Technology-Enhanced Training in Family Medicine during Covid-19 pandemic: Trainers' and Trainees' View

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Abstract:

Background: The COVID-19 pandemic has a dramatic effect on health professions education and training worldwide. Clinical training poses a vital challenge for medical educators. Technology-enhanced training (TET) helps in developing the required clinical and interprofessional skills. **Objectives:** to assess the feedback and satisfaction of the trainers and trainees to the new experience of technology-enhanced clinical training in family medicine. **Methods:** this is an educational interventional study conducted on 890 trainees (house officers). Online trainer-simulation with case scenarios followed by case reflection and discussions was our designed clinical training using Zoom meeting application. We assessed trainers and trainees' feedback. The trainees were asked about the training setting, satisfaction, and recommendation for future trainees. For the trainers, the questionnaire addressed their satisfaction, beneficence, workload, and preference of different training modes. **Results:** Regarding trainees' feedback to the TET, 85% of trainees thought it was a beneficial mode of training and about 75% of them recommended it for the future trainees. Over 80% of the trainers were satisfied with the TET experience, and over 75% of them thought that this was a beneficial experience for the participating trainees. Although two-third of the trainers perceived the training to be mildly and moderately overloading, yet more than 80% were satisfied with this training experience and about three-fourth of them preferred it on face-to-face training. **Conclusion:** TET is a beneficial way of training on clinical skills as communication skills, patient-centered approach, clinical reasoning, and construction of management plan in family practice.

Keywords: Distant Learning, Medical Education & Training, Primary Care

Introduction:

The COVID-19 pandemic has a dramatic effect on health professions education and training worldwide. As a result of the closure of medical schools in many countries, including Egypt, teaching had to be delivered remotely instead of face-to-face. Clinical skills training poses an important challenge for medical educators. An important part of the students and residents training is usually spent in different outpatient clinics and hospitals wards to gain competency in clinical skills. Because student's safety is a top priority for all medical schools, this cannot be fulfilled nowadays.(1)

Many solutions have been proposed including postponing clinical training till the end of COVID-19 pandemic to decrease the risk of exposure for medical students. Some medical schools used videos to demonstrate procedural skills. Students' feedback revealed that using online videos alone was not sufficient and they are still in need for faculty teaching. (2) Virtual patients were also used for clinical skills training. Although they offered an excellent opportunity to train students on clinical reasoning, still it should be integrated with structured tutor sessions.(3)

Embracing the online teaching and training systems is a global path. Using technology to find a solution for clinical training was of utmost importance to avoid clerkships cancellation and allow trainees to improve their clinical and interprofessional skills and adaptability in an innovative matter.(4,5)

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Several studies agreed on online clinical training impact in terms of training on medical disorders[6], linking preclinical knowledge to clinical application,[7] and improving decision making among trainees.[8]

Zoom meeting application is a freely available application, it becomes widely used in communication and education in COVID-19 era. For clinical training, it was used with encouragingly positive results such as the study in Sri Lanka for surgical students to enhance their skills from basic knowledge to management plans through consultant board discussions,[9] also for pathologists training. [10] Various aspects of training, apart from physical exam skills, can be addressed using zoom meeting application. This includes comprehensive history taking, communication and rapport building, and critical reasoning based on data from history, physical exam findings and laboratory results.[11,12]

Amidst COVID-19 pandemic, the family medicine department was struggling to maintain a powerful and successful training program. The clinics' work of the trainees had to be reduced to keep the safety of the doctors and patients through reducing the clinics' crowdedness and keeping the physical distancing. So, it was mandatory to find an alternative way of training and preserving the training quality. Technology-enhanced training (TET) enables training on communication skills, clinical reasoning, and how to construct an evidence-based management plan, which represents important pillars in family medicine training. In this work, we will describe our experience in shifting from face-to-face training into technology-enhanced training over a short period with our limited recourses through the best use of the freely available applications. The primary objective is to assess the feedback and satisfaction of the trainers and trainees to the new experience of technology-enhanced clinical training in family medicine.

