session. They communicated their satisfaction with how the training went and expressed gratitude to the training organizers. This feeling was particularly prominent among those who attended the regional HCW training, most of whom expressed a sense of duty to train other HCWs in their facilities.

Those of us who have the opportunity to go for the training, the onus is on us to be able to train our colleagues back home. Because I think if my colleagues understand the concept and are able to identify the early warning signs, then we can work hand-in-hand with parents so that we all come on board and then identify cases. (HCW 5)

Intervention Coherence

Ease of understanding. Health care workers who took part in the training intervention expressed a good understanding of its purpose and content. They praised the simplicity of its presentation and felt that it made it easy for HCWs across the health care spectrum to understand and implement its content in their various settings. In particular, the use of the Saint Silvan acronym was commended by most participants as an effective medium for communicating the signs and symptoms for childhood cancers, making it easy for them to apply the acquired knowledge in their daily practice.

TABLE 2. Pretest and Post-Test Scores and Distribution of Study Participants

Variable	Training-of-Trainers (n = 33)	P^a	Regional Training (n = 1,067)	P^a
Pretest and post-test scores				
Pre	13.7 ± 3.8	< .001	8.2 ± 2.9	< .001
Post	18.7 ± 1.4		11.6 ± 1.2	
	Training-of-Trainers (n = 11) No. (%)		Regional Training (n = 12) No. (%)	
Sex				
Male	6 (54.5)		3 (25.0)	
Female	5 (45.5)		9 (75.0)	
Clinical specialty				
General/public health nurse	2 (18.2)		5 (41.7)	
Nurse specialist	4 (36.4)		2 (16.7)	
Medical officer	2 (18.2)		1 (8.3)	
Midwife	0		3 (25.0)	
Pediatrician	3 (27.3)			
Physician assistant			1 (8.3)	

^a P value for paired t -test analysis; pretests and post-tests were scored out of an obtainable 20 for training-of-trainers and 13 for regional training category.

