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Journal of Clinical Tuberculosis and Other Mycobacterial Diseases

journal homepage: www.elsevier.com/locate/jctube

Point-of-care program in HIV, tuberculosis, and associated conditions: A virtual global technical assistance platform to strengthen HIV and tuberculosis workforce capacity

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ABSTRACT

A global multi-disciplinary faculty was established to work collaboratively and provide virtual technical assistance, using a point-of-care continuing education model, to clinicians across the world engaged in the care of patients with either HIV infection or tuberculosis. Ancillary offerings included live or virtual lectures, case-based conferences, and courses. In spite of the considerable disruption of the program due to the COVID-19 pandemic, we engaged and assisted a substantial number of clinicians across the world and provided meaningful contributions to their continuous professional development and patient care. In light of the ongoing pandemic, virtual technical assistance models such as this should be scaled to continue essential high-quality HIV/TB services.

1. Introduction

Healthcare workforce shortage is an increasingly recognized worldwide problem, reaching crisis stage in developing countries where the major burden of HIV and tuberculosis lies [1–3]. However, even in resource-rich countries such as the United States, the supply of health care providers for people living with HIV, for example, is not keeping pace with the growth in demand for their services, and significant geographic disparities in HIV care accessibility remain [4–8]. A crisis of human resources for health exists; its reasons are complex and include increases in disease burden, an aging population generating a greater need for care, underinvestment in education and training, an aging health care workforce nearing retirement and weak health systems.

Less attention has been paid to the quality of care delivered. Many obstacles hinder the delivery of quality health care services, in particular for complex conditions, such as HIV infection and tuberculosis. Critical determinants of the quality of care delivered are the competency, proficiency, and skills of the health care worker. Complex caseloads, infrequent access to colleagues for consultation, inadequate availability of specialists, time pressures, staffing constraints, and limited

opportunities for continuing professional development, contribute to professional isolation, professional dissatisfaction, frequent provider turnover, and burn-out.

The response to the health care workforce crisis broadly includes pathway strategies designed to increase the pipeline of new health care professionals and delivery system strategies intended to extend the capacity of the existing health care workforce [1,7,8]. Initiatives include reforming the medical education system and curriculum and professional development strategies aiming to increase the level of expertise and proficiency among clinicians and boost the supply of qualified providers.

Another identified need is continuing medical education (CME). The process of CME enables a clinician to stay current and maintain credibility with patients, colleagues, and oversight organizations. The process also gives some assurance to all involved that those who take care of patients are familiar with the core and up-to-date knowledge that is necessary to provide that service. Without CME, addressing the changes in medical knowledge and practice, including new diagnostics and treatment strategies, will be impossible and only compound the training challenges faced in resource-limited settings. Unfortunately, CME

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<https://doi.org/10.1016/j.jctube.2021.100238>

Available online 22 April 2021

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activities in these settings are either lacking or are rudimentary at best and highly fragmented.

Point-of-care continuing medical education (POC-CME) is a relatively new development in the field of CME, reflecting the shift from the passive transmission of knowledge to a competency-based model focused on professional development. Current POC CME activities focus on self-directed, online learning, whereby clinicians research a self-identified clinical question utilizing online resource databases and claim CME credit by completing evaluation questions [9–11].

We report preliminary observations of a program in HIV, tuberculosis (TB) and associated conditions that we established, adopting the concept of POC-CME, but enhancing it by linking the activity not to an electronic database but to a virtual multi-disciplinary faculty of subject matter experts, who work collaboratively to meet the needs of clinicians across the world.

2. Methods

The target audience includes clinicians from across the world, engaged in the care of patients with HIV, or tuberculosis and their associated conditions. Information about the program was disseminated through a variety of venues, including ministries of health, professional societies, academic institutions, relevant conferences, and e-mail distribution lists. Formal partnerships were established with health care institutions and other organizations involved in the care of patients with HIV and/or tuberculosis.

