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Needs Assessment and Best Practices for Digital Trainings for Health Professionals in Ethiopia Using the RE-AIM Framework: COVID-19, Case Study

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Abstract:

Objectives: To assess the implementation science outcomes of a COVID-19 e-health educational intervention in Ethiopia targeting healthcare workers via the RE-AIM (Reach, Effectiveness, Adaption, Implementation, Maintenance) framework.

Methods: A series of three one-hour medical seminars focused on COVID-19 prevention and treatment education were conducted between May-August 2020. Educational content was built from medical sites previously impacted by COVID-19. Post-seminar evaluation information was collected from physician and other participants by a survey instrument. Cross-sectional evaluation results are reported here by RE-AIM constructs.

Results: The medical seminars reached 324 participants. Key success metrics include that 90% reporting the information delivered in a culturally sensitive/tailored manner (effectiveness), 80% reporting that they planned to share the information presented with someone else (adoption and implementation), and 64% reporting using information presented in their daily clinical responsibilities 6 months after the first medical seminars (maintenance).

Conclusion. Grounded in a theoretical framework and following evidenced-based best practices, this intervention advances the field of dissemination and implementation science by demonstrating how to transition healthcare training and delivery from an in-person to digital medium in low-resource settings like Ethiopia.

Keywords: e-health; Ethiopia; dissemination and implementation science; RE-AIM; COVID-19

Background:

COVID-19 and E-Health in Africa:

Despite many fatal diseases and harsh living conditions, Africa has a rapidly growing population that could increase more than 5-fold over this century.¹ Yet, as evidenced during the COVID-19 pandemic, there is a scarcity of healthcare providers.² In fact, there is a decreasing number of physicians relative to the rest of the population.³ In general, healthcare workers in low-income countries are scarce: the average low-income country has 0.2 physicians and 1 nurse per 1,000 individuals, compared to 3 and 8.8 in high-income countries, respectively.⁴

For decades, various country governments across the African continent have not prioritized healthcare or health systems, something acutely felt during the Ebola epidemic and the current COVID-19 pandemic.⁵ While only 8.9% of the greater population tested positive for COVID-19, experts expect the actual infection rate to be significantly higher due to the low level of testing.⁵ With alarming increases in COVID-19 cases in Ethiopia and other parts of Africa, there is even greater concern around the mortality rates of already-vulnerable populations due to comorbidities including HIV, tuberculosis, malaria, as well as disparities in socioeconomic status and access to quality healthcare services.⁶⁻⁸

Healthcare workers have been labeled the highest risk group for COVID-19 infection due to the nature of their occupation.⁶ Special attention to ensure healthcare workers have both safe workplaces and necessary knowledge is essential. With COVID-19 infection rates rising over 200% in African healthcare workers⁵, the immediate need for educational information on both the COVID-19 and managing chronic illnesses is essential.⁶ Recently, with very limited data available, e-Health educational activities in Africa have been shown to be successful and sustainable.⁹ Specifically, even within resource constraints, e-learning has been used for education and training in the healthcare sector in Africa and is well received by students and practitioners.⁹ Grounded in an established theoretical framework¹⁰ and following evidenced-based best practices,¹¹ this intervention advances the field of dissemination and implementation

science by demonstrating how to transition healthcare training and delivery from an in-person to digital medium in low-resource settings.¹²

RE-AIM

The RE-AIM (Reach, Effectiveness/Efficacy, Adoption, Implementation, and Maintenance) framework has been highly compatible with community-based public health intervention dissemination and implementation in various fields.^{10,13} This framework was built to evaluate interventions and public health programs, to produce a more balanced approach to internal and external validity and to address key issues important for dissemination and generalization.^{10,13}

While RE-AIM is one of the most frequently applied frameworks to guide implementation science in the healthcare field including e-health platforms,^{14,15} it has rarely been used in both international¹⁶ and non-research settings.¹⁴ Employing the RE-AIM framework not only standardizes data collection and reporting but also cultivates a global dialogue around e-health implementation that allows for the bidirectional flow of information.

This paper (1) assesses the efficacy of a COVID-19 e-health educational intervention in Ethiopia targeting healthcare workers; and (2) employs the RE-AIM framework to describe the implementation science features.