TABLE 3. Themes and Subthemes Identified in the Study

Themes	Subthemes	Quotes
Affective attitude	Attendance motivations and attitude toward intervention invitation	<i>We experience things over here and at times it becomes a problem how to go about it. So, when I got the call to attend, I was very happy because I knew that I'll pick something from it and also help my people to identify the early warning signs. So that together, we can help the kids I was actually going to go for a holiday, and I had to postpone my holiday because of the training, and I was going with my husband, so I wasn't very happy when I left for the training. But in the end, I was happy that I attended</i>
	Attitude upon intervention completion	<i>The whole training was something, when I came back, I told my boss that I was grateful that she sent me for that training because I really learnt something. And I can see that there's something greater, something beautiful that will come out of it</i>
Intervention coherence	Ease of understanding	<i>And one thing I liked about the session was that the language or the terminology that were used were broken down in the way that there were no complex terms. Not all the participants there were doctors. Some were community nurses, some were physician assistants. And so, there were no complex terminology that was used that was so difficult that the layman couldn't even understand. That was one thing that I liked about the session</i>
Burden	Individual and system-level constraints	<i>Sometimes the patients are unwilling to go to the teaching hospitals because they have financial issues. So, you want to refer, but the patient is stuck on you because the person does not have any funds</i>
	Impact of religious and cultural factors on health-seeking behaviors	<i>One of them will be religious issues, you know, any city with a lot of prayer camps they have issues with these. Before they come to you, the child might have gone through all kinds of prayers, deliverance and all that, so that it gets to you at a very advanced stage and there is nothing much that you can do... nobody wants you to even mention that my child may probably have cancer, nobody wants to hear that. So, you have to demystify that, for them to know that it is just an abnormal growth of tissues</i>
	Organizational challenges	<i>Some of the visual aids available at our training were not available when we had to train people. For instance, when we were being trained, they showed us flip charts and the idea was that going forward, we would have to do our own training as well, especially in places where you do not have a projector and all that. But when we were doing our training, those things were not available</i>
Perceived intervention effectiveness	Instructor effectiveness	<i>Most of these people were pediatrician's, consultants, who had been dealing with childhood cancers for nothing less than five to 10 years. I think one professor at the training had been doing it for about 20 years and gave a lot of practical examples, and quoted research they had done. The knowledge base was good, the example was good, they brought the discussion to bear</i>
	Intervention impacts on recognition and referrals of suspected cases	<i>Patients who have been diagnosed with certain cancers were brought from the oncology department of the teaching hospital for us [to] have a clear understanding of what we are looking out for when we are in the field. So, we had a firsthand information about how to diagnose retinoblastoma. We had firsthand information about other forms of childhood cancer because the patients were right in front of us, and we saw how the symptoms presented Since the training, I think we've come across three cases. Once, we suspected leukemia and we were able to refer them but did not follow through with them. We counseled the parents to go, because there they can do further labs to confirm or maybe disprove what we suspect</i>
Self-efficacy	Improvement to health care workers confidence and key competencies	<i>I used to be very pessimistic about childhood cancer. When I was a resident, we didn't have a lot of good outcomes, and I used to feel very miserable and burnt out working on the unit... And I think the statistics that was presented during the training really gave me hope. Because in the past, when I pick up a case, I get sad, I'm like, oh, my God, this is another battle that may not be won, you know? And after the training, I realized that when we pick up early, the outcomes are so good. So, I think that's one thing that has been affected, my ideas about childhood cancers Actually, it has really impacted things in my job as a clinician. First, it has brought some awareness to the people I have trained. There is also this newfound confidence that when we see a suspected case, we can discuss and then get a better understanding of what to do. And now, we also know where to refer cases, and we know that the referral centers are also always ready to assess the case and do what needs to be done to arrive at the appropriate diagnosis</i>
Quality improvement	Perceived intervention deficits	<i>During the presentation on the types of childhood cancer, they did not talk deeply about the other ones, they only talked in detail about retinoblastoma, but the other ones were not looked into. They just gave an overview of it, but they did not address them in detail</i>
	Regularity of interventions	<i>In the future, they should do the training annually, but there should also be refresher training as well for those that have previously attended sessions</i>

Burden

Individual- and system-level constraints. Health care workers communicated a range of challenges they perceived as impediments to the successful referral and

diagnosis of childhood cancers, which were key components of the training intervention. These concerns were related to both individual- and system-level factors that were felt to constrain their ability to successfully implement

components of the intervention. For example, during the training, participants were encouraged to identify pragmatic actions that might facilitate the implementation of knowledge gained during the training. A few participants, however, cited funding challenges that made it difficult to effectuate their proposed plans, such as radio airtime for public education or travel for community-based outreach programs. HCWs also highlighted their patients' financial constraints as impediments to successful referral for suspected childhood cancer cases, given identified limitations in public or private funding to cover the costs associated with diagnostic testing and referral to specialized centers for treatment.

Impact of religious and cultural factors on health-seeking behaviors. HCW participants emphasized that patients' cultural and religious beliefs could impose significant barriers to successful referrals to treatment centers. One participant noted that a patient with a confirmed cancer who was referred to a treatment center chose not to go and opted for herbal treatment instead, despite concerted counseling on the deleterious impact it would have. Another HCW highlighted the impact of their patients' religious beliefs on successful knowledge implementation, noting the difficulties associated with re-education of families regarding the nature of their child's illness and the frequent need to demystify its etiology: from one rooted in divine intercession—often retribution for perceived sin—to one without known cause and founded in biomedical conceptions of health and illness.

Organizational challenges. A few HCWs who had attended ToT sessions and were responsible for leading regional-level training, or those who attended regional-level training and were tasked to conduct training sessions with their colleagues, complained about the lack of posters, flipcharts, and flyers to aid communication. Similarly, a few HCWs who were charged with leading regional training sessions expressed their dissatisfaction with the length of time taken by the lead project team to schedule training sessions. A number acknowledged that these delays were in part because of the impact of the COVID-19 pandemic. Nonetheless, the delays in combination with the lack of presentation aids proved frustrating for some HCWs.

