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Innovative telementoring for addiction management for remote primary care physicians: A feasibility study

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ABSTRACT


Objective: Addiction is a growing public health problem which affects the person, the whole family, and society. The primary care physician (PCP) is often the first point of contact in the health care and can play a significant role in the early detection and intervention. It is well established that early intervention is associated with better outcomes. In the formal medical training, PCPs receive no formal training on drug addiction management. In this pilot study, we developed an innovative telementoring model and looked at feasibility as well as acceptability among remote PCPs on drug addiction management.

Materials and Methods: The telementoring model consists of both synchronous and asynchronous components. The *synchronous* component consists of National Institute of Mental Health And Neuro Sciences (NIMHANS) academic center Hub and remote district level primary care physician Spokes, and is implemented by using low-cost multipoint videoconference based tele-ECHO (Extension for Community Healthcare Outcome) clinics. During the tele-ECHO clinics, held fortnightly, the remote PCPs used Internet-enabled smartphones to connect as well as present the patient case summaries to the multidisciplinary expert team of NIMHANS HUB. The asynchronous component consists of mobile-based ubiquitous e-learning integrated to a course completion certificate. We evaluated this innovative telementoring program on participant engagement, learning, confidence, and satisfaction. A pre-post design and e-learning assignments were used to measure the outcomes.

Results: Of the proposed 21 tele-ECHO clinics, 11 were held till the end of August 2017. All the PCPs were able to virtually join at least one tele-ECHO clinic. Out of 38 participants, two participated in all the tele-ECHO clinics and 47.36% ($n = 18$) attended more than six (>60% of total) tele-ECHO clinics. About 76.31% ($n = 29$) of the PCPs presented 41 patient case summaries. Among 38 PCPs, a cumulative of 89.47% completed three e-Learning assignments. The majority of participants (80%) used smartphone with 4G connections to join the tele-ECHO clinics. There was a significant change in knowledge gained over the time duration of 1-month (3.00 ± 0.86 , $P < 0.001$) and 3-month (3.16 ± 0.90 , $P < 0.001$) assessments compared to the baseline (1.77 ± 1.02). About 32.25% ($n = 10$) reported improved confidence level in managing a case of substance use disorder on a 10-point scale.

Conclusion: It has been feasible to connect an academic hub, i.e., NIMHANS to the PCPs of 36 remote districts of Bihar and conduct multipoint videoconference-based tele-ECHO clinics. The results indicate high participant retention. The

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learners are comfortable in adapting new technology-based learning as evidenced by high rate of e-learning assignment completion. These findings suggest that this new innovative learning model using technology can be an important modality for effective training to address management of drug addiction.

Key words: Drug addiction management, primary care physicians, tele-Extension for Community Healthcare Outcome clinics, telementoring

INTRODUCTION

Substance use disorders (SUDs) constitute a major public health concern and have a substantial impact on human suffering and societal costs. In the past two decades, there has been a significant rise in SUDs.^[1] In addition to increased alcohol abuse, there is also a substantial increase in the use of pharmaceutical opioids, benzodiazepines, and newer drugs of abuse (methamphetamine and lysergic acid diethylamide).

More recently, there has been substantial progress in the management of SUDs. Increased understanding in the neurobiology of addiction has led to the development of newer medications. These have been associated with better treatment outcomes. In the case of nicotine addiction, the chances of quitting doubled with the use of nicotine replacement therapies. Similarly, the use of harm reduction measures such as buprenorphine and methadone maintenance has been associated with a decrease in the prevalence of HIV/AIDS and improved survival as well as psychosocial outcomes among opioid users. In low- and middle-income countries such as India, a scarcity of treatment facilities further aggravates the treatment gap.^[2] Studies from across the globe have pointed out that outcomes are better with early identification and intervention.

Primary care physicians (PCPs) are often the first contact for individuals experiencing addiction and related health concerns. In rural and remote underserved areas in India where the access to specialists is limited, the addiction health problems often require initial intervention at the primary care setup.

As a pilot, Centre for Addiction Medicine (CAM), National Institute of Mental Health and Neuro Sciences (NIMHANS), has designed a “blended” training module on drug addiction management for PCPs working in the district deaddiction centers (DACs), as requested by the government of Bihar. These DACs are located in the district hospital premises and have a dedicated space for the drug addiction management clinic. None of them have had any formal training or prior experience in the drug addiction management.