Methods:

Study Description and Design. An international transdisciplinary team of public health professionals, including providers from local clinics and community stakeholders in Ethiopia designed an e-health educational intervention to translate findings and experiences from settings where COVID-19 had already hit (e.g., New York City) to settings where COVID-19 had not yet arrived (e.g., Ethiopia). In other words, these seminars were designed to improve medical knowledge and preparedness among healthcare workers in Ethiopia before the healthcare system was overwhelmed with cases. The cross-sectional study design employed a mixed-methods measurement tool to assess both the interventions efficacy and identify best practices for

developing e-health training interventions for medical professionals in Ethiopia. This Human Studies committee determined that this report did not require IRB oversight.

Procedures. A series of three one-hour medical seminars were established to provide global health experts from the United States with experience in treating COVID-19 a platform to share lessons learned and best practices for low-resource settings. The number and length of seminars was determined based on recommendations from local stakeholders and organizational capacity. The seminars took place between May and August in 2020.

Participants. While targeted for healthcare workers in Ethiopia, the seminars were made available for anyone interested, including healthcare workers from other low-income countries. Participants were recruited using a variety of methods: Targeted online advertisement on Facebook and LinkedIn; emails to partner organizations and NGOs; and posters, word of mouth of colleagues and hospital administration at the local hospitals in Ethiopia.

Intervention Content: The content was designed using an equity-oriented approach with both local stakeholders in Ethiopia and American physicians who had first-hand experience treating the COVID-19 pandemic. The content development was led by an American-trained physician who has been working in Ethiopia for over 30 years and delivered on Zoom. Specifically, for the first session, the aforementioned physician consulted with both local clinic staff in Ethiopia, asking what information they would like to know from physicians treating the pandemic [as the pandemic had yet to arrive in Ethiopia], and leading American-based doctors, asking what tricks, tips, and or knowledge that had been learned from the outbreak in America could be translated back to Ethiopia. The subsequent two seminars employed an adaptive design that both incorporated the aforementioned process as well as direct feedback from participants and local stakeholders, including representatives from the local Public Health Association.

Dissemination Platform Description:

Measures: After each seminar, an anonymous de-identified mixed-methods survey was sent out to seminar participants to assess 1) the seminar's effectiveness and 2) if the seminar was meeting the needs and preferences of the target audience in a safe and respectful manner, including marketing and communication strategies. The full list of questions and measurement tool can be found in Appendix A. Each seminar was iterative, in the sense that changes to both format and content were made based on the feedback from participants. The measurement tool (i.e., survey) was designed prior to the intervention to evaluate the seminars using the RE-AIM framework and remained the same.

Iterative Process: Importantly, based on feedback provided using the mixed-methods measurement tool, each medical seminar was modified to respond to participant needs and preferences. Briefly, the first medical seminar was a high-level overview of COVID-19's etiology, prevalence, and risk factors. The second medical seminar was focused on preparing both the medical facility and staff to test, triage, and treat COVID-19. The third medical seminar used real de-identified case studies that included imaging and lab work so that providers could have first-hand exposure and experience in virtually treating a COVID-19 patient.

As a result, while just under 40% of the participants in the first medical seminar were physicians, the second and third medical seminar were comprised of 50% and almost 80% physicians, respectively. Similarly, while just under 30% of the participants in the first medical seminar were from developing countries, the second and third medical seminars were comprised of 54% and 84% persons from the developing world, respectively. In other words, each medical seminar more successfully reached and responded to the needs of our target population, healthcare providers from Ethiopia and developing countries.

Participants were informed both in writing and verbally at multiple points both during and after the seminar that all information collected was done both on a voluntarily basis and anonymously.

Statistical Analysis: All descriptive statistics (e.g., frequencies, percentages, and averages) were computed using STATA/SE 14.2 (Statacorp, Texas).

Results:

Reach:

Three e-health medical seminars took place between May and August 2020, approximately 6 weeks apart using the Zoom platform and conducted in English. Demographic information describing seminar participants can be found in Table 1. Across all three seminars, there were a total of 324 participants, 218 live participants during the medical seminar itself and 106 participants who viewed the recorded seminar at a later point. From the project inception, the RE-AIM framework was used to guide both the intervention development and the cross-sectional measurement tool that was developed for project evaluation. Qualitative participants responses describing the RE-AIM constructs evaluated described below can be found in Table 2.

