

Evaluation of Infection Prevention and Control Extension for Community Healthcare Outcome Clinic in Referral Hospitals in Tanzania

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Abstract

Background: Project ECHO™ (Extension for Community Healthcare Outcome) is a telehealth initiative that aims to improve access to medical knowledge among healthcare workers (HCWs). Infection Prevention and Control (IPC) ECHO Clinic was implemented from April 2022 to January 2023 in Tanzania where HCWs from ten referral hospitals shared their experiences. This study aimed to evaluate the implementation of the IPC ECHO clinic, by assessing enablers and barriers; and elicit recommendations for improvement and further scale-up. **Methods:** A descriptive study design was conducted whereas both quantitative and qualitative methods of data collection were used. **Results:** A total of 472 (47.2%) out of 1000 targeted HCWs attended scheduled IPC ECHO sessions. Availability of infrastructure; facility management support; good coordination from the national team and availability of internet bundle were the enablers for the implementation of the clinic. Barriers included: lack of motivation among attendees; lack of Continuous Professional Development (CPD) points; shortage of staff; and poor internet connectivity. To improve the implementation of IPC ECHO clinic it was recommended to: include IPC ECHO clinic in CPD initiatives; review time for the sessions; provision of incentives for attendees; improve facilitation techniques; improve network connectivity; enhance HCWs participation in IPC ECHO Clinic; and scale up of IPC ECHO clinic. **Conclusion:** Implementation of IPC ECHO clinic was successfully conducted. Scale-up of IPC ECHO clinic to other re-

referral health facilities and primary health care facilities is recommended to facilitate knowledge sharing in the areas of IPC during this era of emerging and re-emerging diseases.

Keywords

Project ECHO™, IPC ECHO Clinic, Infection Prevention and Control, Quality Improvement, Project Evaluation

1. Introduction

Infection Prevention and Control (IPC) is a scientific approach and practical solution intended to prevent harm caused by infection to patients and healthcare workers (MoHCDGEC, 2018). IPC is a critical component of quality health care, yet it has received insufficient attention in health care settings (MoHCDGEC, 2018). The elevated rates of prevalence of highly infectious and potentially life-threatening diseases in Tanzania, such as HIV/AIDS, cholera, tuberculosis (TB), and bloody diarrheal diseases, also demand that special attention be placed on safe and effective infection prevention practices (MoHCDGEC, 2018).

Project ECHO™ (Extension for Community Healthcare Outcome) was established in Tanzania to train, mentor, and share experience with healthcare workers (HCWs) with the ultimate goal of responding to an increasingly diverse range of healthcare services (MoH, 2022). Project ECHO uses teleconferencing approach to decentralize knowledge through case-based learning and sharing of knowledge among multidisciplinary Subject Matter Experts (SMEs), teams of specialists, and facilitators on a specific subject matter (MoH, 2022). Following the emerging and re-emerging infectious diseases, the Tanzania Ministry of Health (MoH) with support of Management Science for Health (MSH) through the Medicines, Technologies and Pharmaceutical Services (MTaPS) Project initiated a virtual mode of technical support using Project ECHO platform in 10 referral hospitals focusing on IPC interventions. This technical support was provided through the establishment of IPC ECHO clinic whereby health facilities share their experience on the implementation of IPC interventions in selected topics and SMEs provided clarification and shared specialty expertise and knowledge on the specific topic.

Before launch of IPC ECHO clinic, IPC ECHO champions from the facilities were oriented on Project ECHO platform as well as participated in selection of topics that their health facilities shared experiences with other HCWs. Oriented champions included IPC Focal Person [IPCFP]; Quality Improvement Focal Person [QIFP]; Hospital Pharmacist; IPC and Antimicrobial Stewardship (AMS) Facilitators. From April 2022 to January 2023, health facilities shared their experiences on the following topics: infectious disease transmission cycle; instrument and equipment processing; health care waste management; Water, Sanitation and Hygiene (WASH); IPC practice in operating theater; prevention of Surgical Site

Infections (SSIs); preventing maternal and newborn infections; infection monitoring and surveillance; Healthcare Associated Infections (HAIs) and Infection prevention in Intensive Care Units (ICU).

Since its inception, IPC ECHO clinic has never been evaluated hence evaluation of the implementation of this clinic was conducted in order to: assess its performance in relation to the objectives set; identify enablers for the implementation of the clinic; barriers encountered; and recommendations towards improvement of the IPC ECHO clinic. The results of this evaluation will help to improve the implementation of the clinic in next phase and indicate explicit recommendations for scale up and sustainability of the clinic.

This paper is organized into review of related literature, methods, findings, discussion of findings, conclusion and recommendations.