Perceived Intervention Effectiveness

Instructor effectiveness. HCWs in both stakeholder groups communicated their satisfaction with the instructors who had led training sessions. In particular, those who attended the ToT session felt that the extensive oncology experience of their instructors created a valuable training experience.

“One thing I will always remember is the lecturer at the training...Because of the way he taught us, if we end up seeing those warning signs with a child, whether or not it is childhood cancer, I am sure that the information we received will keep ringing in your mind...” (HCW 7)

Some participants also valued the pretest and post-test assessments, which were seen as an impactful way to

empirically measure improvements in their knowledge and thereby demonstrate the value of the intervention at a personal level in real time.

Intervention impacts on recognition and referrals of suspected cases. HCWs in the ToT category who were introduced to active childhood cancer patients during their training session underscored the positive impacts this had on their ability to recognize the warning signs for childhood cancers. A few HCWs also discussed how their participation in training and the knowledge received led to real-world referrals and/or diagnoses of suspected cases.

Self-Efficacy

Improvement to health care workers' confidence and key competencies. Most of the HCWs interviewed expressed confidence in their ability to recognize the EWSS for childhood cancers. They acknowledged the impact of the training they had received in improving their knowledge base and capacity to deliver intervention components.

It has had an immeasurable positive impact. It made me always have childhood cancer in mind when managing the pediatric clients under my care. It has brought about a sense of responsibility to help identify childhood cancer. So, I now see myself as an advocate for childhood cancers. I always help create the necessary awareness and to ensure that those who need help get it as quick as possible. (ToT 1)

In addition, HCWs shared how the training they had attended had brought about a renewed sense of optimism toward how they viewed children who have been diagnosed with childhood cancer. Finally, participants in the ToT stakeholder group expressed how being called upon to train other HCWs led to improved confidence in their overall leadership capability, affirming a broader capacity-building impact of the intervention.

Quality Improvement

Perceived intervention deficits. In addition to themes identified within the TFA constructs, we identified an additional theme that encompassed HCWs suggestions for improvements in the training content, delivery, and overall intervention. Some participants highlighted a range of perceived deficits in the training content. Specifically, a few HCWs trained at the regional level felt that there was a disproportionate focus on retinoblastoma during the training while the other kinds of childhood cancers were covered summarily. Likewise, a few HCWs in both training categories alluded to perceived issues with the organization of the training. They felt that the training could have been more spread out as too much content was covered in limited time. A few participants in the ToT category felt that there was a decline in the quality of the training they were asked to facilitate relative to the training they attended. Finally, some participants mentioned that, although the training was focused on recognition and referral of childhood cancers, more information could have been provided

on possible treatment interventions that could be delivered at the local level before referring to treatment sites.

Sustainability of intervention. A few HCWs suggested supplemental training sessions be conducted regularly to keep participants updated on current knowledge. Similarly, a number of HCWs discussed the need for incorporating the training intervention as part of the training curricula for all cadres of HCWs in Ghana. Some HCWs also discussed the potential of creating a group chat for all trainees to facilitate the provision of relevant context-based information. Last, the need to complement the HCW training with a public awareness component was underscored by some of the trainees. They felt that adequate knowledge of the warning signs by parents and guardians would spur the presentation of potential cases to health care centers.

DISCUSSION

This study sought to evaluate a health care intervention aimed at improving the early diagnosis and referral of childhood cancers in Ghana. We identified six major themes, five of which align with existing TFA constructs and one additional theme that provides insights into and suggestions for intervention quality improvements. Overall, our findings provide novel insights into the acceptability of an EWSS training intervention among HCWs in Ghana that could inform the implementation of comparable HCW training interventions in LMICs.