Design of program: Clinicians will be able to submit their queries through a dedicated e-mail address or a web-based form created specifically for this activity. Queries should be accompanied by relevant clinical, laboratory, and imaging data but should not contain patient identifying information. Faculty are assigned on a weekly rotation throughout the year to receive and respond to queries through the entire work week, during working hours (8AM – 5PM local time). The response will be formal, in writing, within 3–7 days of receipt of request. The consultant of record will share his or her planned response with the rest of the faculty and incorporate any additional relevant input before sending the official response directly back to the requestor. All efforts are made to ensure that the local context and constraints, such as prevailing medical conditions, available medications and access to resources are taken into consideration such that the recommendation is realistic and relevant to the requestor. The response is accompanied by the evidence basis for the opinion either as attached documents or as a link to electronic resources for the clinician to access for additional self-directed learning. The response is also accompanied by a disclaimer: “The opinion is based on the documentation provided and/or discussion with a physician or provider who submitted the query. The opinion provided is intended for licensed health care professionals. Information is offered as clinical decision support, is advisory in nature and is not intended to replace local health care decision-making expertise or provision. Requestors are free to disregard any advice offered. Final clinical decisions are the sole responsibility of the health care provider”.

The evaluation of the POC CME will be conducted as required for Joint Accreditation through the Accreditation Council for Continuing Medical Education (ACCME), With each response to a query, evaluation questions for both the response to the consultation and the additional material provided are submitted to the clinician to complete and return. Participants will be surveyed for satisfaction; changes in knowledge, attitudes, or skills that reflect intent to change; and behavior and practice change.

Clinicians are encouraged to provide follow-up information if/when it becomes available or if clinical changes occur. If desired, the faculty is able to continue to assist the requestor in the care of specific patients on a longitudinal basis.

A web-based educational program including webinars and courses will be created, based on the need identified through analysis of requests submitted and complementary needs assessment, and using cases

submitted, after anonymizing, to illustrate important points in the contemporary management of difficult to treat HIV and tuberculosis cases.

Infrastructure. A dedicated website and communication platform were built. https://centerfortuberculosis.mayo.edu/mcct/_consultation/ A program coordinator and a CME specialist were hired to triage incoming requests and responses as well as manage the CME component of the program.

Faculty. A multi-disciplinary, multi-national faculty of 45 subject matter experts including infectious diseases physicians, pulmonologists, pediatricians, radiologists, nurses, and pharmacists was established. The expert faculty were selected through personal contacts and knowledge of their work in the field of HIV and/or TB. Additional criteria for selection were that the individuals are willing to work within the design of the program, which mandates thoughtful and thorough responses accompanied with supporting evidence, but also allowing for additional input from the rest of the faculty; and that they are willing to volunteer their time and be assigned a number of weeks in the year to be on call for the program.

Partnerships. Working and formal relationship with a number of institutions and entities around the world has been established [Table 1](#).

3. Impact of the COVID-19 pandemic on the program

The COVID-19 pandemic and the responses to it, not unexpectedly, caused a disruption of both TB and HIV prevention and treatment services globally, threatening to derail the progress that has been made in the fight against these two global public health threats [12–27]. Diversion of TB and HIV diagnostic resources to COVID-19 testing has led to reductions in timely diagnosis and treatment. Destabilization and fragmentation of TB and HIV service delivery has resulted in adverse clinical outcomes. These disruptions have adversely impacted the program significantly at various levels: Implementation of quarantine, social distancing, and community containment measures have reduced access to routine HIV and TB care; health care workforce as well as financial and other resources have been diverted away from routine HIV and TB services to COVID-19; the number of health workers has also declined because of illness and self-isolation; the devastating impact on the economy has forced institutions across the world to take austerity measures, including salary cuts, furloughs, reduction in travel, and cancellation of courses. All of these issues in aggregate have resulted in a substantial slowing down of program uptake. This notwithstanding, the program has managed to be of considerable service to TB and HIV clinicians as detailed below. The challenges highlighted above actually reinforced the need for a program such as this one to support isolated and poorly resourced healthcare providers.