2. Literature Review

Infection prevention and control in the health care settings is an important aspect in management of patients to prevent infection from spreading to both health care workers and clients (Kessy et al., 2023). A large percentage of HAIs are preventable through effective IPC measures (WHO, 2016). Inadequate knowledge, and a lower level of awareness about the anticipation of risks, may account for non-compliance to IPC standards among HCWs (Bahegwa et al., 2024). In Tanzania, situation analysis reveals that there is inadequate knowledge and skills for IPC basics, and inadequate compliance to IPC standards among healthcare workers (MoHCDGEC, 2018; Powell-Jackson et al., 2020; Hokororo et al., 2021a; Hokororo et al., 2021b; Marandu & Masika, 2023; Kinyenje et al., 2020). A strong understanding of IPC procedures and comprehensive training among healthcare workers is essential for effective IPC programs (Moghnieh et al., 2023). To reduce the risk of HAIs the World Health Organization recommend provision of education and training to all HCWs (WHO Core components, 2016). The Coronavirus disease of 2019 (COVID 19) further showed the need to strengthen IPC practices through various strategies (Powell-Jackson et al., 2020; Mghamba et al., 2022; Gomes et al., 2022).

In order to strengthen and expand capacity of healthcare workers, the MoH adopted an online knowledge sharing platform, Project ECHO model that is used to mentor, train and share experience among HCWs (MoH, 2022). As part of the implementation of Project ECHO Framework in Tanzania, the MoH established IPC Project ECHO clinic that provide opportunity for online trainings and sharing of knowledge among HCWs in the areas of IPC.

Several studies have been conducted to evaluate the implementation of Project ECHO model in various aspects including COVID 19 whereas IPC was among the intervention. Evaluation study of virtual IPC training sessions targeted to African Union member states reported poor levels of IPC across the continent whereas the move towards online training was recommended as an important opportunity to improve IPC across African Continent (Kessy et al., 2023). Use of virtual course curriculum was also described as an important training model in

building healthcare IPC capacity (Penna et al., 2022).

A study conducted at Malasia to evaluate the implementation of Project ECHO training during COVID 19 pandemic highlight enablers for the implementation that include: content and format; dedicated time; asynchronized flexible programming; incentives; and ensuring technology was available (Walters et al., 2022). Another study on the use of Project ECHO in respond to COVID 19 in different countries reported enabling factors for the implementation, these include: availability of technology, networks, equipment; partnership among key Project ECHO stakeholders, support from the Ministries of Health; availability of local and national health experts; virtual delivery method and reasonable time that minimize disruption of clinical duties (Wright et al., 2022).

Evaluation of an online training program on COVID 19 for healthcare workers in Papua New Guinea highlight that busy workload; limited or no access to Wi-Fi, mobile data, or technological devices; not having the technological knowledge; and not having known about the project were the barriers to accessing the training (Mohamed et al., 2023). Another study highlights the barriers to Project ECHO such as conflicting priorities, time constraints, and technology (Walters et al., 2022).

Studies suggested several recommendations to improve virtual healthcare IPC trainings, this includes addition of more case-based scenarios tailored to local health department needs, reinforcing training through applied learning experiences, and supporting mechanisms to retain trained staff (Penna et al., 2022). Other recommendations include: develop strong collaboration with key stakeholders; adopting blended learning approaches such as combining virtual training and in-person training as well as continuously evaluate and review training aim, content, format and audience (Kessy et al., 2023).

In other countries a number of evaluation studies have been conducted to evaluate the implementation of health online trainings including the use of Project ECHO platform. However, in Tanzania since the adoption of Project ECHO platform in training and experience sharing on IPC, there is study that have been conducted to evaluate the implementation, hence there is inadequate information regarding the implementation of IPC ECHO clinic. Therefore, this study aimed to fill this gap and provide information on enablers and barriers for the implementation as well as recommendations for improving and scale up of online IPC training and experience sharing in the country.

3. Methodology

3.1. Study Design

A descriptive study design was conducted whereas both quantitative and qualitative methods of data collection were used. A quantitative approach was used to collect data for the participation of health facilities and HCWs in the scheduled IPC ECHO clinic; based on the fact that participation is the key element of any project ECHO clinic implementation (MoH, 2022). A qualitative approach was used to collect data regarding the; existing enablers and barriers to the imple-

mentation of the IPC ECHO Clinic; and recommendations to be considered to improve the implementation of the IPC ECHO clinic.

3.2. Study Area, Target, and Study Population

The study was conducted in all 10 referral hospitals that were involved in the implementation of the IPC ECHO Clinic. These hospitals include three zonal referral hospitals (Bugando Medical Center, Benjamin Mkapa Hospital, Mbeya Zonal Referral Hospital) and seven (7) regional referral hospitals (Maweni, Bukoba, Sekou Toure, Morogoro, Amana, Temeke and Mbeya). Quality Improvement Focal Persons (QIFPs) and Infection Prevention and Control Focal Persons (IPCFPs) from the targeted 10 hospitals were involved in this study based on their role as coordinators of IPC ECHO Clinic at respective hospitals. Furthermore, the Quality Improvement Teams (QITs) and heads of Work Improvement Teams (WITs) from the same hospitals were involved as they were initially targeted to attend IPC ECHO sessions.

