Innovative solution to admission process of Intermediate Field Epidemiology Training Program during COVID-19 Pandemic, Liberian Experience, 2021

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ABSTRACT

Introduction: The unpredictability of COVID-19 outbreak as it waxes, and wanes has led governments to different preventive measures. There were lockdowns, restriction of movements, and closure of institutions which disrupted regular education and trainings. In the developed world, this necessitated movement of education online rather than in-person. Online education had not been well established in Liberia before this outbreak. Therefore, the restrictions resulted in the suspension of the training of public health workforce, a critical component of effective outbreak response. The Liberia Field Epidemiology Training Program (FETP) could not continue to wait till the conditions are right to admit a new cohort. Therefore, we innovated to admit new cohort in a cost-effective manner while maintaining the standard. **Methods:** We designed and implemented an online pre-admission course (O-PAC) which involved training and online examination. Using a checklist, we screened and selected affordable and secured online examination software which was able to identify unusual behaviors and yet easy to deploy and implement in the local setting. We described the process, analyzed for performance of the applicants, and presented results in figures, proportions, and tables. **Results:** Of the forty-five persons who applied, thirty-one (69%) of the people were male, 23 (66%) were from the district level, 41 (91%) are graduates of LFETP-Frontline, 42 (93%) attended the O-PAC and 41(91%) took the examination. One (2%) had his examination terminated for unusual behavior. O-PAC reduced cost of PAC by 80%. **Conclusion:** This innovation helped to admit a new cohort which commenced their training within the COVID-19 preventive measures.

Introduction

The Government of Liberia´s response to the first case of COVID-19 on March 16, 2020 [1], included several preventive measures like compulsory facemask, hand washing, ban of mass gatherings, and the nationwide lockdown for about 2 months [2,3]. During this period Liberia Field Epidemiology Training Program (LFETP), which has been building a resilient public health workforce post Ebola virus disease (EVD) outbreak [4], could not continue her training. All faculty staff, current residents of the Intermediate and Frontline FETP, and graduates were deployed to respond to the outbreak in various parts of the country. As the outbreak progressed and seemed under control, the government relaxed on some of her initial preventive measures. This allowed African Field Epidemiology Network (AFENET), implementing partner for the United States Centers for Disease Control and Prevention (US CDC) funded Field Epidemiology Training Program, to conclude the prolonged FETP trainings which were disrupted due to the COVID-19 outbreak [5]. Thereby necessitating enrolment of a new cohort.

The unpredictability of COVID-19 transmission [6] especially when preventive measures are relaxed, has necessitated that Liberia FETP must adapt to COVID 19 protocols. The country´s COVID-19 guidelines required that not more than 20 persons can attend a large gathering 1 [7]. To achieve a final selection of not more than 20 trainees per cohort, shortlisted applicants were assessed in a pre-admission course (PAC). Pre-COVID-19 outbreak, more than 40 individuals usually apply for enrolment, out of which 30 - 35 are shortlisted for an in-person 3-day pre-admission course due to the cost. After the PAC, 15-20 residents are selected for the FETP-Intermediate training after passing the PAC examination. The shortlisting of less than total application was due to cost.

The pandemic has negatively impacted medical and public health education globally. Therefore, as the COVID-19 pandemic progressed, accompanied by restrictions of gathering or lockdown as preventive measures to curb transmissions, we needed an innovative way to select the new cohort without reducing the opportunities of the applicants. Meanwhile, many training institutions globally have adapted various alternative methods including use of social media, and online meeting platforms, with emphasis on e-learning [8-10].

The Liberia FETP therefore designed and implemented an innovative way of admitting residents into the cohort 5 FETP-Intermediate training without compromising the quality of the process, maintaining cost, and allowing all qualified applicants to participate in the admission process. We described the innovative method adapted to achieve this outcome and hoped that other training programs can consider similar approach.

Planning for in-person or online pre-admission course

The team had two options. First option was to conduct the PAC twice through an in-person workshop, if applicants are more than 20 and the second option was to have an online PAC.

The risk associated with in-person PAC was high due to challenges of asymptomatic COVID-19 cases, virulence among adults and the fact that a double workshop will increase the cost. Furthermore, additional cost for in-person PAC will be incurred to ensure compliance with social distancing guidance, face mask, and COVID-19 testing of each candidate. These costs are beside the usual transport reimbursement for each candidate, hotel accommodation, and feeding.