Methods:

This educational interventional study was conducted in May-June 2020 during the peak of the COVID-19 community spread in Egypt. Online trainer-simulation of clinical case scenarios, followed by trainer's feedback and discussion, was our solution during the current crisis. TET was planned using Zoom meeting application.

Study Participants and Setting: The 890 trainees were junior physicians (house officers) who graduated from medical school and were spending their one-year clinical clerkship. They spend two weeks-training in family medicine department. The trainers were lecturers, assistant lecturers, and residents of family medicine.

Ethical Considerations: The proposed plan of TET was approved from the family medicine department council. The unprecedented situation of COVID-19 with the urgent need for training solutions and the educational nature of the research obligated us to only get department council and family medicine research

committee approval. Informed consent was taken from all study participants.

The proposed plan consists of two phases as shown in Figure 1:

Preparatory phase: This phase started by assigning the training team from the department's lecturers and assistant lecturers (trainers) and residents (facilitators and trainers).

Since training using simulation and role-play with discussions was part of the conventional training in the family medicine department, the next step in this phase was choosing the most suitable cases scenarios from our item bank that suits the online training.

The next very crucial step was to train the trainers and trainees on Zoom meeting application with the option of breakout rooms as the chosen application for TET. It is freely available with no need for an official or institutional account, also its free basic package was sufficient for us to implement our training with no need to subscribe to the premium version, which enabled us to promptly implement our training with no need for extra paperwork or fund. Three educational videos with an average length of 10- 15 minutes for each video (prepared by a lecturer and an assistant professor of family medicine) were sent to the trainers and trainees. The videos explained in detail how to download, sign in, host, join a meeting, and also, how to use the breakout rooms option. Then several Zoom meetings were held with the use of breakout rooms to help the trainers and trainees getting familiar with the application.

The last step of this phase was dividing the current cohort of trainees into 5 groups (10 trainees in each group) with an organizing resident responsible for each group.

Work phase: Step 1 (Synchronous TET session) comprised the family medicine TET via trainers-simulation, reflection and discussion using Zoom application and breakout rooms were applied to one cohort of trainees (50 trainees). Several simultaneous Zoom meetings were organized for the 50 trainees with a detailed announced schedule. At the start of the zoom meeting, the host briefly explained the learning objectives of TET (including how to conduct an interview, how to explore the patient's hidden agenda and ICE [ideas, concerns, and expectations], adopting the biopsychosocial approach, and the process of the virtual training).

An approval for recording the session was taken from all participants at the start of the meeting. Then, the host assigned each trainee and trainer into a breakout room. Each station consists of 10-minute roleplay (the trainer played the role of the patient) followed by a 5-minute discussion and reflection regarding communication skills, history taking, data gathering and management plan. After 15 minutes, each trainee was assigned to another room for another 15 minutes. To mimic the real practice in family medicine clinics, each trainee attended multiple simulated cases with various

trainers and case scenarios. The TET sessions were conducted in a systematic order (Figure 2). After this step, the feedback was obtained from the trainees and trainers. Although the trainees' feedback was positive, 83% of the trainers preferred and suggested to work with their assigned group of trainees through asynchronous TET sessions. According to this feedback, each trainer prepared a schedule of asynchronous TET sessions that was announced to his trainers. This was applied to the rest of the cohorts.

In step 2 (Asynchronous TET sessions), we made some modifications on the training program guided by the trainers' feedback while keeping the main core of the training. *A*synchronous TET was conducted on 15 cohorts of trainees. The average number of trainees per cohort was 50. Each cohort of trainees was divided into 5 groups, each group had its responsible lecturer, assistant lecturer, and resident. Each group had 2 weekly TET sessions via Zoom meeting which helped in providing more training sessions but at a more eased pace to avoid burdening our trainers.

Each session included trainers-simulation, reflection and discussion as mentioned in step 1. At the end of the family medicine rotation, each trainee completed 4 TET sessions. All participants of the training program consented on recording the training sessions. This allows for having a repository of videos of the recorded sessions and building an online family medicine training bank, for future clinical training.