Importantly, the marketing strategy changed between each medical seminar. For the first event, almost 200,000 profiles viewed the event on Facebook over the 5-day advertising period for the first seminar, 68 NGOs were emailed about the opportunity, and 3 hospitals in Ethiopia agreed to share the opportunity with medical providers. By the third seminar, only 4,253 people saw the event over the 10-day advertising period, but 187 NGOs were emailed about the opportunity, and 15 hospitals to share the opportunity with medical providers.

Effectiveness:

Across all three medical seminars, almost 100% of participants reported the training to be effectively in English - only one person reported challenges. Importantly, 100% of participants reported the presenters to be experts in their field. 45.7%, 100%, and 83.3% of participants reported that they anticipate the information presented will be relevant and useful for their clinical responsibilities, respectively. The iterative development of the medical seminar ensured that participant needs and preferences were incorporated. See Table 3.

Adoption:

On a settings level, the research team assessed adoption through its ability to not only cultivate the necessary internal trust and willingness of the organization to develop this medical webinar series but also with organizations, including the Ethiopian federal government, to offer this program to the appropriate target population. On a participant level, over 80% of participants reported that they planned to share the information presented with someone else after all three medical seminars. In fact, over 80% of participants in all three medical seminars reported that the information presented was new. Finally, by the second and third seminars, hospitals began to both advertise and offer live viewings of the seminar. See table 4.

Implementation:

The format and content of each medical seminar evolved, based on the feedback from the previous medical seminar. For example, feedback from the first medical seminar indicated that the information was generic and high-level, and professionals were looking for more specific recommendations for their facilities. In terms of format, they wanted it to be more interactive (as opposed to frontal) with a longer question and answer session. After the second medical seminar, participants asked if it would be possible to review real cases that the presenters have treated. While they appreciated the more interactive nature of the second medical seminar, they wanted more of a virtual workshop where they were actively participating.

Keeping in mind that iterative nature of the intervention, over 90% of participants reported that the was information delivered in a culturally sensitive/tailored manner after all three medical seminars. As the pandemic arrived in Ethiopia, participant expectations for COVID-19 training decreased. While participants reported having as high as 96 hours a month to train for COVID-19 after the first medical seminar that took place as COVID-19 was arriving in Ethiopia, the maximum amount of time reported for COVID-19 training after the third medical seminar was 10 hours.

Participants were asked about which social media platforms they use for work in order to better understand how to reach the target population. LinkedIn and Facebook were most popular, followed by Telegram and Instagram and then Twitter. Additionally, participants were asked about their access to internet. In all three medical seminars 50% or more reported having internet access both at home and on a smartphone, around a third reported having internet only on their smartphone, and around 10% reported having internet only at home.

While over half of the participants in the first medical seminar reported finding out about the seminar from a friend, over half of participants reported finding out about the opportunity via work for the second and third medical seminar. Similarly, while advertisements brought in over 20% of the participants for the first seminar and over 10% of the participants for the second seminar, no participants for the seminar reported that they learned about the experience from advertisements. Finally, when asked about how much lead time participants would like to have to know about trainings, most reported less than one week followed by 1-2 weeks. See table 5.

Maintenance

The research team and organization that developed the medical seminars has applied for funding to continue offering medical seminars. At the current time, there are no additional plans to offer more seminars. However, there is significant organizational interest in piloting additional eHealth training programs for their staff and stakeholders in Ethiopia and other developing countries.

One follow-up question was sent to all participants to assess maintenance on the patient level at the end of October 2020, almost 6 months after the first medical seminar. When participants were asked if (s)he has used or applied any information presented in any of the three medical seminars in your daily clinical responsibilities, over 64% reported they had, demonstrating a high level of *maintenance* or long-term effects of the intervention. See table 6.