The use of online platforms for conferencing and meetings had become popular since the onset of COVID-19 outbreak. Daily Incident Management meetings for COVID-19 response were already being conducted online in Liberia but had never been a local method of education or training. Among professionals, online courses are providing more opportunities allowing for continuous professional development to improve productivity [11]. In Africa, healthcare workforce development is gradually being conducted online and it has opened more opportunities for the African healthcare workforce to compete with the rest of the world [8]. Apart from conducting an online course, organizing an online assessment also has been of concern. Issues regarding authentication of the students, examination malpractices, poor internet truncating the examination, anxiety with the use of technology for examination, ease of examination and examination software interface are common [11-13]. Although online learning and examination have

been difficult for low-income countries to adopt, the pandemic has necessitated its consideration [14-15].

Methods

The Liberia setting

Liberia has a population of 5,057,677 [16] and it is divided into 5 geographic regions (Southeast-A, Southeast-B, South Central, North Central and Northwest), 15 counties, and 93 health districts which supervise health data from 831 health facilities. The course was open to all counties, districts and health facility staff who met the admission criteria.

Course Structure and Schedule adjustments for O-PAC

The pre-admission course has two parts: the training which runs for 2 days and the examination which takes place on the third day

In-person PAC was conducted for 8hours each day. However, to encourage maximum concentration, and reduce interruption from poor internet connectivity, we limited the training period for the O-PAC for 3 hours each day.

Pre-COVID, the admission examination was in two sessions. A multiple-choice questions examination and practical exercise involving a case study and PowerPoint presentation. However, due to the COVID restrictions and the decision to conduct the course online, the team restricted the examination to only multiple-choice questions.

The Search

To identify an appropriate online examination software, we entered the keyword "online examination software" on google search engine, and from returned results, we randomly selected a review website from the first 10 google search results. We used a checklist to analyze the examination software in the review website.

The checklist parameters were cost of acquiring and maintaining the software, ease of use, and software security. Ease of use was determined by how simple it was to set-up the examination by the administrator and for students to participate in the examination. Software security was assessed by the observed and self-reported ability of the website to protect data and prevent or minimize examination malpractices.

Examination malpractice was identified by the software as unusual behavior. The examination software was set to terminate a candidate´s examination, if more than 10 episodes of unusual behaviors were recorded. The following were considered as unusual behaviors: if applicant minimized the browser, resized the browser, opened a new tab, opened a new program, took a screenshot on the desktop, pressed Ctrl + C, pressed Ctrl + V, pressed Print Screen, pressed F12 or any of these combinations.

Call for application for the cohort 5 training **Figure 1** was advertised for 2 weeks on various social media, Liberia FETP and National Public Health Institute of Liberia (NPHIL) websites, and surveillance offices nationwide[17].

Results

The commonest conferencing/ meeting software in use in Liberia during this pandemic was adopted for the training.

When we entered the keyword "online examination software" on google search engine, it returned over 61,000 results. We randomly selected a review website and used a checklist to analyze the examination software in the review website. Of the 130 online examination software reviewed, we shortlisted 6 software based on the three criteria. Median number of examinations per year was 1,200 (Range: 100-6000), while the median cost of running the software per year was $853 (Range: $245-$2500). One examination software was chosen out of the six shortlisted based on the criteria.

We received a total of 45 applications, and all were invited for the O-PAC. We shared the online conferencing link required to attend the training. All invited applicants acknowledged the invitation.

Thirty-one (69%) of the people who applied were male, 23 (66%) were from the district level of the national surveillance system, 3 (7%) were animal health surveillance officers from the Ministry of

Agriculture, 41 (91%) are graduates of LFETP-Frontline **Table 1** and 23 (51%) are from Monsterrado county which is the most populous county in Liberia.

The Training

Of the 45 who applied, 42 (93%) attended the O-PAC **Figure 2**. Three lessons from the frontline training were taught by faculty members of the Liberia FETP who facilitated from the AFENET office. The participants and faculty agreed to abide by internet etiquette which aided in the smooth execution of the online course: we made sure that attendees are familiar with functions of the platform, asked attendees to mute their voice when not speaking, asked them not to use their video unless asked, and asked them to use hand raising icon if they have questions or comments. Whenever there was interruption due to poor internet reception, we advised the attendees to change location to achieve better internet reception. The training materials were shared with all attendees on the first day of the training giving them the opportunity to revise the lessons learnt and prepare for the second day.

On day 3, 41 (97%) of the course attendees participated in the 1 hour 45 minutes´ examination which was conducted using the chosen examination software.

The Examination

Prior to commencement of the examination, an examination instruction e-mail was sent to attendees. In the thirty minutes ahead of the examination, the faculty explained the examination instructions for clarity. We explained 'unusual behavior' during the examination to the applicants. These unusual behaviors were termed examination malpractice by the software and it led to the termination of applicant´s examination when the conditions are met.