4. Results

4.1. Queries

One hundred four individual queries were submitted to the program, originating from 11 different countries, and generating over 1000

Table 1
Partners of the point-of care CME program.

Black Lion Hospital, Addis Ababa University, Ethiopia
AFROMED Institute of Public Health, Ethiopia
Apollo Institute of Medical Sciences and Research, India
Botswana-University of Maryland School of Medicine Health Initiative, Botswana
Institute of Medical Sciences & SUM, Siksha 'O' Anusandhan Deemed to be University, Bhubaneswar, India
Midway Specialty Care Center Guyana
Ministry of Health, Guyana
Pan American Health Association
Queen Mary University of London, England
University of Manipal, India

emails. Fifty of the queries involved female patients, 49 involved male patients; gender was not provided in 5 cases. The age distribution of the patients is detailed in Fig. 1. Seventy-four of the queries pertained to HIV infection, 37 to tuberculosis, and 11 involved HIV and TB coinfection. Twelve queries were not related to either HIV or TB. The top 3 HIV topic categories were antiretroviral therapy in treatment experienced, Fig. 2 drug interactions/drug adverse reactions, and management of coinfections. The top 3 TB topic categories were TB disease diagnosis, drug-resistant TB, and TB disease treatment. Further details of topic categories among the queries submitted to the program is provided in Fig. 3.

4.2. Ancillary programs

Beyond responding to queries on individual patient cases, supplemental education was also provided in various formats including in-person lectures, conferences, video-based case conferences, and webinars. Two hundred and fifty-one clinicians attended webinars and video-based case conferences; 968 individuals attended live courses and lectures conducted by the program.

4.3. Participant feedback

At the time of preparing this manuscript, feedback has been obtained from a limited number of clinicians who participated in the program. All respondents agreed or strongly agreed that the overall experience with the consultation service and the quality/usefulness of the consultation was good (Fig. 4). Individual comments included the following: "You have one of the best medical consultation service. Please keep it up!" All respondents agreed that the goals of implementing recommendations for prompt diagnosis, appropriate treatment and effective management of HIV infection and tuberculosis were met. All respondents agree that evidence-based references were incorporated when appropriate. The extent to which the program improved knowledge, competence, performance, patient outcomes, and team performance was rated by all respondents as being from medium to extremely high (Fig. 4). All respondents, except for one individual, agreed and strongly agreed that the timeliness of the response was appropriate (Fig. 4).

5. Discussion

We report our preliminary experience of the novel Point-of-care CME program conducted via a global technical assistance faculty. Despite the substantial challenges posed by the COVID-19 pandemic on HIV and TB clinical care as well as in the conduct of our program, we have been able to provide assistance to a substantial number of clinicians across the globe on complex clinical questions they were facing in real-time. We have also been able to provide in-person and online training and

education in HIV and tuberculosis and associated conditions to a substantial number of clinicians across the world.

There are other programs in existence, which provide remote support to clinicians on HIV or tuberculosis. Project Extension for Community Healthcare Outcomes (Project ECHO) is a telemedicine and distance-learning program from the University of New Mexico School of Medicine that intends to improve the competence of primary-care providers in underserved rural areas in the management of various complex chronic diseases [28]. Telemedicine clinics using an interactive video technology and a standardized, case-based format as well as didactic presentations, are conducted regularly and connect primary care providers with specialists. Participants can receive CME credits. These interactions are primarily synchronous through real-time videoconferencing.

The complexity of treating TB has instigated the establishment of expert multidisciplinary teams to provide advice and guidance to treating clinicians. The Centers for Disease Control and Prevention supports and coordinates regional TB centers of excellence in the United States, which provide expert medical consultation in tuberculosis to public health and medical professionals within their assigned regions [29,30]. While these centers also provide CME-based educational and training activities, the expert medical consultation itself is not a CME activity. The European Respiratory Society/World Health Organization (ERS/WHO) TB Consilium platform is an online program of peer-to-peer clinical consultation for individual TB patients [31,32]. Two independent experts provide suggestions on clinical management of complicated TB cases in response to queries from clinicians as well as national Consilium bodies. These interactions are not linked to CME credits. A number of other countries have also introduced TB Consilium-like bodies at a national or subnational level to provide consensus-based guidance on complex TB cases [33,34]. The formats used include email-based discussion as well as regular teleconferencing or in person meetings. CME credits are not a component of these interactions.