The findings from the evaluation showed that the training intervention improved the ability of the participants to recognize the warning signs for childhood cancers, with a concomitant effect on patient referrals to appropriate treatment centers. Participants expressed a sense of confidence in their ability to implement intervention components within their treatment centers and found the intervention to be acceptable, despite the system-level constraints experienced. Most participants saw this as an opportunity for capacity-building and improvements in the quality of care provided in their communities. Additionally, participants in both the ToT who were recruited to train other HCWs in subsequent World Child Cancer–organized regional trainings and HCWs who attended regional training felt a sense of obligation to communicate the knowledge they had received with other HCWs in their health care settings. These findings highlight the commitment of HCWs in resource-deprived settings, and show that when provided with the requisite support, HCWs are invested in improving the poor health outcomes experienced within their communities. Similar results were reported in a training intervention aimed at improving infant mortality in Ghana,¹⁷ and in training interventions to improve chronic disease management across LMICs,^{18,19} where HCWs reported increased skill-level, confidence, and a shared commitment to improving quality of care provided by other HCWs as well.

Despite the broad support for the intervention among HCWs, a range of system-level challenges and patient-level factors were expressed. These bottlenecks included religious and cultural attitude toward illnesses in general, where patients opt for religious and herbal remedies rather than seeking prompt medical care. In addition, health-system constraints such as funding challenges and challenges related to referrals and testing were also identified. Similar findings have been reported in other HCW training interventions targeting conditions such as HIV and cardiovascular disease in Mozambique and Uganda.^{12,13} In Cameroon, trained childhood cancer referral ambassadors were provided with mobile phones and mobile money accounts for transportation of suspected cases.²⁰ These results suggest that although HCW-focused interventions can be effective in improving health outcomes, they are not a one-size-fits-all approach to addressing health challenges in low-resource settings. As such, effort toward improving health outcomes must be multilevel and comprehensive in scope if they are to succeed.

The Ghanaian EWSS intervention was adapted from an earlier campaign in South Africa that yielded statistically significant increases in referred cases.²¹ Most of these cases, however, were referred at later stages of cancer progression.²¹ To address this known limitation, our adapted intervention incorporated focused education on referral pathways for HCWs during the training sessions, equipping them with ways to directly contact regional treatment centers in cases of suspected childhood cancer. Importantly, rollout of this EWSS intervention was undertaken within the broader implementation context of a series of complementary interventions, including the provision of funds to cover transportation, feeding, and/or housing costs for families of confirmed cases. These interventions were underscored with HCWs during training sessions to ensure known socioeconomic barriers to swift referral of suspected cases were understood and addressed. Of note, a few HCWs suggested the need for regular EWSS training as a way to improve the overall quality and sustain the impact of the EWSS intervention. This suggestion has been backed by a range of research studies documenting best practices relating to educational interventions in low-resource settings.^{22,23} Global health funders seeking to implement similar interventions must consider this to ensure that the benefits of training interventions are optimized and sustained.

To our knowledge, the intervention described in this study and our formal evaluation of it are the first of their kind. Across LMICs, a few HCW-focused training interventions aimed at improving pediatric cancer early recognition and referrals have been implemented, as documented in a recent systematic review.²⁴ Although some of these studies report important quantitative metrics such as increases in knowledge after intervention and increased number of referral and diagnosis,^{21,25-27} a detailed evaluation of these HCW-focused training interventions has been lacking. Our

study addresses this research gap by providing information on the range of factors that should be considered when implementing a training intervention in an LMIC context, to ensure that the intervention achieves its desired impacts.

A few limitations of our study are worth noting. Although HCWs highlighted the perceived salutary effect of EWSS training on their capacity for childhood cancer recognition and appropriate referral, our qualitative approach to evaluation limits broader claims about the real-world effectiveness of the intervention in improving early detection and diagnosis. Rigorous study designs that afford a comprehensive picture of the long-term impacts of EWSS interventions on key clinical outcomes will constitute an important next step.²⁸ Of the seven constructs within the TFA, only five constructs were fully explored within our study leaving two constructs—ethicality and opportunity costs—unexplored. This was largely attributed to the lack of ample data considered congruent with these themes. Nevertheless, the other constructs of the TFA explored within our study and the additional identified theme allowed us to evaluate the acceptability of the EWSS intervention within relevant constructs, ensuring that the EWSS intervention was grounded within critical implementation science components. Consequently, the results we present hold significant potential to inform the development of

comparable intervention programs, particularly those targeting other noncommunicable diseases in other low- and middle-income health system contexts, for which HCW capacity might be lacking. Policymakers and global health funders can leverage these findings to implement, and scale up effective and sustainable intervention programs aimed at improving HCW knowledge, and concomitantly survival outcomes across LMICs.