3.3. Sample Size and Sampling Procedures

Purposive sampling techniques were employed where participants were selected by virtue of their positions, i.e., Quality Improvement Focal Persons (QIFPs), Infection Prevention and Control Focal Persons (IPCFPs), members of Quality Improvement Teams (QITs) and heads of Work Improvement Teams (WITs) from the targeted 10 hospitals.

3.4. Inclusion and Exclusion Criteria

Inclusion Criteria were all QIFPs, IPCFPs, members of the Quality Improvement Teams, and heads of Work Improvement Teams from the targeted 10 hospitals.

Exclusion Criteria were all targeted participants who were not available during the time of the study.

3.5. Data Collection and Management

Quantitative data were sourced from iECHO databases as well as from MoH and MTaPS documents which included monthly submitted attendance from the facilities. For qualitative data, sixteen (16) virtual in-depth interviews using an in-depth interview guide were conducted with QIFPs and IPCFPs from targeted 10 referral hospitals. Furthermore, three (3) virtual focused group discussions with QITs and heads of WITs from the same hospitals were conducted.

Data management was done to ensure the maintenance of confidentiality by which the digital audio recorders and other collected data were kept in a safe cabinet and access was limited to the researchers only.

3.6. Data Analysis

Qualitative data were prepared by transcribing the audio clips. To prevent interviewer, recall bias, the transcriptions were completed in less than 24 hours. The

transcripts were translated into English, presented in Microsoft Word, and were then deductively coded with the pre-defined themes organized into supra codes, main codes, and subcategories. Respondents' body language (e.g., Silent pauses, voice-filled pauses,) was recorded on a notebook along with respondents' identities for future consideration especially when a need arose to display direct quotes from participants (Verbatim). Lastly, the display and interpretation of extracted content were done by synthesizing it and hence, presenting results by considering predetermined themes. Making sense of the results was accomplished by using direct quotes from participants to illustrate subject matters.

Quantitative data were analyzed using Microsoft Excel to generate findings on the proportion of participation of both facilities and HCWs in previously scheduled monthly IPC ECHO Clinic.

4. Results

4.1. Social Demographic Characteristics of the Study Population

The study was conducted in all ten targeted referral hospitals. Sixteen (80%) IPC ECHO Clinic coordinators participated in in-depth interviews, among them 12 (75%) were women and 4 (25%) were men. Majority of interviewed HCWs were Nurse Officers 10 (62.5%), others were Environmental Health Officers 1 (6.25%), Assistant Nurse Officer 1 (6.25%), Clinical Pharmacist 1 (6.25%), Medical Officer 1 (6.25%), Radiologist 1 (6.25%) and Nurse Midwife 1 (6.25%) as shown in **Table 1** below. Three Focus group discussions were conducted whereby a total of 37 HCWs participated, among them females were 25 and males were 12.

Table 1. Distribution of key informants by cadre.

SN	Cadre	Number	%
1	Assistant Nursing Officer	1	6.25
2	Clinical Pharmacist	1	6.25
3	Environmental Health Officer	1	6.25
4	Medical Officer	1	6.25
5	Nursing Officer	10	62.5
6	Nurse Midwife	1	6.25
7	Radiologist	1	6.25
Total		16	100

4.2. Participation of Both Facilities and Health Care Providers in Previous Scheduled Monthly IPC ECHO Clinic in 10 Referral Hospitals

During the ten months of implementation, the 10 referral hospitals were to share knowledge and experience in ten areas namely: infectious disease transmission cycle; instrument and equipment processing; health care waste management;

water, sanitation and hygiene (WASH); IPC practice in operating theater; prevention of Surgical Site Infections; preventing maternal and newborn infections; infection monitoring and surveillance; healthcare associated infections and infection prevention in intensive care units (ICU). Results of participation show that all 10 referral hospitals participated in sharing experiences according to the date and topic selected. Moreover, 471 (47.2%) out of 1000 targeted HCWs from the ten referral hospitals attended scheduled IPC ECHO sessions. It was reported that IPCFP and QIFP were mostly used to coordinate IPC ECHO clinic at the facility level in which they share virtual link from the MoH to other HCWs through different social media platforms (e.g., WhatsApp groups).

4.3. Existing Enablers for the Implementation of IPC ECHO Clinic in 10 Referral Hospitals

Participants shared their perspectives on key enablers for the implementation of IPC ECHO Clinic. These enablers were grouped into four themes such as: availability of infrastructure for ECHO sessions; facility management support; good coordination from the national team; and availability of internet bundle.