Discussion:

Key Findings from the COVID-19 Medical Seminar Series:

As demonstrated, this iterative series of medical seminars that was developed and evaluated using the standardized RE-AIM framework to prepare medical professionals in Ethiopia where COVID-19 had not yet spread was largely successful. Participants reported the e-health intervention to be effective, measured by comprehension, subject matter expertise, and relevance to both expected and actual clinical responsibilities. Moreover, a novel finding is that medical providers preferred to engage in such trainings together at their place of work at the end of the workday in the middle of the week. Another key finding is that effective stakeholder engagement happens on many levels – it requires engaging individuals, hospitals, and associations. Finally, the RE-AIM framework can be effectively employed in both non-research and international settings.

Learnings for Developing an E-Health Intervention for Medical Professionals in Ethiopia and other Low-Income Countries:

Through assessing an urgent e-health intervention to empower and prepare medical providers to respond to the COVID-19 pandemic, important descriptive information that describes the needs and preferences of medical providers in Ethiopia and other low-income countries were obtained. For example, consistent with the literature, internet technologies are relatively widespread and efficacious to facilitate medical training with medical leaders from around the globe.^{17,18} Similarly, training conducted in English is effective. Participants reported that trainings should take place in the middle of the week and at the end of the local workday, that way they can participate with colleagues, together, at hospitals without it interfering with either their work and or home responsibilities. While acknowledging they had sufficient internet access outside of their workplace, it appears that medical providers preferred to participate in trainings with colleagues in their workplace setting.

Most medical professionals were under 40 years old, as older physicians were in a higher risk category. Through the iterative process, we were able to better tailor our intervention for our target population, healthcare providers from Ethiopia. Specifically, Ethiopian healthcare providers reported preferring interactive sessions based on real case studies as opposed to frontal presentations that provided an overview of [global incidence trends](#) and etiological information. Moreover, they are self-aware of their needs and eager to advocate for specific information to which they do not have access. As a result, it is critical to engage local stakeholders – both individuals and institutions – in developing a content, recruitment, and implementation strategies. This aligns with equity-oriented^{19,20} and community-based participatory methods for engagement best practices.²¹ Participants reported having local medical leadership frame the experience before the seminar began. They also appreciated the opportunity to follow-up with experts after the seminar ended.

Finally, especially in terms of building emergency trainings for medical professionals, the approach to translate and disseminate findings from other settings was endorsed by participants.

RE-AIM Framework

As evidenced, the RE-AIM has widespread use and has proven to be an effective dissemination and implementation research framework for many settings, intervention types, and target populations.²² There is also limited published research on its application in both international and non-research settings.^{14,16} Therefore, employing the RE-AIM framework in this international non-research setting was an effective and novel way to show its versatility and utility in these settings. Importantly, the implementing team decided to use the RE-AIM framework when designing the intervention to inform both the intervention design and measurement tool. By verifying its applicability and encouraging the uptake of the RE-AIM framework in more settings, it creates a standardized way in which global research can build on itself, with an ultimate goal of decreasing the extreme lag between research and touching a patient.²³ This standardized and bidirectional flow of information is critical to improve the quality of research – be it in developing equity-oriented interventions or assessing external validity.

E-Health as a tool for medical training in Ethiopia and other Low-Income Settings:

As evidenced in this intervention and others,⁹ e-health trainings for medical providers are effective in Ethiopia and other low-income settings. Specifically, within the constraints of bandwidth, cost, and power, e-learning has been used for healthcare education and training in the healthcare sector in Africa well received by students and practitioners.⁹ This intervention supports this finding, as, after every seminar, participants expressed appreciation and a desire for more like-opportunities.

Therefore, e-health has been proposed as a solution to both limit the burden of diseases like the COVID-19 pandemic and address aforementioned infrastructural challenges, including, but not limited to, the insufficient number of health workers.²⁴ In fact, given the significant expansion in telecommunication infrastructure, especially in many rural regions,¹⁷ over the last two decades in places like Ethiopia in Sub-Saharan Africa,¹⁸ e-health and international cross border telemedicine is becoming imperative to efficacious care.⁹ Systematic reviews demonstrate that successful e-health endeavors in Africa and other low-income countries have relied on international collaborative efforts between centers in Africa and counterparts in North America or Europe.¹⁸ Therefore, given the uneven spread of the pandemic across the globe, this e-health intervention instructed by renowned medical leadership in the US who have already treated COVID-19 cases for healthcare workers in Ethiopia and other low-income countries supports this finding and is an example of an evidence-based and efficacious approach to developing e-Health educational activities on COVID-19 for healthcare workers.