In the third step, structured trainers' and trainees' feedback forms were designed in Google Form and sent to all the participants to enable us to continuously improve our training. Each feedback questionnaire was anonymized and used 5 Likert and numerical scales questions with 2 open ended questions to allow the participants to openly express the positive and negative aspects of the training and their suggestions for improvement.

The trainees were asked about the training setting regarding audio-visual clarity, case scenario clarity and achieving learning objectives. They were also asked about their satisfaction and recommendation of TET training for future trainees. For the trainers, the questionnaire addressed their satisfaction, beneficence of the TET for trainees, workload, and their preference of either face-to-face or online training and either synchronous or asynchronous TET sessions.

The collected data was managed and analysed using Stata statistical software package (version 16). The categorical variables were presented in numbers and percentages.

Results:

Trainees' Feedback: Out of 890 trainees, 623 trainees responded to the feedback form (75% response rate). Regarding the TET, 85% of them agreed that it was a beneficial mode of training. Figure 3 shows their feedback regarding different aspects of online training such as audio-visual clarity, case scenario clarity, and achieving learning objectives highlighted by the

trainers, with excellent and good as the most prevalent responses. More than 75% of them recommended TET for future trainees. A trainee stated in his feedback "*a very nice experience, need to be repeated more often, we appreciate spending this great effort to continue our training in the department, well-organized training, although TET is not as good as dealing with real patients in the clinics it was informative and beneficial*".

Trainer's Feedback: More than 80% of the trainers were satisfied and extremely satisfied with the TET experience (Figure 4). More than 75% of them agreed upon its beneficence to the participating trainees. Regarding the workload, one-third of the trainers perceived the TET to be moderately overloading compared to face-to-face training, while another third perceived it as mildly overloading (Figure 5). Surprisingly, 75% of them preferred the TET on face-to-face training.

They stated that it was an exceptional experience, especially the residents, as they became more confident with their teaching skills. One of the trainers stated that "*I think it was great to experience something new and to find a way to communicate with the trainees during this period of social distancing. It was helpful for them to understand more about family medicine as best we can without them being in the clinic*'.

The trainers suggested increasing the time of the session to allow for more feedback and discussion.

Discussion:

In this work, we presented our experience in shifting from face-to-face training into technology-enhanced training over a short period with our limited recourses through the best use of the freely available applications. Our principal goal was creating supportive surroundings for the adoption of this innovative experience, which requires different skills and competences from the trainers and trainees and maintaining the quality of training. The feedback and satisfaction of the trainers and trainees to the new experience of technology-enhanced clinical training in family medicine were encouraging.

To engage students in a learning experience during COVID-19 crisis, multiple conditions should be fulfilled; ensuring the ability of the trainer to get used to this novel method, using the available training resources, and maintaining constructive feedback and mentorship in a virtual environment to ensure that the trainees could continuously practice what they have learned.[13] Therefore, our first step was performing an online training for trainers and trainees to ensure that they became familiar with the use of Zoom application before the start of the training. The second step was to design the TET with the available training resources. To accomplish this, we used the same case scenarios that was used before in face-to-face learning but after applying some modifications to be more engaging and challenging to suit the online environment. And to avoid the extra cost

of role players, trainer-simulation was adopted where the trainer plays the role of the patient. TET sessions were trainee-centered training with continuous feedback and reflection.