The National Clinician Consultation Center, based at the University of California, San Francisco, is an online tele-consultation program in HIV infection [35]. It requires registration before submission of queries; a consultant will respond within 2 business days. The center provides compiled resources on HIV/AIDS management on its website, but the interactions with individual clinicians are not linked to CME credits.

Our program shares similar goals and some of the features of the above programs, but it is unique and innovative at a number of levels. First and foremost, our program is a point-of-care CME activity, with responses to queries accompanied by the evidence basis for the opinions rendered and allowing for self-directed learning and thus capacity building of the individual clinician. Second, we have created a global, multi-disciplinary, multi-national, global expert technical assistance faculty to work collaboratively in supporting the global HIV and TB clinician. Third, the consultation process has a unique design that allows for input from the entire faculty and not just the consultant of record for that week. This serves a number of purposes: A broader input into the question received; the faculty benefits from having exposure to all queries received by the program and the opinions of other faculty members; it serves as an ongoing real-time quality evaluation for program management. Fourth, the program provides for longitudinal management, where needed. Finally, the needs of clinicians identified through the core point-of-care CME activity are further met by the development of targeted on-line and in-person educational and training activities.

Going forward, we intend to sustain as well as enhance our program in a number of ways. It is critical that we maintain the robustness of the unique global technical assistance faculty that we have established as it relates to their commitment to the program as well as diversity in gender, specialties and geographic representation. We will work on ensuring the quality of expert consultation as well as ancillary educational activities. We will strengthen the relationships already established and establish new ones to reflect the truly global nature of our program