4.3.1. Availability of Infrastructure for ECHO Sessions

Availability of infrastructure such as rooms, infrastructure for internet connectivity, screen and speakers for ECHO session were mentioned as a major enabler for the implementation of IPC ECHO clinic. Some of the interviewed HCWs were quoted as highlighted below:

“Availability of equipped conference room enables us to join the session, ... we have a well-equipped conference room, we are comfortable during the session” (KII Number 3c, IPCFP).

“We have an ICT officer who is also responsible to help HCWs to connect the session, HCWs use hospital conference hall to join the session, HCWs may also use their personal device when outside the facility” (KII Number 2a, IPCFP).

“The sessions are taking place at Care and Treatment Clinic (CTC) conference room where the screen is big... this enables many HCWs to join session..., we inform the whole hospital through link whereby those who are out of the facility join through mobile phone while those who are in the facility join at the stated venue (CTC)” (KII Number 8c, IPCFP).

4.3.2. Facility Management Support

HCWs acknowledge that the support received from facility management is among key enablers for the implementation of IPC ECHO clinic. The support reported include internet bundle, permission to attend orientation session as well as scheduled sessions, and infrastructure. It was stated that:

“Management is supporting us in the implementation of the sessions, for example the facility bought for us modem to be used during the session as well as they allow use of facility internet to join the sessions... management is supporting us 100%” (KII Number 2a, QIFP).

It was emphasized that:

“Initial orientation to the sessions included awareness and our hospital management provided permission for selected HCWs to attend orientation workshop” (KII Number 10a, QIFP).

Another IPCFP emphasized that:

“... we thank our hospital management for providing good environment for learning purpose, they currently support us with well-equipped conference room that has large screen and other facilities that allow us to participate in ECHO sessions” (KII Number 3c, IPCFP).

It was also narrated that:

“at first we did not have a dedicated venue and equipment for all of us to attend the session, we used to join using personal computers or mobile phones, but after we shared this challenge with hospital management... we are now supported with a room dedicated for all zoom meetings including ECHO sessions” (KII Number 9a, QIFP).

4.3.3. Good Coordination from the National Team

QIFP and IPCFP reported that good coordination from national team (MoH and implementing partners—(IPs)) has been among the enablers for the implementation of IPC ECHO Clinic whereby facilitators were well coordinated, HCWs were reminded to join sessions and follow up was done after sessions:

“We have experienced that national team coordinated well the sessions, facilitators are well coordinated” (KII Number 3c, QIFP).

Another IPCFP emphasizes that:

“National team from Ministry of Health and Implementing Partners remind us on the topic to be presented five to three days before the session and provide link to us, this help us to share session link timely with the participant... follow up to share training materials with participants was done after session” (KII Number 1c, IPCFP).

4.3.4. Availability of Internet Bundle

QIFP and IPCFP who are the coordinators of IPC ECHO sessions reported that availability of internet bundle has enabled them in implementation of IPC ECHO clinic, as it enables HCWs to join virtual sessions. Two of the interviewed HCW were quoted saying:

“... we receive internet bundle for the sessions and we also have hospital modem specific for ECHO sessions” (KII Number 2a QIFP).

“Provision of internet bundle before the session allows staff to attend the session” emphasized IPCFP (KII Number 7b, IPCFP).

In addition, another key informant had this to say:

“The hospital has internet with high speed, this motivates us to join the session even when the provided bundle from IPs has challenges, this enables us not to miss the session” (KII 3c, IPCFP).

4.4. Existing Barriers for the Implementation of IPC ECHO Clinic

IPC ECHO clinic coordinators and other HCWs reported several barriers for

implementation of IPC ECHO clinic; these barriers were grouped into four main themes, namely: motivation among attendees; CPD points; staff availability, and internet connectivity.

4.4.1. Motivation among Attendees

Coordinators of IPC ECHO clinic narrated that attendees lack motivation which is attributed by lack of monetary incentives, training certificates, physical workshop for sharing knowledge and interaction.

“barriers are there... at the beginning we had a good number of HCWs attended sessions, some of them think that maybe they will get incentive like monetary allowance when joining the sessions” (KII Number 1a, QIFP).

Another key informant who is IPC ECHO coordinator had this to say:

“another barrier is HCWs themselves, some of the HCWs did not receive teleconference training positively, they still have notion that they must get something beyond education, e.g., money after training... hence their participation is low” (KII Number 2a, QIFP).

It was narrated that:

“no recognition of participants, some sort of recognition such as physical IPC sharing meetings and provision of certificates to those who attended session are needed to motivate participants” (KII Number 3c, IPC FP).

Also, it was reported that:

“... but also, there is one thing called motivation, it is true HCWs like to get education but once you tell them there is something provided after training they will run to the session, hence lack of motivation is a barrier for HCWs to participate in the sessions” (KII Number 8a, QIFP).