Trainer-simulation was found to be an effective method of clinical training. In agreement with Dalwood et al. that concluded that peer simulation is an excellent method for providing clinical skills training, it promotes student self-confidence and efficacy, it also improves communication and patient empathy.[14]

Reflective learning used in the online discussions between trainers and trainees in general practice settings was studied by Gillingham et al. in 2020, and it was found to have a good impact on supportive interaction and expanding trainees' perspectives.[15] Is it also crucial to mention that in contrary with our study, Gillingham et al. study was in an asynchronous manner through posts and comments, that empowers our study as our reflection was at a timely manner. Also, the study of Torre et al. concluded that feedback is an essential learning component.[16]

For the trainees, 85% of them agreed that it was a beneficial mode of training although they missed their interaction with real patients in the clinics. This is in agreement with a study conducted by Agha et al. in 2015 that revealed high overall satisfaction scores with simulation-based learning (85%).[17] Also, in a study conducted in 2020 by Rucker et al., zoom meeting application and breakout rooms was used for emergency training. They assessed the feedback of the students regarding the online experience compared to the traditional face to face learning and positive results were reported.[11]

Although two-third of the trainers perceived the training to be mildly and moderately overloading than face to face training, yet more than 80% of them were satisfied with this training experience and about three-fourth of them preferred it on face-to-face training. As Taylor et al in 2020 highlighted that consistent changes can be easily achieved with the presence of "local champions who are active teachers".[13] This was the cornerstone of our TET, having dedicated trainers, who did not mind exerting efforts in this challenging situation to ensure high-quality training.

In contrast to the trainers' feedback, it was difficult to assess the trainees' feedback regarding what they preferred and found more useful from the 2 applied methods (one synchronous Zoom meeting of the full cohort or multiple asynchronous TET sessions) because each method was performed on a different cohort of trainees.

Future Work: This training experience with its positive feedback and its learned lessons will be used as a pilot study to implement on family medicine postgraduate training. Also, our residents will have more active roles in future training as this experience has made them more confident with their teaching skills, which motivated them for the next training. Our plans

also include the use of the recorded training videos for future training.

Conclusion: TET is a beneficial way of training on clinical skills as communication skills, patient-centred approach, clinical reasoning, and construction of management plan in family practice. We have shifted from face-to-face training into technology-enhanced training over a short period with our limited recourses through the best use of the freely available applications.

TET can be applied in other clinical specialties, especially in crisis times. Although the feedback from both trainers and trainees so far has been overwhelmingly positive, some have expressed understandable concern about the lack of opportunity to practice clinical examination skills in the clinics. So, in the future, it can be used as a blended method of training besides face-to-face training in the clinics so they can complement each other.

Conflict of interests: Authors declare absence of any competing interests.

Funding: No Fund was needed in this work.

Acknowledgements: The authors want to express their gratitude to all the training team and trainees for their motivation to try a new experience.