Of the 41 who took the examination, 1 (2%) had his examination terminated because the software identified more than 10 unusual behaviors, while 34 (83%) had less than 5 unusual behaviors during the examination. Each candidate saw their results displayed on their laptop screen immediately after submission of their online script.

When there were internet interruption and attendees complained to the examination administrator, attendees were asked to refresh the browser and the examination continued where the attendee stopped.

Of the 41 who completed in the admission process, 19 (46%) applicants were selected, compared to 18 (60%) out of 30 in previous in-person PAC. There was an 80% reduction in cost of implementing the O-PAC compared with previous in-person PACs. This was because, there was no need for transport reimbursements, daily subsistence allowance and conference packages for the participants. We only supported internet access cost for the 10 hours for the applicants.

Discussion

We have shown that it is possible to innovate in capacity building process in a resource poor country like Liberia through the online medium. O-PAC provided equal opportunities to all applicants to participate in the admission process, compared to previous cohorts´ admission process where candidates where short-listed to attend in-person pre-admission course. The O-PAC was economical, which is similar to the findings in a review made by Kerryn Butler-Henderson and Joseph Crawford [13]. The 'unusual behaviors' or examination malpractice among applicants was high which is similar to finding in studies on students´ perception that cheating, or examination malpractices are commoner with online examinations compared to paper examination [13]. Though only one person was penalized, it could be due to the arbitrary selection of 10 unusual behaviors for penalization. Do we need to wait for 10 malpractices before an examination candidate is penalized? This could have been improved upon by reducing the opportunity to cheat. The faculty could search for a more scientific way of determining the cut-off mark for unusual behavior.

Furthermore, we conducted visual authentication at the beginning of the examination but did not monitor who actually continued and completed the examination, because we did not use the proctor section of the examination software due to cost. However, if any program wants to authenticate and monitor the candidate participating in the examination, the program could activate the proctor

section of the software for an extra fee, and they will be able to monitor each candidate through video.

Conclusion

In conclusion, we conducted an innovative admission process which gave all applicants an opportunity to be assessed equally for admission into the cohort 5 of the Liberia Field Epidemiology Training Program. We recommend to other FETPs to consider using this cost-saving and effective method of conducting pre-admission course in admitting their FETP Intermediate.

What is known about this topic

- FETP Intermediate admission process requires pre-admission course which is usually done in person within limit of funds available
- To conduct the pre-admission course, shortlisting will have to be done along with extensive cost

What this study adds

- This study provided an opportunity to conduct the pre-admission course for admission into FETP-Intermediate without shortlisting applicants when it was conducted as an online course
- It also provided an opportunity to conduct the course in a cost-effective manner allowing for more funds to be used for the training of successful candidates

Competing interests

The authors declare no competing interests.

Authors' contributions

Peter Adewuyi conceived the concept of online pre-admission course, organized the implementation, wrote the manuscript, and organized the reviews. Obafemi J. Babalola, Himiede Sesay, Lily Sanvee-Blebo, Faith Whesseh, Godwin E. Akpan, participated in the development and implementation of the online course, and reviewing of manuscript drafts. Maame Amo-Addae and Thomas Nagbe supervised implementation of the course and reviewed manuscript drafts. Chukwuma Umeokonkwo participated in data gathering and substantially reviewed the first draft up until final draft. Godwin Akpan facilitated mapping in one of the topics of the training. All authors read and approved the final version of the manuscript.

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Tables and figures

Table 1: Demographic Distribution of Applicants for Online Pre-Admission Course, Cohort 5 admission Process, Liberia FETP, Liberia, 2021 (N= 45)

Figure 1: Call for application, Liberia FETP Intermediate Cohort 5, February 2021.

Figure 2: Online Pre-Admission Course for Cohort 5 Intermediate FETP, Liberia, 2021comm

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Table 1: Demographic Distribution of Applicants for Online Pre-Admission Course, Cohort 5 admission Process, Liberia FETP, Liberia, 2021 (N= 45)		
Characteristics	**Number**	**%**
Gender		
Male	31	68.9
Female	14	31.1
Levels of Work (N=45)		
National	16	35.6
County	2	4.4
District	25	55.6
Health Facility	2	4.4
Ministry Affiliation		
Ministry of Health/ NPHIL	40	88.9
Ministry of Agriculture	3	6.7
Others (University of Liberia & Police Force)	2	4.4
FETP Training Experience		
Yes*	41	91.0
No	4	9.0
Yes: FETP Frontline graduates*		

- **Contribute to scientific reports that uses the IMRaD structure**
- **Develop and deliver oral presentations of work-related projects**

Pre-requisite for admission

Job-related: The applicant should be a government worker involved in disease surveillance and be willing to be re-assigned after the training

Academic: The applicant should be a graduate of Frontline FETP and/or be prepared to undertake a pre-admission frontline competency assessment

Logistics: The applicant should have access to a functioning laptop throughout the period of the training.