4.4.2. Lack of Continuous Professional Development (CPD) Points

Responders pointed out that IPC ECHO sessions do not contribute any CPD points to the participants hence, this is among the barriers to the implementation of the sessions as noted by one of the interviewee.

“Lack of CPD Points among attendees also facilitates poor attendance of HCWs to the sessions” (KII Number 1a, QIFP).

Another responder mentioned that:

“The main question asked by attendees is if they will get CPD points by joining IPC ECHO clinic, when we answered them no CPD points provided, they do not join the sessions” (KII Number 8a, QIFP).

It was emphasized that:

“IPC ECHO session is not included in CPD platform, HCWs thought that if the session could contribute to their career development through CPD points they may participate more” (FDG Number 3).

4.4.3. Shortage of Staff

Interviewed key informants narrated that inadequate staff at the facilities is also a barrier to the implementation of IPC ECHO clinic such that HCWs are overloaded with clients and hence fail to participate in the scheduled ECHO session:

“Shortage of staff in the facility, you might find that few staff are present at work to attend sessions because of roster variation, this led to inadequate attendance during the session” (KII Number 10a, QIFP).

It was also reported that:

“Major challenge we experience is inadequate staff, and the available staff at workstation have another competing duty to perform” (KII Number 7b, IPC FP).

Another responder emphasized that:

“HCWs are few, sometimes there are emergencies, and they cannot leave what they are doing” (KII Number 2a, QIFP).

4.4.4. Poor Internet Connectivity

Responders mentioned that they sometimes experience challenges of internet connectivity and hence fail to join the session or fail to follow session proceedings in the middle of the session:

“Sometimes there are challenges of internet connection, sometimes we may not hear the presenters hence we are not getting well the session proceedings...” (KII Number 2a, QIFP).

Another respondent highlighted that:

“The first barrier at our facility is internet connectivity, sometimes we may join for a few minutes and the connection cut off, and sometimes we want to join the session but we fail completely; this is due to climate challenges at our Region” (KII Number 5a, QIFP).

4.5. Recommendations for Improvement of IPC ECHO Clinic

Interviewed IPC ECHO Clinic coordinators and HCWs participated in FGD provided the following recommendations to be considered in order to improve implementation of IPC ECHO clinic: include IPC ECHO clinic in CPD initiatives for all cadres; reviewing time for the sessions; provision of incentives for attendees; improve facilitation techniques among SMEs and facilitators; improve network connectivity; enhancing HCWs participation in IPC ECHO Sessions; and scale up of IPC ECHO clinic to other referral hospitals and primary health care (PHC) facilities.

4.5.1. Include IPC ECHO Clinic in CPD Initiatives for All Carders

HCWs recommended that IPC ECHO Clinic enables them to gain knowledge and experience in the areas of IPC hence they recommend that this clinic should be accredited under their respective professional councils to motivate HCWs to participate in the session since it will help them to receive CPD points after the session as well.

“We think that we may tackle the challenge of inadequate participation of HCWs in ECHO session by including IPC ECHO session in CPD platform... HCWs will see they get credit from sessions” (FDG Number 1).

It was emphasized that:

“Ministry of Health to provide information to HCWs on how many CPD points

HCWs will receive by joining IPC ECHO sessions” (KII Number 1a, QIFP).

4.5.2. Reviewing Time for the Sessions

It was reported that the current time is not conducive for the HCWs as some of them will be in the mosque and for others it is the time for daily report exchange. Hence, it was proposed that the time for the session should be reviewed to allow more HCWs to participate in IPC ECHO sessions as highlighted below:

“... currently the sessions are conducted at peak hours where there are a lot of patients... time for the session should be reviewed to 14:00 hours to allow more participation”(FDG Number 1).

“I think the time for the session should be reviewed and instead of 13:00 hours, the session may start from 15:30 hours, this is a good time as HCWs will be free from most of the major activities at the hospital also this time will allow those who are on duty at operating theater to attend the sessions” (FDG Number 2).

“If we can change the time and day it will be good, since from 13:00 to 14:00 hours some of the HCWs will be in a mosque, so we may think on a few Friday the sessions to start at 15:00 hours” (KII Number 3a, QIFP).

“Time for the sessions is not conducive for us, sessions are conducted at the time where HCWs exchange daily reports, we suggest the time to be between 10:00 and 13:00 hours” (KII Number 5a, QIFP).

4.5.3. Provision of Incentives for Attendees

Study participants recommended the need to provide incentives to attendees to motivate more participation. The recommended incentives include certificates of attendance, organizing physical IPC meetings, and allowances in terms of money.