MATERIALS AND METHODS

In this paper, we will be presenting the steps of development of the telementoring model and feasibility of implementing the same in the 36 remote districts of Bihar.

The telementoring module on e-health developed for these remotely located PCPs has components of both synchronous (virtual multipoint smartphone app/PC-based videoconferencing) and asynchronous (mobile app-based e-learning).

The program is designed to train the PCPs on:

- Screening, identification, and contributing factors influencing drug dependence
- Pharmacological management of cases
- Handling brief psychosocial interventions
- Decision-making regarding the cases which requires referral to a specialist setting [Figure 1].

Step 1: Sensitization program (March and April 2017)

A 10-day face-to-face sensitization program was conducted for 38 district PCPs (from 36 districts of Bihar) at the CAM, NIMHANS, Bengaluru, Karnataka, India. Training was completed in March and April 2017 of two small batches, each batch containing 18 PCPs. Onsite training was focused on interviewing skills, the basics of drug dependence, assessment of drug use disorders and related conditions, and treatment algorithms including pharmacological and psychological interventions.

A discussion was also held about future curriculum to be delivered remotely through contemporary technology following need assessment. Although participation was optional, all the PCPs consented, following which, mobile applications, i.e., the Health Insurance Portability and Accountability Act-compliant videoconference application

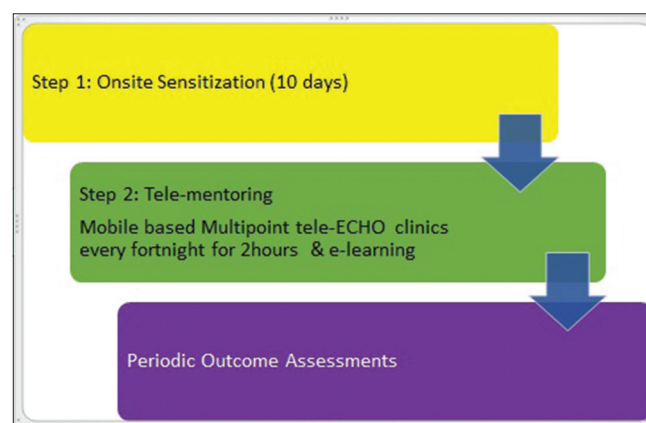


Figure 1: Course curriculum delivery

and secured mobile learning application were installed on their smartphones through Google play store.

Needs assessment comprised frequency, day of the week, and timing of tele-Extension for Community Healthcare Outcome (ECHO) clinics, curriculum, and completion criteria for certificate accreditation. Based on this, fortnightly sessions on Wednesday afternoons were held.

As per the course structure, participating PCPs agreed to commit to a minimum of 60% attendance and to participate in program evaluation initiatives including surveys and knowledge tests. Each PCP had to present a minimum of six cases during training to meet the certification criteria [Figure 2].

Step 2: Telementoring (April 2017 to January 2018)

There are two main components of knowledge delivery and skill transfer.

Synchronous: Virtual tele-Extension for Community Healthcare Outcome (ECHO) clinics on 2nd and 4th Wednesday of the month through the Virtual Knowledge Network (VKN) National Institute of Mental Health and Neuro Sciences Extension for Community Healthcare Outcome (NIMHANS ECHO)

Since 2014, NIMHANS in collaboration with Project ECHO, UNM, USA, has been using this telementoring model with local adaptation to cater to the community need for capacity building. The heart of the ECHO model is “hub and spoke” knowledge sharing network, linking expert interdisciplinary specialist teams located at academic medical centers (hub) with PCPs in rural and underserved areas (spokes) virtually through tele-ECHO clinics. In this ECHO model, experts mentor and share their expertise through case-based learning, enabling PCPs to develop the ability to treat patients with complex conditions in their own communities [Figures 3 and 4].^[3]

Every fortnight, the district PCPs (spokes) joined through multipoint videoconference from their workplace/home, majority through smartphones and a few on laptops with 4G/3G Internet connectivity [Figure 3]. In places with poor Internet connectivity, a toll-free number with unique meeting ID was provided for participation.