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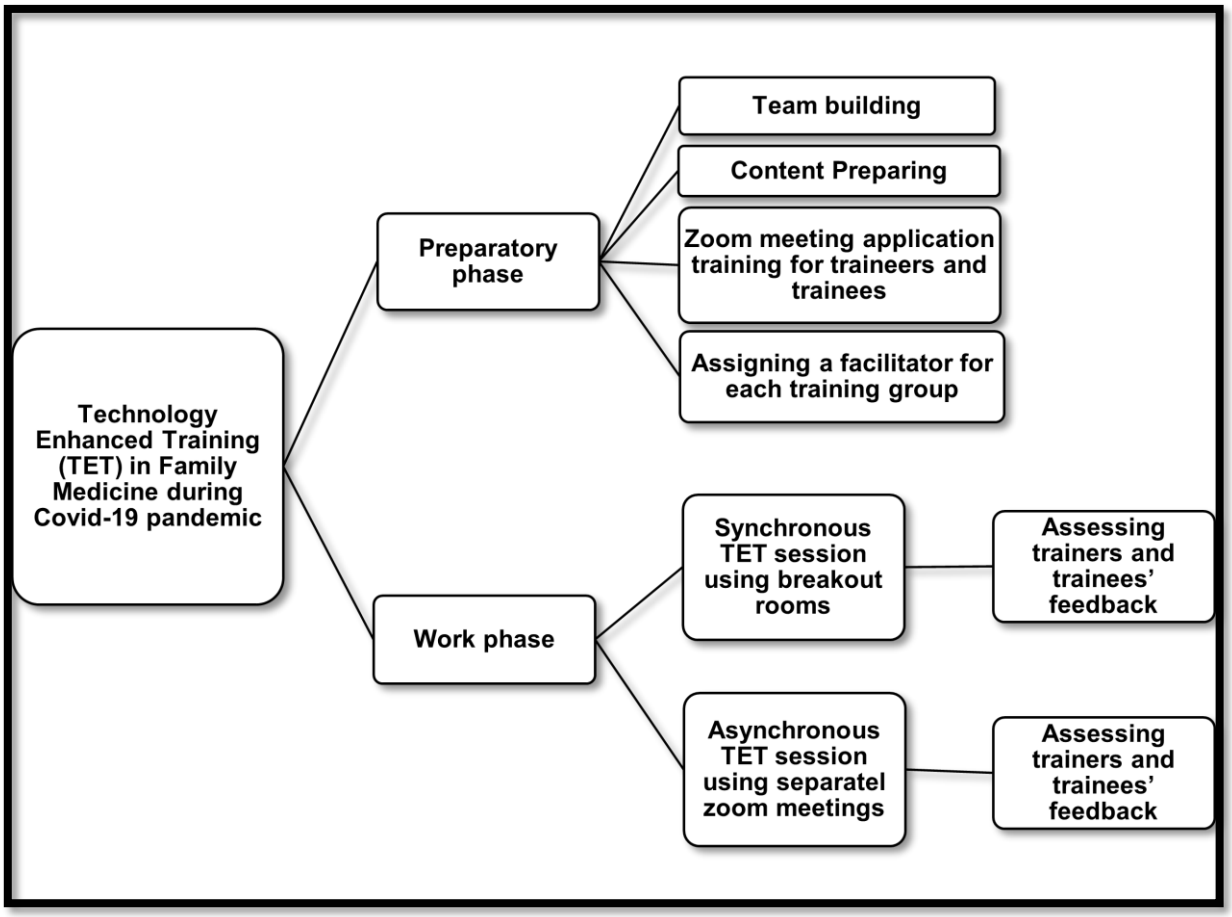