Additionally, as there is significant inequality in medical care in Africa,⁹ e-health approaches are an innovative and equitable approaches to delivering training healthcare workers and improving health outcomes in marginalized and deprived populations,¹⁸ such as rural communities.²⁵ In fact, e-health interventions have been proven to have added benefits for rural providers such as improve their self-esteem, and promote continuing professional development and the recruitment and retention of rural physicians in rural regions.^{6,9,17} The full potential of global e-health to meet both national and global health objectives is not being tapped, and it may be the necessary tool to

strengthening health systems like those in Africa.²⁶ In fact, developing nations and International Standards Organization have also supported e-health via policy or legislation.²⁶ This intervention supports this finding.

Limitations and Future Research:

The primary limitation of this study is potential selection bias, in that survey respondents may differ from nonrespondents. Additional limitations are based on the measurement tool and study design. Specifically, given the anonymous cross-sectional measurement tool that was employed in this study, it was not possible to measure the number of returning participants from seminar to seminar. Additionally, as groups of physicians reported watching the medical seminars together at their respective hospitals, their survey response now, at times, represented groups of individuals rather than just a single participant, and should have, perhaps, been weighted. However, given that all responses were anonymous, there was no way to adjust for the grouped response.

Therefore, future research should incorporate a more effective way to include individual and grouped responses and consider employing deidentified rather than anonymous data collection approaches. Additionally, by incorporating the recommendations in this paper, future research should work with local hospitals and healthcare institutions to increase the sample size. Finally, future research should assess maintenance at a longer-term interval, especially for e-health trainings not focused on global pandemics or urgent responses.

Conclusions:

As demonstrated in both other settings and populations, e-health technologies can be an effective tool to train medical providers in Ethiopia and, perhaps, other low-income countries both in Africa and abroad. In this case study, due to the uneven spread of the COVID-19 pandemic, e-health technologies empowered medical expertise to be shared and employed in clinical settings across the globe when travel was prohibited. E-health trainings empower the dissemination and implementation of best practices and encourage the bidirectional flow of information that

ultimately cultivates a more transparent and accessible global dialogue around evidenced-based practices. Similarly, the RE-AIM framework standardizes data collection and reporting processes with the same end goal. Ultimately, if employed correctly and equitably, e-health technologies have the opportunity to decrease global health disparities, increase the retention of healthcare workers (especially in vulnerable communities), improve health outcomes of patients, and reduce the overall cost of healthcare.

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Table 1a: Indicators Measuring the "Reach" Construct from the Medical Webinar			
	Webinar 1	Webinar 2	Webinar 3
Number of Participants	n (%)	n (%)	n (%)
Summary Data - Total Participants in the Live Webinar			
From Developing Countries	26 (27.4)	26 (54.2)	63 (84.0)
From Developed Countries	69 (72.6)	22 (45.8)	12 (16.0)
<i>Subtotal</i>	<i>95 (100)</i>	<i>48 (100)</i>	<i>75 (100.0)</i>
Physicians	37 (38.9)	24 (50.0)	59 (78.7)
Webinar Participants' Geographic Breakdown			
Ethiopia	22 (23.2)	25 (52.1)	63 (84.0)
Nigeria	2 (2.1)	0 (0.0)	0 (0.0)
Indonesia	0 (0)	1 (2.1)	0 (0.0)
Haiti	1 (1.1)	0 (0.0)	0 (0.0)
Nepal	1 (1.1)	0 (0.0)	0 (0.0)
USA	52 (54.7)	11 (22.9)	7 (9.3)
Israel	16 (16.8)	9 (18.8)	5 (6.7)
UK	1 (1.1)	0 (0.0)	0 (0.0)
Austria	0 (0.0)	1 (2.1)	0 (0.0)
Netherlands	0 (0.0)	1 (2.1)	0 (0.0)