The hub team consisted of two expert psychiatrists in drug addiction and one psychologist. In each tele-ECHO clinic, five to six cases were presented for 15–20 min each, in a predesigned semi-structured format, followed by discussion (hub-spoke and inter-spoke) on diagnosis and management [Figure 4]. The other district PCPs would clarify and respond to the challenges raised by the presenter through a chat function which enabled them to post questions and recommendations. At the end of each case, a hub team member would summarize and suggest management plan. Expert recommendations



Figure 2: Digital technology enabled telementoring for district primary care physicians



Figure 3: Communication channels (NIMHANS hub and PCP spokes topology)

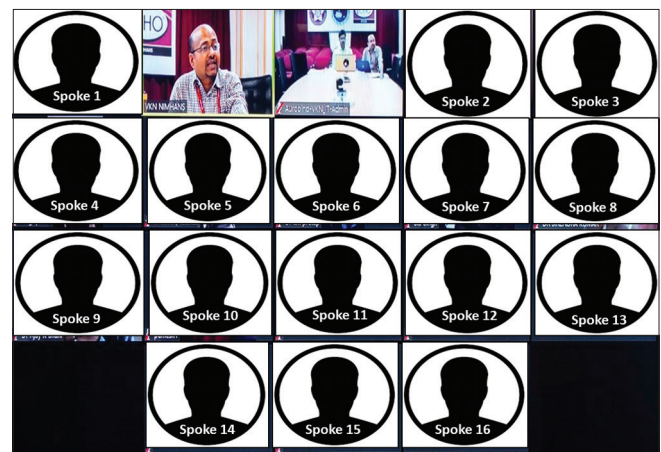


Figure 4: Live tele-Extension for Community Healthcare Outcome clinic using multipoint secured connection. The remote district primary care physicians engaged in case discussions with National Institute of Mental Health and Neuro Sciences experts through digital mode

were shared later through e-mail. In addition, a member of Virtual Knowledge Network (VKN) NIMHANS ECHO IT team provided technical assistance regarding any troubleshooting issues to all the participants.

The case discussions would end with a “brief didactic” by a hub expert on relevant predecided curriculum, selected through a provincial need assessment of PCPs. Each didactic lecture was followed by a short question session for spokes to clarify doubts related to topic, both lasting for 20 min. Thus, each tele-ECHO clinic lasted for 1½–2 h.

Asynchronous: Smartphone app-based e-learning

A cloud-based learning management solution was used for e-learning purposes. The application could be accessed anytime from a desktop or mobile device. The objective was to engage the PCPs in the learning process and consolidation of the knowledge and skills. As per the needs assessment requirements, each assignment was designed in such a manner that had a brief learning material in the form of video, text, and photo and was followed by an exercise (multiple choice, match the following or fill in the blank questions, etc.) so that they could read the relevant materials and attempt the assignments instantly.

Half the questions were knowledge based and other half were focused on skills. The learners were requested to review the specific video, text, and power point and answer questions pertaining to the module. There were six assignments in total and each was given once in 2 months. Periodic gentle reminders were sent, and each learner could use five attempts to complete these assignments.

Social media (WhatsApp)

WhatsApp is an extremely popular and free to use social media mobile application. All the PCPs were familiar with its use for social networking. Hence, it was used for sharing of nonpatient-related information, discussion, reminders, and sometimes didactic presentations.

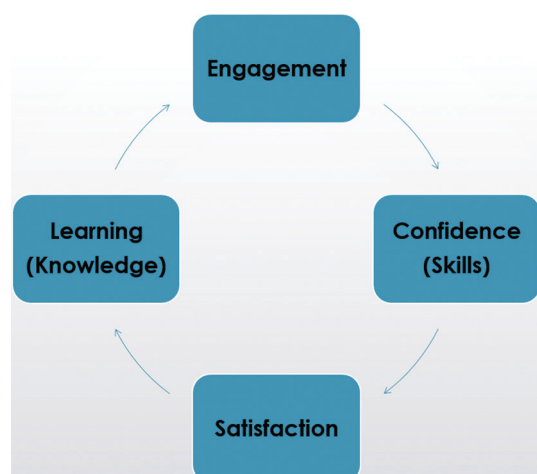


Figure 5: Outcome assessment topology

Outcome assessments

All the PCPs were given pretest questionnaire at the time of onsite sensitization and were asked to complete them before the training started.