Figure (1): Framework of Study Methods

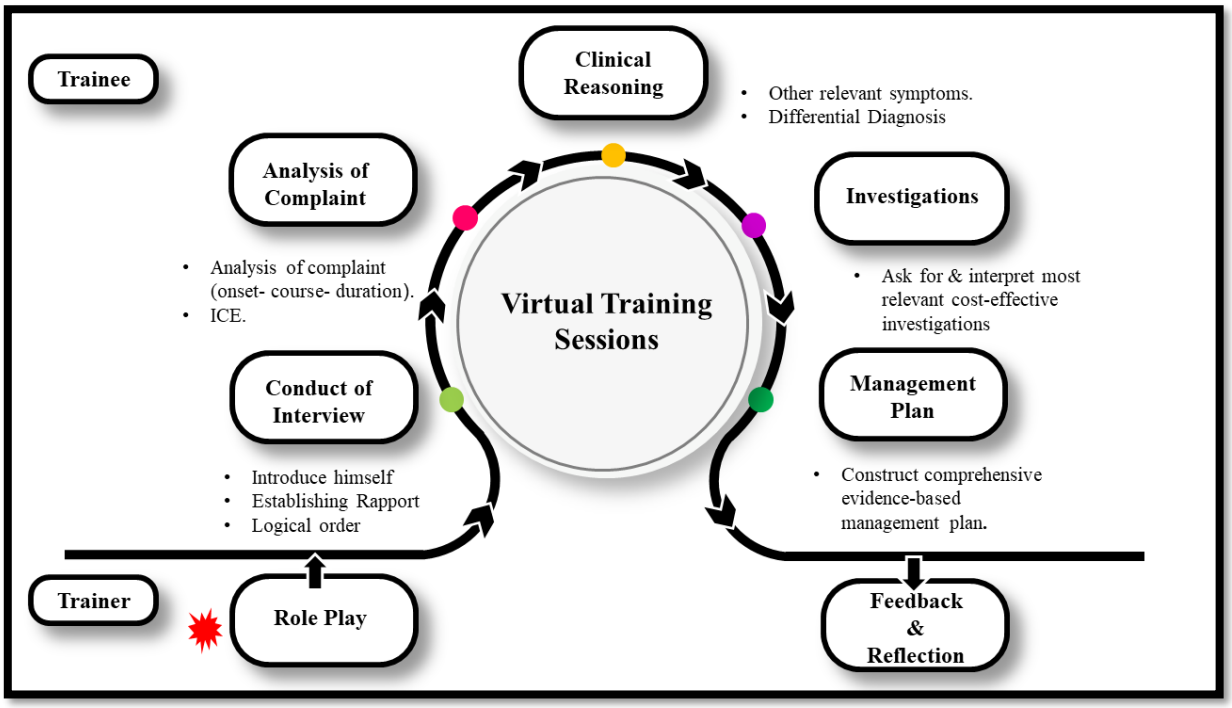

Figure (2): The Process of the Virtual Training Sessions

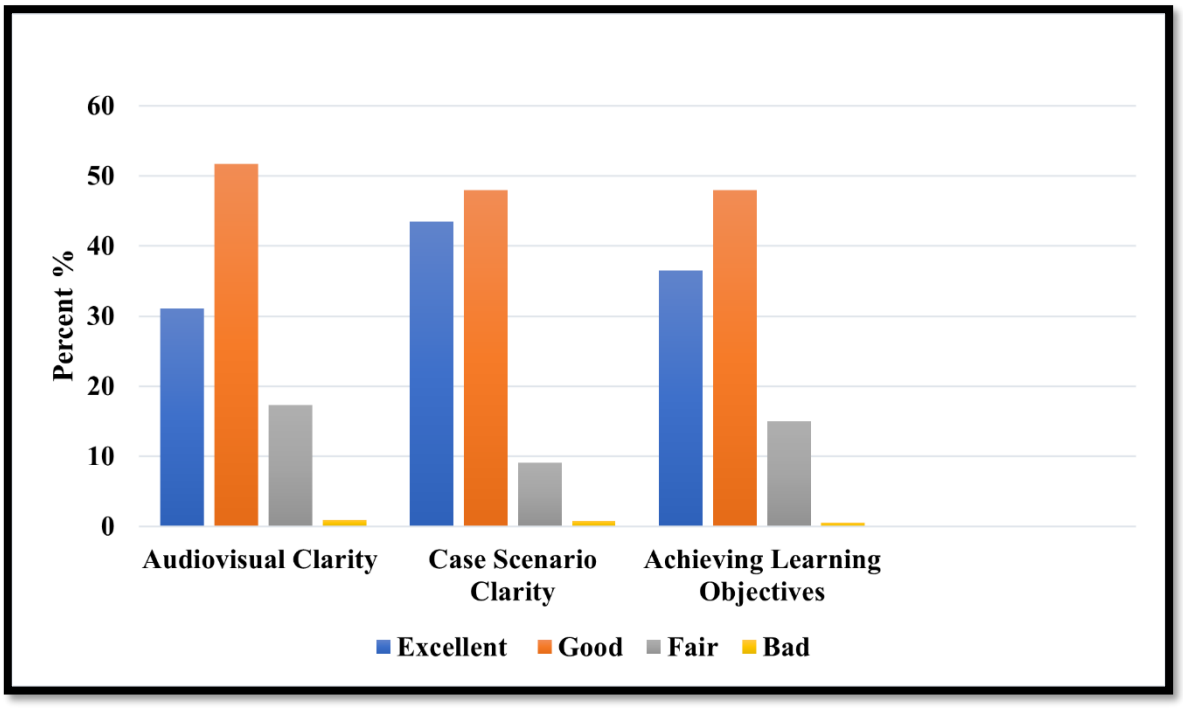

Figure (3): Trainees' Feedback Regarding Different Aspects of the Online Training