Table 1b: Indicators Measuring the "Reach" Construct from Survey			
Survey Results			
Responses	35 (36.8)	16 (66.7)	6 (10.2)
Participant Ages			
<30 years	9 (25.7)	1 (6.3)	2 (33.3)
30-39	6 (17.1)	11 (68.8)	3 (50.0)
40-49	6 (17.1)	2 (12.5)	0 (0.0)
50-59	3 (8.6)	0 (0.0)	0 (0.0)
60-65	2 (5.7)	0 (0.0)	0 (0.0)
>65	9 (25.7)	2 (12.5) (0.0)	1 (16.7)
Participant Sex			
Male	21 (60.0)	12 (75.0)	4 (66.7)
Female	14 (40.0)	4 (25.0)	2 (33.3)
Language Spoken with Patient			
Tigrinya	1 (2.9)	0 (0.0)	0 (0.0)
Amharic	6 (17.1)	11 (68.8)	4 (66.7)
Creole	1 (2.9)	0 (0.0)	0 (0.0)
English	25 (71.4)	3 (18.8)	2 (33.3)
Afan Oromo	1 (2.9)	1 (6.3)	0 (0.0)
Indonesian	0 (0.0)	1 (6.3)	0 (0.0)
N/A	1 (2.9)	0 (0.0)	0 (0.0)
Location of Participant			
USA	18 (54.1)	1 (6.3)	0 (0.0)
Israel	2 (5.7)	0 (0.0)	0 (0.0)
Nigeria	1 (2.9)	0 (0.0)	0 (0.0)
Ethiopia	13 (37.1)	14 (87.5)	6 (100.0)
Indonesia	0 (0.0)	1 (6.3)	0 (0.0)
Haiti	1 (2.9)	0 (0.0)	0 (0.0)
Participant Professions			
Physician	13 (37.1)	8 (50.0)	3 (50.0)
Public Health Professional	8 (22.9)	4 (25.0)	2 (33.3)
Medical Student	1 (2.9)	0 (0.0)	0 (0.0)
NGO	9 (25.7)	1(6.3)	1 (16.7)
Educator	2 (5.7)	0 (0.0)	0 (0.0)
Other (journalist, electrical engineer, retired, accountant)	2 (5.7)	3 (18.8)	0 (0.0)
How many years have respondent worked in the field?			
0 or NA	14 (40.0)	1 (6.3)	0 (0.0)
1 to 5	6 (17.1)	3 (18.8)	2 (33.3)
6 to 10	5 (14.3)	9 (56.3)	2 (33.3)
11 to 15	4 (11.4)	2 (12.5)	1 (16.7)
More than 15	6 (17.1)	1 (6.3)	1 (16.7)

Table 2a: Qualitative Data Supporting the RE-AIM Evaluation from Medical Seminar 1	RE-AIM Construct
<i>Effectiveness</i>	
Wonderful session. Thank you!	Effectiveness
Would also be great to hear how countries or institutions are preparing for a new normal	Effectiveness
well done!	Effectiveness
Good info on situation in Ethiopia. It would have been helpful to have more Ethiopia-specific information...I appreciated the presentation, kudos!	Effectiveness
Thank you!	Effectiveness
This is wonderful! You should do this more to create awareness in Africa. We could learn a lot from the other countries mistakes, preventions, and experiences to save lives. Thank you	Effectiveness
Participants should be prepped to be brief. On the other hand ...was very informative and excellent	Effectiveness
I have enjoyed the last webinar. Looking forward to a next one.	Effectiveness
Very informative and lots of new (to me) information about COVID 19.	Effectiveness
Thank you for creating this opportunity - it felt much higher level and informative than all of these generic webinars everyone is putting out.	Effectiveness
Somewhat difficult for me to understand one of the Ethiopian doctors.	Effectiveness
<i>Adoption</i>	
I would like to find the recordings but don't know where they are available.	Adoption
I work with the community health department of a research institute	Adoption
More of it so I could share with colleagues at work.	Adoption
It was really good information. This sort of practice, holding such session, I would think would be valuable to developing nations and healthcare workers where relevant.	Adoption
Hope I can get recording to share with others	Adoption
<i>Implementation</i>	
Very good as a starter. Broadcasting time was a real setback to Ethiopian Attendees and Panelists. Huge number of amazing professionals didn't join the seminar. Even equally important individual to the main interviewee from Ethiopia didn't manage it because of the time. All participants doesn't have equal capabilities to stay focused by listening. Some may need to use at least two sense organs (Example: Eye and Ear. It would make the seminar closer to perfection if we had a chance to have a PPT presentation from at least one of the panelists or if the format was tailored in that way) The format was not interactive so there was no as many Q&A, Chat etc in an entire session. And one of the metrics to measure a success in a webinar is a Chat interaction. The seminar doesn't give any clue who the actual target group or country or professionals were.	Implementation
Moderator was hard to understand. She [moderator] didn't provide time for questions.	Implementation
Summary of suggestions at the end and some documents will be good.	Implementation
More difficult for me to understand the Ethiopian doctors.	Implementation
Please inform presentation format and time allotted for speakers ahead of the training	Implementation