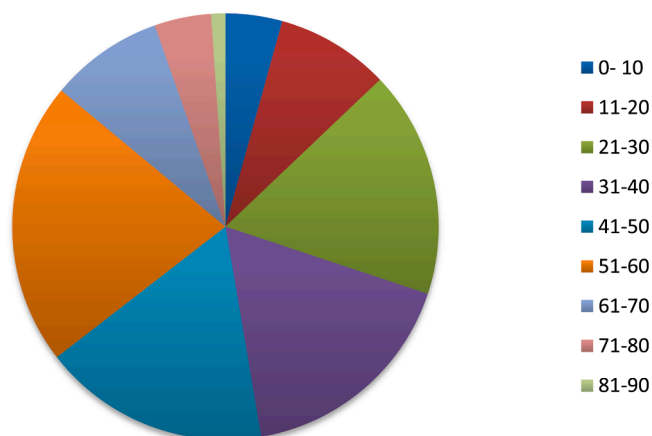


Fig. 1. Age distribution of cases

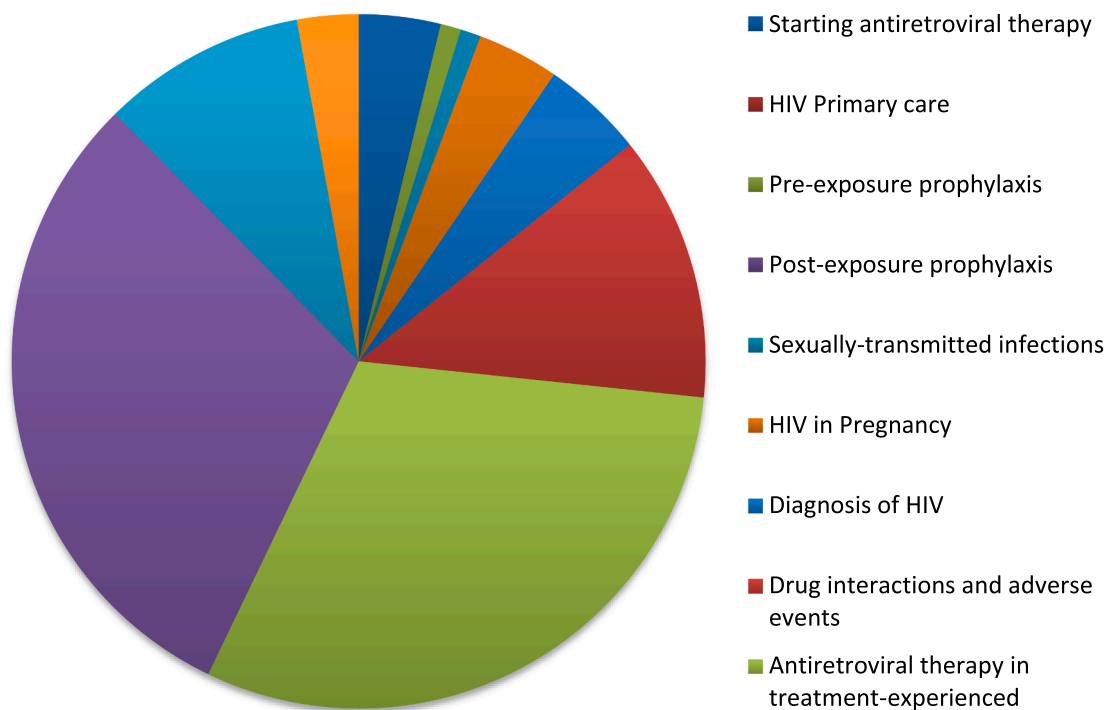


Fig. 2. Distribution of HIV Topic Categories

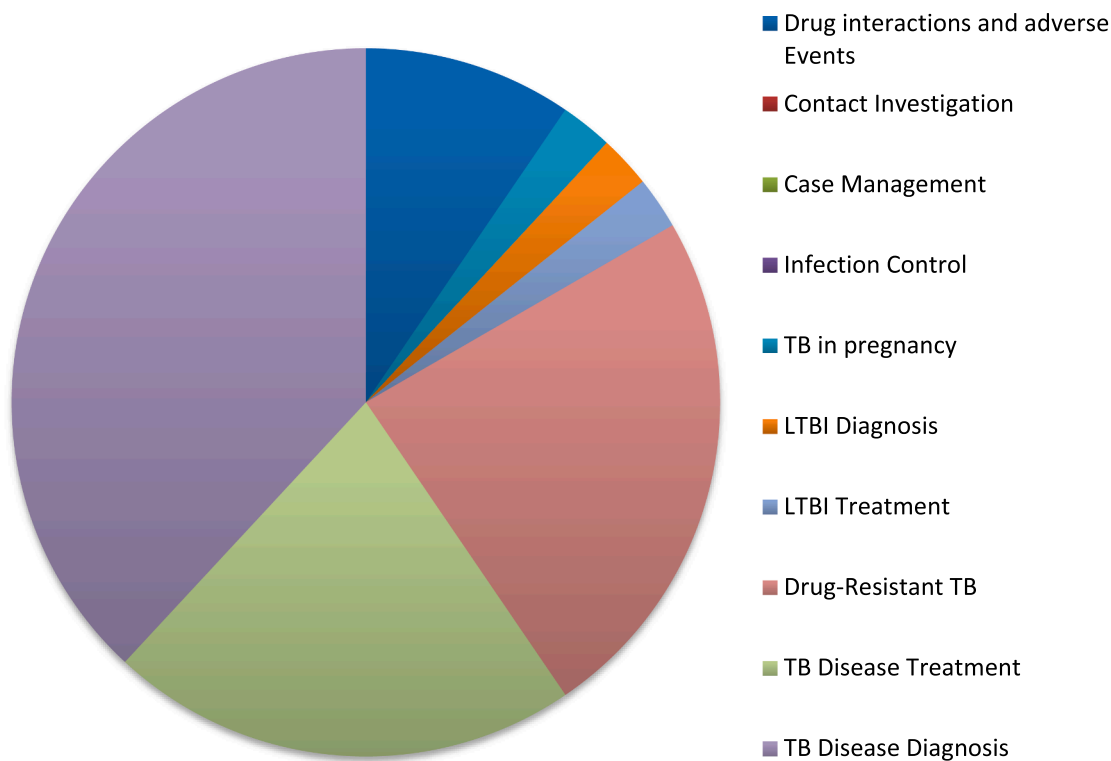
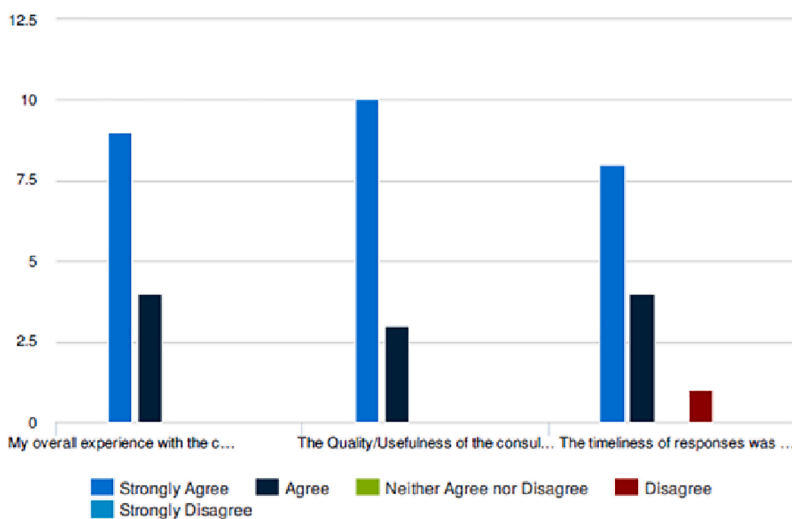