In reference to this, some of the interviewed respondents were quoted saying:

“Ministry of Health to plan for incentives to attendees, just small incentive (e.g., internet bundle)... to motivate and encourage HCWs to join the sessions” (KII Number 1a, QIFP).

“Recognition of attendees through physical meetings, monetary allowances, and provision of certificates for attendees motivates participation” (KII Number 4a, QIFP).

4.5.4. Improve Facilitation Techniques among Subject Matter Experts (SMEs) and Facilitators

Respondents gave their viewpoints regarding the facilitation of the IPC ECHO sessions and provided recommendations to improve facilitation in the areas of environment used by facilitators and SMEs during the session, their appearance, managing of time, and use of evidence-based data during the presentation as quoted below:

“Environment where SMEs are, and their appearance should be looked over as in another session this was a challenge, good environment, and appearance highlight that we are more serious” (FDG Number 3).

“Time management during the session is important, facilitators should ensure that there are no excuses for delay to start or end the session” (KII Number 4a, QIFP).

“SMEs should give more information and data rather than what is available in the guidelines because for the last sessions more of the content was from our guidelines, we need more content from research work...” (FDG Number 3).

“SMEs and facilitators should conclude the topic by real data from our country for example we need to hear maybe by practicing standards precautions we were able to reduce SSIs by what %” (KII Number 4a, QIFP).

4.5.5. Improve Network Connectivity

Participants extensively discussed how internet connectivity is sometimes a challenge and recommended that this should be worked on both at SMEs/facilitators' side and their respective health facilities as noted below:

“... we get so many challenges in connecting to the sessions, I wish we should improve on internet connectivity” (FDG Number 2).

“... aaah... I cannot understand if it's a network or, but I think you should work on the internet connection as in other sessions we may not hear facilitators well...” (KII Number 4a, QIFP).

4.5.6. Enhancing HCWs Participation in IPC ECHO Sessions

Many participants frequently recommended that; there is a need to sensitize HCWs and facility management on the need and the importance of participating in IPC ECHO sessions through the provision of official letters and emails to the facilities from the Ministry of Health. Respondents had this to say:

“my request is that... sensitization to Hospital Management Teams on IPC ECHO clinic should be done as it will improve participation at the facility level” (FDG Number 3).

“... I think MoH should write an official letter to remind health facilities and HCWs to participate in the session” (FDG Number 2).

“I think we should sensitize staff on the importance of attending virtual sessions while at the workstation to easily manage human resources for better service delivery” (KII Number 5c, IPC FP).

4.5.7. Scale-Up of IPC ECHO Clinic to Other Referral Hospitals and PHC Facilities

HCWs recognize the knowledge gained through IPC ECHO sessions and recommend that; it is high time to include more referral hospitals and Primary Health Care (PHC) facilities (hospitals at Local Government Authorities level, health centers, and dispensaries).

“The Ministry of Health should think of rollout IPC ECHO Clinic to more health facilities especially PHC facilities, as well as other referral hospitals... we receive a lot of referrals from PHC facilities and we think that if they had chances to receive what we learn through ECHO session we may see changes, as currently, they are still behind on IPC practices” (FDG Number 3).

5. Discussion

5.1. Participation of Both Facilities and Health Care Providers in Scheduled Monthly IPC ECHO Clinic

The evaluation results of this study show that all 10 hospitals participated in presenting their experience according to the date and topic selected hence allowing other health facilities to have experience of what is being done by their neighbors in the implementation of IPC interventions.

Furthermore, the analysis revealed that the average participation of HCWs in scheduled ECHO sessions was only 47.2% of targeted HCWs for the scheduled sessions that were conducted from April 2022 to January 2023. HCWs who participated in FGD highlighted that workload and shortage of staff were among the reasons for low participation. This result is comparable to the study aimed at exploring attendance patterns across ECHO networks in which competing workplace demands and staff shortages were mentioned as the reasons for low attendance in ECHO sessions (Diffin et al., 2021).

5.2. Existing Enablers for the Implementation of IPC ECHO Clinic

The results of this study reflect that the availability of infrastructure such as rooms, screens, and speakers was among the enablers for the implementation of the ECHO clinic. Our results are comparable to the report on operational reflections on what contributes to building a successful Project ECHO network whereby supportive infrastructure provided by the operational team was highlighted as an essential component in achieving the implementation of ECHO sessions (Jenkins et al., 2022).

The results of this evaluation show that the support from the facility management team was among key enablers for the implementation of IPC ECHO clinic. The management support to HCWs in terms of a conducive environment for attending the sessions, provision of facilities such as internet bundle and modem as well as allowing HCWs to participate in ECHO orientation sessions was reported to be very essential. The results of this study are comparable to the study conducted in Zambia on the effects of the ECHO telementoring program whereby facility management support was stipulated as among enablers intrinsic to the implementation of ECHO clinic (Mubanga et al., 2023).