The program is still in progress, and the following parameters were used to assess training outcomes [Figure 5].

Engagement

Participation in the fortnight tele-ECHO clinics and mobile based ubiquitous learning.

Learning (knowledge)

Pre- and posttest questionnaires were used to test the declarative knowledge of PCPs. They comprised 15 questions about SUDs and e-learning assignments as scheduled.

Confidence (skills)

Pre- and posttest questions contained self-reported skills in assessment and management of SUDs. These contained 25 questions and e-learning assignments.

Satisfaction

Posttests contained statements to be rated on a 10-point Likert scale (where 1 is not helpful and 10 is extremely helpful). These were given at different time intervals of 1 month, 3 months, and 6 months.

Statistical analysis

All data were analyzed using the Statistical Package for the Social Sciences (SPSS for Windows, Version 16.0. SPSS Inc., Chicago). A descriptive statistical analysis was conducted; percentages and frequencies were reported for categorical variables, while mean and standard deviation for continuous variables. Knowledge, confidence, and satisfaction variables were analyzed using repeated measures ANOVA. We focused on program evaluation and quality improvement.

Table 1: Outcomes of telementoring program for 6 months (from March to August 2017)

Parameter	n (%)
Step 1: Sensitization program (March and April 2017)	
Number of districts	36
Step 2: Telementoring (April to August 2017)	
A. Synchronous	
Number of PCPs joined for 6 or more virtual tele-ECHO clinics (>60%) out of 11	18 (47.36)
B. Asynchronous: Mobile-based ubiquitous e-learning (n=38)	
Total number of e-learning assignments	3
Number of PCPs completed all assignments in specified duration (2 weeks)	34 (89.47)
Number of PCPs not able to complete	4 (10.52)
Number of PCPs required >5 attempts to complete	7 (25.92)

PCPs – Primary care physicians; ECHO – Extension for Community Healthcare Outcome

RESULTS

Engagement

Synchronous live virtual tele-extension for Community Healthcare Outcome clinics

Till August 2017, 11 virtual tele-ECHO clinics (of the 21 planned) and 3 e-learning assignments (out of six assignments) had been completed [Table 1].

All ($n = 38$) participants participated in at least one virtual tele-ECHO clinic. Out of 38 participants, two participated in all while 47.36% ($n = 18$) attended more than six (>60% of total) tele-ECHO clinics. Seven out of total 11 tele-ECHO clinics with total attendance >20 and 4 out of 11 had thinly attended with total attendance <20. Majority of participants (80%) used smartphone with 4G connections. On an average there were 3-4 breakages in the internet connection per participant in each tele-ECHO clinic.

During the 11 tele-ECHO clinics, 76.31% ($n = 29$) of the PCPs presented 41 patient case summaries and obtained clarifications/recommendations from the hub experts. The queries raised by the participants were broadly on diagnostic clarifications, treatment choices, medicine doses, side effects, and holistic management. About 11 brief didactic lectures were presented by hub experts. The tele-ECHO clinics were conducted in Hindi, the local language of the participants. Mean duration of participation in each session was 82 min (of the scheduled 90–120 min).

Asynchronous mobile app-based e-learning

At present, the results of three assignments are represented here graphically (statistical report).

Among 38 PCPs, a cumulative of 89.47% ($n = 34$) had completed three e-learning assignments. Approximately 18–20 reminders were given to participants through phone calls, e-mails, and WhatsApp messages to motivate them to complete the e-learning assignments. About 25.92% ($n = 7$) of participants required >5 attempts to complete the assignments in part because of language barriers (English) and technological issues.

Learning (knowledge)

A repeated measures ANOVA was performed across three-time points (baseline, 1 month, and 3 months) for the scores of knowledge assessment. There was a significant change over time ($P < 0.001$). On *post hoc* analysis, the scores were significantly more during 1-month (3.00 ± 0.86 , $P < 0.001$) and 3-month (3.16 ± 0.90 , $P < 0.001$) assessments compared to the baseline (1.77 ± 1.02).