Table 2b: Qualitative Data Supporting the RE-AIM Evaluation from Medical Seminar 2	RE-AIM Construct
<i>Effectiveness</i>	
Thank you very much. It was informative. I would like to participate in future similar webinars too. Bless you!	Effectiveness
Nice presentation. Keep it up	Effectiveness
This panel discussion is very interesting and useful about the to update, follow and identify the COVID-19 character.	Effectiveness
I'm happy to attend this discussion and should be strengthen	Effectiveness
Thanks for the nice presentation!	Effectiveness
Your presenters were fantabulous; especially the woman physician. She has it all: honesty, intelligence, listening skills, observations skills, compassion. She's simply the best.	Effectiveness
Excellent presentations by everyone....well done and impressive!	Effectiveness
The presenters were very good. The host was very good spoken and professional. American doctors were very smart.	Effectiveness
The training was very informative and it was based on practical experiences which make me interested on it. Please continue such training that will help on the prevention and control of COVID-19.	Effectiveness
It was an interesting, interactive and helpful webinar. It was really nice to share their experience especially from the health professionals who is currety treating COVID patients.	Effectiveness
<i>Implementation</i>	
I assume that it would be very helpful if we try to find a way that the advertisement and the recorded version of the webinar post on Ethiopian Medical Association (EMA) website.	Implementation
1. Better if future webinars are based on real cases with visuals including diagnostic tests done such as CT scan and their description	Implementation
2. Better to focus on how Management modalities of patients can best be tailored to our own Ethiopian context	Implementation

Table 2c: Qualitative Data Supporting the RE-AIM Evaluation from Medical Seminar 3	RE-AIM Construct
<i>Effectiveness</i>	
Thank you so much and please share some reading materials, especially on lab diagnosis methods and molecular characteristics of the virus	Effectiveness
Very gud presentation	Effectiveness
I find these of interest and share information about them with acquaintances who might be interested, especially if they might be practitioners (which I am not).	Effectiveness
Keep it up other training	Effectiveness
<i>Adoption</i>	
Please arrange the training as soon as possible. We Ethiopian's have limited resources ...	Adoption

Table 3: Indicators Measuring the "Effectiveness" Construct			
	Webinar 1	Webinar 2	Webinar 3
Number of Participants	n (%)	n (%)	n (%)
	<u>35 (100.0)</u>	<u>16 (100.0)</u>	<u>6 (100.0)</u>
Training was effective in English			
Yes	34 (97.1)	16 (100.0)	6 (100.0)
No	1 (2.9)	0 (0.0)	0 (0.0)
Did you feel that the presenters were experts in the field?			
Yes	35 (100.0)	16 (100.0)	6 (100.0)
No	0 (0.0)	0 (0.0)	0 (0.0)
Do you anticipate the information presented relevant and useful for your clinical responsibilities?			
Yes	16 (45.7)	16 (100.0)	5 (83.3)
Not Sure	17 (48.6)	0 (0.0)	0 (0.0)
No	2 (5.7)	0 (0.0)	1 (16.7)