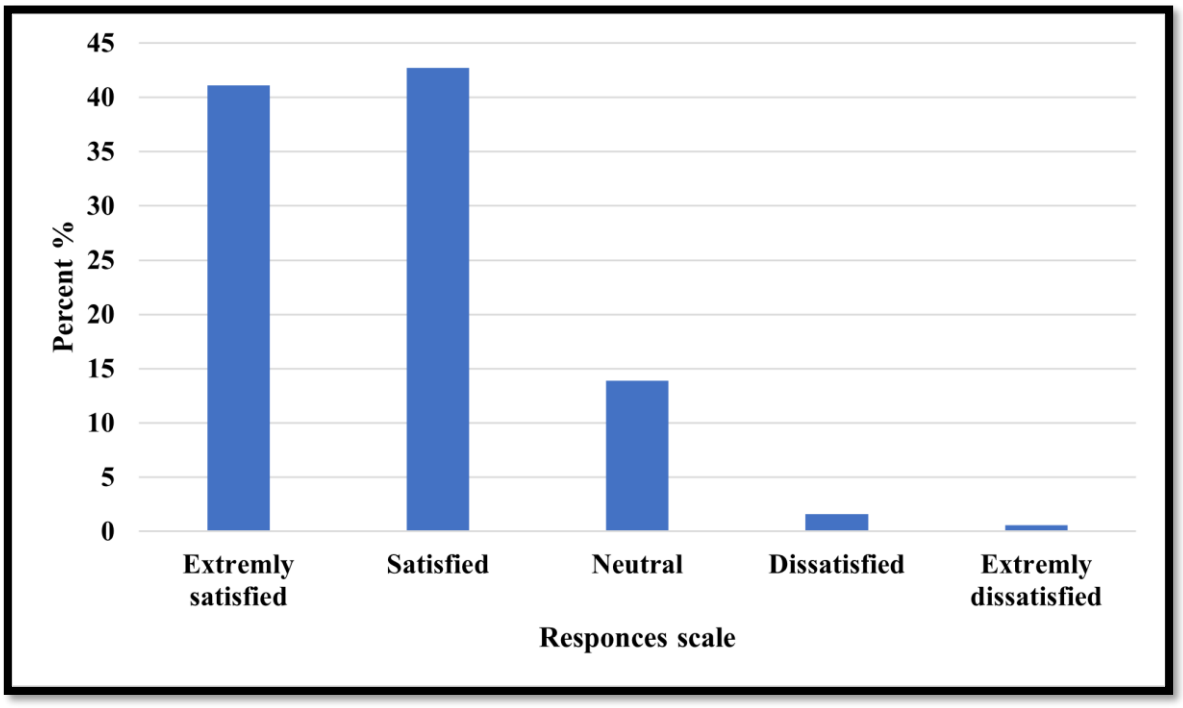

Figure (4): Overall Satisfaction of the Trainers

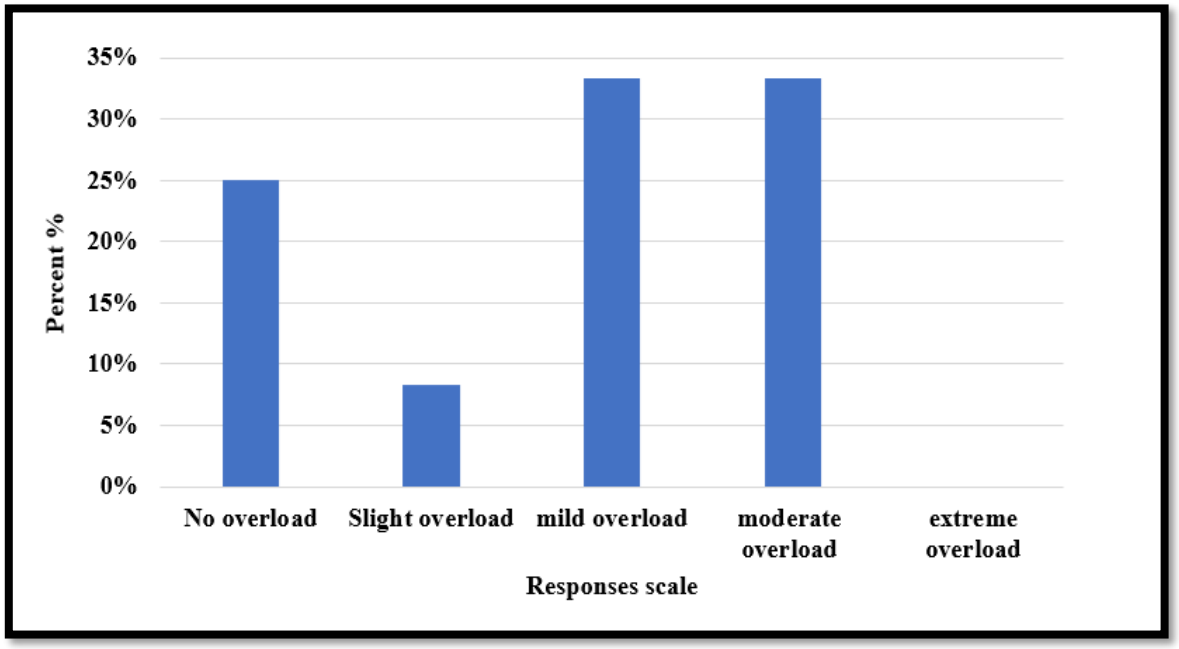

Figure (5): Perceived Workload of the Trainers

الملخص العربي

التدريب المعزز بالتكنولوجيا في طب الأسرة أثناء جائحة كورونا من وجهة نظر المدربين والمتدربين

مروة مصطفى أحمد - إيناس طلعت السيد - سمر حسن فارس

الخلفية: لوباء كورونا تأثير كبير على تعليم وتدريب المهن الصحية في جميع أنحاء العالم. وحيث ان التدريب السريري يشكل تحديًا خصوصا في الكليات محدودة الموارد ، فقد اصبح من الضرورة ابتكار طرق جديدة للتدريب.ويعتبر التدريب المعزز بالتكنولوجيا واحد من الطرق المبتكرة حيث يساعد في تطوير المهارات السريرية والمهنية المطلوبة.
الهدف: تقييم رضا المدربين والمتدربين على التجربة الجديدة للتدريب السريري المعزز بالتكنولوجيا في طب الأسرة.