In conclusion, we report novel findings from a qualitative evaluation of an HCW-focused training intervention aimed at understanding the impact of the intervention on recipients. In general, we found that HCWs had a positive attitude to the intervention, found it easy to understand and implement, and that the intervention had improved their confidence and led to improved capacity to recognize and refer cases. Burdens related to funding challenges and patients' religious and cultural beliefs placed some challenges to successful intervention implementation. Likewise, participants highlighted a few suggestions for improving the quality of the training interventions. Overall, the findings suggest that although the intervention was found to be acceptable among trained HCWs, the burdens expressed underscore the need for multidimensional interventions that address the challenges highlighted if the EWSS intervention is to be truly successful and sustainable.

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SUPPORT

Supported by UBS Optimus Foundation and a UK Aid Match fund provided by the UK Foreign, Commonwealth & Development Office (Grant No.: XX6D-4C59-84).

DATA SHARING STATEMENT

Data are available upon reasonable request. Data requests can be made to the corresponding author.

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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)).

Sumit Gupta

Consulting or Advisory Role: Jazz Pharmaceuticals

No other potential conflicts of interest were reported.

ACKNOWLEDGMENT

The authors would like to thank all the HCWs who participated in the study. The authors would also like to thank Emmanuel Ayire Adongo and Seth Kwaning Kore who were instrumental in the intervention implementation and in completing the data collection for this evaluation, respectively.

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APPENDIX

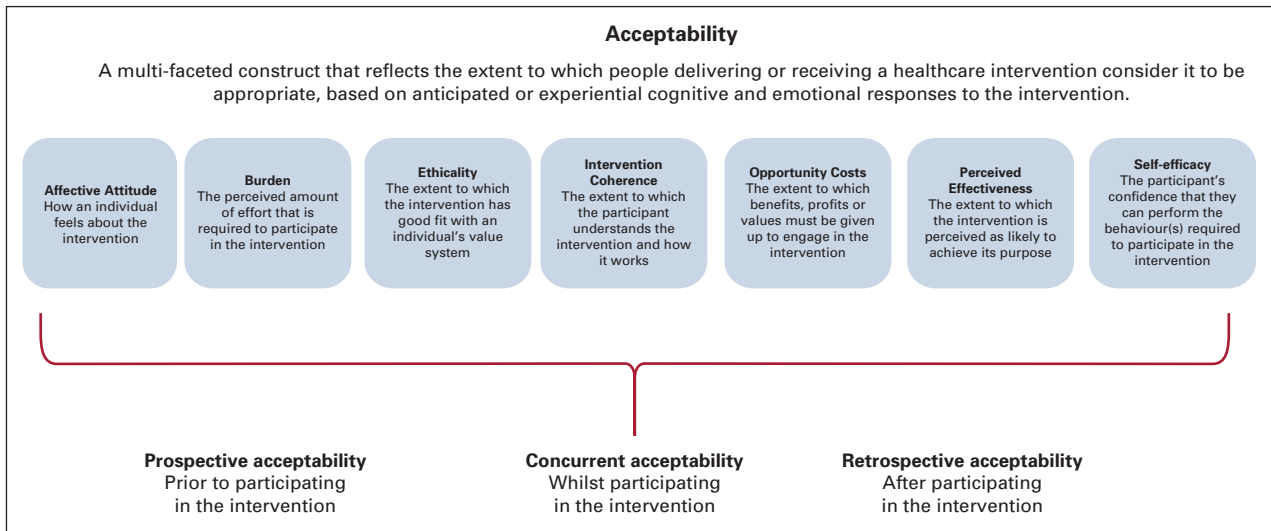


FIG A1. The theoretical framework of acceptability. Created from the study by Sekhon et al.¹¹