Application

Applications are being invited from disease surveillance officers/frontline graduates of LFETP at the national, county and district levels.

Interested applicants should submit the following:

1. Letter of application
2. Letter of recommendation from supervisor: Indication of support by immediate supervisor and willingness to allow applicant time to attend the workshops and conduct fieldwork exercises
3. Letter of motivation/interest: Reasons why the applicant wants to undertake the course ***(not more than one page).***
4. Current curriculum vitae

Deadline for application: **Friday, February 27, 2021**

Mode of submission: submit to the website: www.liberiafetp.com.

Figure 1: Call for application, Liberia FETP Intermediate Cohort 5, February 2021

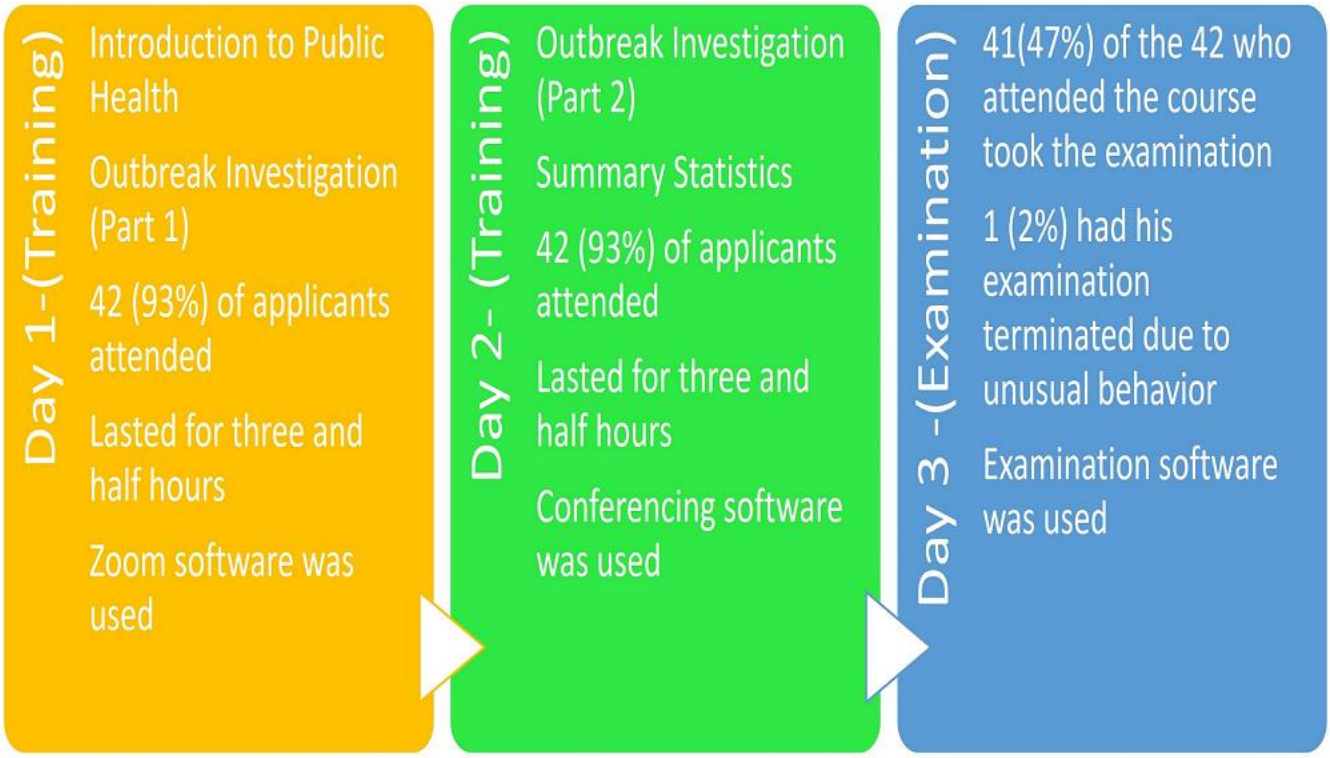

Figure 2: Online Pre-Admission Course for Cohort 5 Intermediate FETP, Liberia, 2021