Confidence (skills) [Figure 6]

Self-confidence level of PCPs in managing a case of drug use was assessed using Likert scale 1–10. About 32.25% ($n = 10$) reported improved confidence level and 54.83% ($n = 17$)



Figure 6: Significant improvement in self-confidence

reported the same confidence level in managing a case of SUD. There was a significant change over time ($P < 0.001$). On *post hoc* analysis, the scorings for confidence were significantly more for 1-month (5.61 ± 2.69 ; $P < 0.001$) and 3-month (5.93 ± 2.50 ; $P < 0.001$) assessments compared to the baseline (1.48 ± 0.12).

Satisfaction

Satisfaction level is assessed at different time points during the course using Likert scale 1–10. About 22.58% ($n = 7$) reported improved satisfaction level from baseline, 51.61% ($n = 16$) reported the same satisfaction levels above 5, and 16.12% ($n = 5$) reported the same satisfaction level below 5 about the management of patients with SUDs.

DISCUSSION

With the rapid strides in educational technology, learning has become more ubiquitous, personalized, and accessible. In this concept study, we looked at feasibility and acceptability of transfer of knowledge and skills in drug addiction management from a multidisciplinary team of an academic medical center to remotely located district PCPs using educational technology. A telementoring model, i.e., synchronous multipoint videoconference VKN NIMHANS ECHO-based patient-centric learning with asynchronous mobile-based assignments with certification was used.

The ECHO model is not like the telemedicine model where the specialist assumes the care of the patient but is instead a guided practice model where the PCPs retains responsibility for managing their patients.^[3]

We observed the feasibility of implementing this telementoring program despite technological barriers such as poor Internet connectivity and lack of computers. The majority of learners could join as well as discuss clinical cases with the academic experts during the virtual tele-ECHO clinics. They could seek clarifications about concomitant medical and psychiatric issues apart from drug addiction. Approximately 90.0% of PCPs had completed the e-learning

assignments using their smartphones, also indicating the acceptability of this program.

Studies among various health disciplines have also shown that blended learning, including both traditional face-to-face learning and pure e-learning, is more effective than nonblended learning.

A clear majority of the learners used the personal smartphones with 4G/3G Internet to connect, interact, and complete this learning, indicating the emerging role of mobile-based learning. These new forms of mobile, social, and networked technologies and digital resources have amplified opportunities for flexible and self-organized learning practices. In developing countries such as India, smartphones are more accessible and widely available at a lower cost and have a better penetration in remote areas as compared to that of traditional personal computers.

Knowledge about the assessment and management of a patient with SUD, confidence in managing a case of SUD, and satisfaction levels about the telementoring course had increased significantly at different time points of posttraining compared to the baseline. An improvement of confidence (skills) was also reported by PCPs through the focused group discussions and success stories, with due recognition as local de-addiction experts.

CONCLUSION

In this preliminary study, multiple effective learning principles,^[4,5] i.e., active cooperation and participation, self-directed learning had been used to sustain motivation and engagement throughout the process.

From health-care trainer and trainee perspective, this model gives an opportunity to use emerging pedagogic principles connecting formal (i.e., ten days onsite), nonformal (virtual NIMHANS ECHO and e-learning), and informal educational contexts (social media such as WhatsApp) as strategies for knowledge transfer.^[6] This method of networked learning (academic center to remote district health centers) could be used as a method to improve health-care system delivery by empowering the health workforce to provide quality care in the community.

Implications

1. Telementoring model in e-health care has tremendous future potential using technology as a part of learning
2. Preliminary evidence suggests that this model is a feasible model to enhance the training and mentoring of existent human resources to address major public health problems such as drug addiction
3. Future studies using this model to train the health-care workforce in various priority disease areas are necessary to generalize its effectiveness in reducing huge health gap in general and specifically in mental health.

Limitations

1. This was a small unicentric study with limited participants from a single state
2. Only a single-focused area of de-addiction was undertaken
3. Confidence/skills were assessed by self-reported improvement instead of real-time assessment
4. Technological shortcomings due to unequal infrastructure at the district PCP sites.

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Conflicts of interest

There are no conflicts of interest.

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