Good coordination from the national team was mentioned as a key enabler for the implementation of IPC ECHO Clinic whereby facilitators were well coordinated, HCWs were reminded to join sessions, and follow up was done after sessions. Our results correspond to the evaluation study conducted to evaluate Project ECHO in Sydney Australia in which overall good management and coordination of the session as well as good process related to follow-up email of the ECHO session and reminders before the session were reported as what working well during the implementation of the clinic (De Morgan et al., 2021). Additionally, our results are equivalent to case studies of project ECHO implementation in four universities in the United States by Larson and Medved in which it was

described that coordinators did more than administrative work; they were mentors to the facilitators, guiding them on how to work most effectively with participants and prepare for sessions (Larson & Medved, 2022).

Availability of internet bundles was highlighted as among enablers in this study where HCWs used internet bundles from their health facilities and sometimes use internet bundles provided by the national team. Our results are comparable to another study conducted in Kenya on the feasibility of project ECHO telementoring to build capacity among non-specialist emergency care providers in which it was highlighted that institutional buy-in is important when it comes to investing in internet connectivity (Wanjiku et al., 2022).

5.3. Existing Barriers for the Implementation of IPC ECHO Clinic

Results of this study demonstrated that lack of motivation among attendees such as money paid to HCWs, training certificates, and physical meetings were among the barriers to the implementation of the clinic. This result concurs with the findings of the study conducted to determine if the ECHO model improved the knowledge and skills of health care providers and teams to provide high-quality HIV care and treatment services in Côte d'Ivoire in which the limited financial or other incentives, such as no coffee breaks and no training certificates offered were described as the barrier for the implementation of the ECHO Clinic (MSHP et al., 2019).

Participants mentioned that IPC ECHO session does not contribute to the available CPD initiatives owned by their professional councils. Our results are contrary to the findings on the effects of the ECHO tele mentoring program in Zambia whereby participants shared that they were motivated by perceived personal benefits, such as career development and the sessions contributed to their CPD (Mubanga et al., 2023).

The results of this study reported that an inadequate number of staff was also a key barrier for HCWs to attend IPC ECHO sessions as during the session, the same HCWs are overloaded with other conflicting tasks hence they had no time to attend scheduled sessions. Few available staff had to prioritize the provision of services to clients over attending ECHO sessions. This finding is consistent to the study conducted in Malaysia whereby conflicting priorities and time constraints were among the barriers for clients not attending ECHO sessions (Walters et al., 2022). Furthermore, the results of this study are comparable to another study conducted in Zambia on the effects of the ECHO tele-mentoring program whereby limited workforce, general workload, and time constraints were highlighted as barriers to the implementation of ECHO Clinic (Mubanga et al., 2023). Another study conducted in Namibia has also reported that staff could not attend the sessions due to shortage of staff (Bikinesi et al., 2020).

The results of this study reported that poor internet connectivity was among the barriers in the implementation of IPC ECHO Clinic whereby at some moments HCWs failed to join sessions or failed to continue with session in the

middle of the presentation. This result is similar to the study conducted in India to evaluate the COVID-19 ECHO training program for HCWs whereby internet connectivity was highlighted as the biggest limitation of the COVID-19 ECHO program (Panda et al., 2022). Another study conducted in Malaysia to evaluate the implementation of COVID-19 clinic has also revealed that internet connection and accessibility to stable internet were a prominent barrier to implementing the sessions (Walters, et al., 2022). Also, the results of this study are comparable to the experience on the implementation of IPC global webinar series whereby internet access was highlighted as a barrier that may have affected participants' reach to series (Wilson et al., 2021).

5.4. Recommendations for Improvement of IPC ECHO Clinic

Results of this evaluation show that participants recommended a need to include the IPC ECHO Clinic in CPD initiatives so that HCWs participating in the session may be awarded CPD points as part of their professional development. This result is comparable to an evaluation study conducted to evaluate Project ECHO in Sydney Australia in which stakeholders recommended establishing CPD points for target group (s) through professional associations (e.g., for participation in an ECHO session, case presentation, completion of evaluation survey and/or e-assessment) (De Morgan et al., 2021). The provision of continuing professional development points to trainees who participate in telementoring training was recommended for the future development and implementation of high-quality Project ECHO programs (De Morgan et al., 2021).

Results of this study show that participants recommended time for sessions needs to be reviewed as the sessions are conducted during peak hours of patients, at the same time HCWs exchange shifts and others might be in the mosque. This study corresponds to the study conducted in Namibia to evaluate HIV Project ECHO clinic whereby participants suggested Project ECHO to adopt a more flexible schedule to accommodate each site's high volume of patient times (Bikinesi et al., 2020).