Table 4: Indicators Measuring the "Adoption" Construct			
	Webinar 1	Webinar 2	Webinar 3
Number of Participants	n (%)	n (%)	n (%)
Do you plan to share the information presented with someone else?			
Yes	30 (85.7)	15 (93.8)	5 (83.3)
No	5 (14.3)	1 (6.3)	1 (16.7)
<i>Subtotal</i>	<u>35 (100.0)</u>	<u>16 (100.0)</u>	<u>6 (100.0)</u>
Was there new information presented?			
Yes	29 (82.9)	15 (93.8)	6 (100.0)
No	6 (17.1)	1 (6.3)	0 (0.0)
<i>Subtotal</i>	<u>35 (100.0)</u>	<u>16 (100.0)</u>	<u>6 (100.0)</u>
How many hospitals shared/viewed the webinar as a formal event			
How many hospitals agreed to share the opportunity?	0 (0.0)	12 (N/A)	15 (N/A)
How many hospitals shared/had a viewing of the webinar live?	0 (0.0)	Unknown (N/A)	4 (N/A)
<i>Subtotal</i>	<u>0 (0.0)</u>	<u>12 (N/A)</u>	<u>19 (N/A)</u>

Table 5: Indicators Measuring the "Implementation" Construct			
	Webinar 1	Webinar 2	Webinar 3
Number of Participants	n (%)	n (%)	n %
	<u>35 (100.0)</u>	<u>16 (100.0)</u>	<u>6 (100.0)</u>
Was the information delivered in a way that is culturally sensitive/tailored			
Yes	33 (94.3)	15 (93.8)	<u>6 (100.0)</u>
No	2 (5.7)	1 (6.3)	(0.0)
How much time do they have for COVID training, survey respondents, per month			
Unsure	13 (37.1)	0 (0.0)	0 (0.0)
0	4 (11.4)	1 (6.3)	2 (33.3)
1 to 10 hours	11 (31.4)	10 (62.5)	4 (66.7)
11 to 30 hours	3 (8.6)	2 (12.5)	0 (0.0)
Greater than 30 hours	4 (11.4)	3 (18.8)	0 (0.0)
Social Media Needs for Work:			
Facebook	20 (57.1)	9 (56.3)	2 (33.3%)
Twitter	12 (34.3)	1 (6.3)	1 (16.7%)
LinkedIn	14 (40.0)	10 (62.5)	1 (16.7%)
Instagram	6 (17.1)	3 (18.8)	1 (16.7%)
Telegram	3 (8.6)	3 (18.8)	1 (16.7%)
Viber	1 (2.9)	0 (0.0)	0 (0.0%)
Zoom	3 (8.6)	1 (6.3)	0 (0.0%)
Email	2 (5.7)	1 (6.3)	0 (0.0%)
Google	1 (2.9)	0 (0.0)	0 (0.0%)
Phone	1 (2.9)	0 (0.0)	0 (0.0%)
What's App	1 (2.9)	0 (0.0)	1 (16.7%)
How did you watch the webinar			
Live	35 (100.0)	16 (100.0)	5 (83.3)
Video	0 (0.0)	0 (0.0)	1 (16.7)
How did you find out about the webinar			
Through a friend	19 (54.3)	5 (31.3)	2 (33.3)
Through work	8 (22.9)	9 (56.3)	4 (66.7)
Advertisement	8 (22.9)	2 (12.5)	0 (0.0)
Internet Access			
WiFi at home + Smartphone	28 (79.0)	9 (56.0)	3 (50.0)
Only WiFi at home/office	4 (12.0)	1 (6.0)	1 (16.7)
Only WiFi on the smartphone	3 (9.)	6 (38.0)	2 (33.3)
How much lead time would you like to have to know about trainings?			
Not interested	6 (17.1)	1 (6.3)	0 (0.0)
Less than 1 week	11 (31.4)	7 (43.8)	2 (33.3)
Between 1-2 Weeks	10 (28.6)	5 (31.3)	1 (16.7)
Between 2-3 Weeks	5 (14.3)	1 (6.3)	1 (16.7)
3-4 Weeks	0 (0.0)	1 (6.3)	2 (33.3)
4 Weeks or more	3 (8.6)	1 (6.3)	0 (0.0)

Table 6: Indicators Measuring the "Maintenance" Construct	
Have you used or applied any information presented in any of the three medical seminars in your daily clinical responsibilities? (Sent out October 29th)	
Number of Participants	<u>n (%)</u>
Yes	17 (60.7)
No	11 (39.3)
<i>Subtotal</i>	<u>28 (100.0)</u>