Fig. 3. Distribution of TB Topic categories.

and the diseases we are combating. Through these relationships, we intend to objectively demonstrate the impact of our program on individual patient outcomes. We also plan to introduce a structured mentoring program to groom the next generation of expert HIV and TB clinicians around the world.

In summary, it is our sincere belief that our point-of-care CME program in HIV, TB, and associated conditions has resulted in the improvement of the competence of participating clinicians, specifically regarding the issues they raised through their queries. This should translate to a better quality of HIV and TB care, and thus improved

Overall experience with the consultation service



Result details

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
My overall experience with the consultation service was good	9	4	0	0	0
The Quality/Usefulness of the consultation was good	10	3	0	0	0
The timeliness of responses was appropriate	8	4	0	1	0

Fig. 4. Participant feedback.

outcomes for patients, but the program is not designed to demonstrate this at the present time. We also believe that our program will play an even more important role in mitigating the effects of disruption of HIV and TB care across the world due to the COVID-19 pandemic. On a higher level, we believe that our program makes a meaningful contribution to the global strategies to end the HIV and TB epidemics, addressing the desired principles of innovation, collaboration, equity, and quality.

CRedit authorship contribution statement

Maria Koshy: Data curation, Formal analysis, Writing - original draft, Writing - review & editing. **Leah Mische:** Data curation, Formal analysis, Writing - original draft, Writing - review & editing. **Stacey Rizza:** Conceptualization, Writing - review & editing. **Maryam Mahmood:** Conceptualization, Writing - review & editing. **Roger Bedimo:** Conceptualization, Writing - review & editing. **Ramona Bhatia:** Conceptualization, Writing - review & editing. **Wissam El Atrouni:** Writing - review & editing. **Jennifer Curran:** Project administration, Supervision, Writing - review & editing. **Zelalem Temesgen:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Supervision, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial

interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgement

This project was partially supported by unrestricted educational grants from ViiV Healthcare and Gilead Sciences.

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