الطريقة: تم التدريب السريري المعزز بالتكنولوجيا باستخدام تطبيق زووم مع خاصية الغرف الفرعية. يتكون التدريب من محاكاة المدرب عبر الإنترنت متبوعة بمناقشة الحالة والتغذية الراجعة. تم استخدام استبيانات بمقاييس ليكرت ومقاييس رقمية بأسئلة مفتوحة. **النتائج:** فيما يتعلق بملاحظات المتدربين على التدريب السريري المعزز بالتكنولوجيا ، اعتقد 85٪ من المتدربين أنها كانت طريقة مفيدة للتدريب وأوصى حوالي 75٪ منهم بتكراره للمتدربين المستقبليين. أعرب أكثر من 80٪ من المدربين عن رضاهم عن تجربة التدريب السريري المعزز بالتكنولوجيا واعتقد أكثر من 75٪ منهم أن هذه التجربة كانت مفيدة للمتدربين المشاركين. على الرغم من أن ثلثي المدربين رأوا أن مقدار العمل بالتدريب ليس بالقليل ، إلا أن أكثر من 80٪ كانوا راضين عن هذه التجربة وحوالي ثلاثة أرباعهم يفضلونه عن التدريب وجهاً لوجه. واقترحوا زيادة وقت الجلسة للسماح بمزيد من المناقشات. **الخلاصة:** التدريب السريري المعزز بالتكنولوجيا هو طريقة مفيدة للتدريب على المهارات السريرية في طب الأسرة مثل مهارات الاتصال ، والنهج الذي يركز على المريض ، والتفكير السريري ، وبناء خطة العلاج.