Most of the participants emphasized the need to provide incentives (e.g., certificates of attendance, organizing physical IPC meetings, and allowances in terms of money) to attendees to improve participation in ECHO sessions. These results are comparable to the study conducted in Vietnam on the feasibility, acceptability, and sustainability of Project ECHO to expand the capacity for pediatricians whereby participants emphasized that the provision of a certificate for continuous training will motivate participants to join the program (Nhung et al., 2021). Also, another study in Nigeria by Baldrige and colleagues emphasized on the need to provide incentives and recognition as strategies to motivate participation and ongoing engagement of staff in Project ECHO sessions (Baldrige et al., 2023).

Internet network connectivity was highlighted as an area that needs more improvement in which study participants recommended that there should be plans to manage the challenges both at SMEs/facilitators' side as well as at the respec-

tive health facilities to enhance smooth participation in the session. The results of this study are comparable to a study conducted in India on the retention of knowledge levels of HCWs through telementoring platforms such as ECHO whereby the findings recommended that with the improvements in internet connectivity in ECHO sessions, HCWs will easily access the sessions (Hariprasad et al., 2018). Another study conducted in Malaysia on barriers and facilitators to Project ECHO recommended that mobile devices may be a way to overcome the technology barrier of poor Wi-Fi or lack of Wi-Fi internet connection (Walters et al., 2022).

Other recommendations provided by HCWs include a need to improve facilitation techniques among SMEs and facilitators, especially in the areas of environment used by facilitators and SMEs during the session, their appearance, time management as well as the use of local data support subject matter presented. Sensitizing HCWs and facility management on the need and the importance of participating in IPC ECHO sessions was recommended to improve participation among HCWs. Scale up of IPC ECHO clinic to other referral hospitals and PHC facilities is key to help avoid unnecessary referral from PHC facilities that may be associated with knowledge gaps.

6. Study Limitation

The study was conducted in ten referral hospitals which were the only health facilities where IPC ECHO Clinic was implemented; hence, the results may not well represent PHC facilities (dispensaries, health centers, and hospitals at the Local Government Authority level) especially those located in remote areas.

7. Conclusion and Recommendations

Good infrastructure, management support, good coordination, and availability of internet bundles were highlighted to enable the implementation of IPC ECHO Clinic. Despite the barriers encountered during the implementation, participants recommended that the scale-up of IPC ECHO clinic to other referral hospitals and PHC facilities is a key to facilitating knowledge sharing in the areas of IPC during this error of emerging and re-emerging diseases. Such scale-up to referral hospitals and PHC facilities can enable knowledge dissemination and health system resilience as we have learned from efforts in other countries in addressing the COVID-19 pandemic (Wright et al., 2022). As Tanzania moves towards implementation of universal health insurance (Tanzania Invest, 2023; URT, 2023) as part of efforts towards universal health coverage, investment in digital technologies including infrastructure for Project ECHO in PHC facilities is critical (Powell, 2023). The investment will help in efforts to disseminate quality improvement and quality assurance knowledge to HCWs; and also, will assist managers at council, regional, and national levels to follow up with HCWs on improvements in processes of care delivery (Kasper et al., 2023).

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Data Availability

All the data used in this study are available and can be shared upon request to the corresponding author.

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Contributions

R.N, S.S worked on data collection, analysis and writing of draft zero manuscripts. E.K, D.L, E.E, J.H, C.G, R.B, Y.M, O.N, S.M, L.M, M.D, T.Y, J.L, and E.L revised the manuscript. The final manuscript was approved by all authors.

Ethics Declarations

Permission to conduct this study was obtained from the National Institute of Medical Research, Tanzania with an ethical clearance certificate's Reference Number NIMR/HQ/R.8a/Vol.IX/4246.

Conflicts of Interest

The authors of this manuscript declare that they have no competing interests. However, the authors were the part of coordination and implementation of IPC Project ECHO Clinic.

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List of Abbreviations and Acronyms

AMS	Antimicrobial Stewardship
CDC	United States Centre for Diseases and Control
CPD	Continuous Professional Development
CTC	Care and Treatment Clinic
ECHO	Extension for Community Healthcare Outcomes
EGPAF	Elizabeth Glaser Paediatrics AIDS Foundation
FGD	Focus Group Discussion
HAIs	Healthcare Associated Infections
HCWs	Healthcare Workers
ICU	Intensive Care Unit
IPC	Infection Prevention and Control
IPCFP	Infection Prevention and Control Focal Person
KII	Key Informant Interview
MoH	Ministry of Health
MSH	Management Sciences for Health
MSHP	Ministry of Health and Public Hygiene Cote d'Ivoire
MTaPS	Medicines, Technologies, and Pharmaceutical Services Program
QIFP	Quality Improvement Focal Person
QIT	Quality Improvement Team
SSIs	Surgical Site Infections
URT	United Republic of Tanzania
WASH	Water Sanitation and Hygiene
WIT	Work Improvement Team