

Original Research Article

ECHO ADHD in India: a feasible and acceptable training model for child-care physicians to identify and manage attention deficit hyperactivity disorder

Roopa Srinivasan¹, Ashwini A. Marathe^{1*}, Manisha K. Mukhija¹, Nandita de Souza²

¹Developmental Pediatrician, Ummeed Child Development Center, Mumbai, Maharashtra, India

²Developmental Pediatrician, Sethu Centre for Child Development and Family Guidance, Goa, India

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*Correspondence:

Dr. Ashwini A. Marathe,

E-mail: ashwini.marathe@ummeed.org

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ABSTRACT

Background: Children with attention deficit hyperactivity disorder (ADHD) have complex unmet needs. Physicians cite lack of knowledge, skills and resources as barriers to meeting these. ECHO (Extension of community health outcomes) ADHD, a case based tele-mentoring model was designed to address gaps in physician knowledge and skills regarding ADHD. A study was conducted to assess 1. Acceptability and feasibility of the program 2. Change in knowledge, self-efficacy and perception about appropriateness and feasibility of role in ADHD diagnosis and management pre and post program.

Methods: The 6-month pilot trained pediatricians, developmental pediatricians, psychiatrists, neurologists through 14 sessions comprising lectures, case discussions. Participants completed measures for knowledge (KADDS-knowledge of attention deficit disorders scale), self-efficacy, and acceptability and feasibility of role at baseline and endline. Descriptive and non-parametric analysis assessed acceptability and feasibility of program and change in knowledge, self-efficacy, appropriateness and feasibility of role. De-identified case summaries helped in analysing participant queries.

Results: Sixty four percent (57/88) participants completed baseline and endline evaluations and were included. Most were pediatricians and developmental pediatricians who found the model acceptable and feasible. Significant improvement was noted in knowledge about ADHD diagnosis, self-efficacy and perceptions about appropriateness and feasibility of role. Improvement in knowledge about ADHD comorbidities and management was not significant on KADDS. Case summaries, questions to hub team, discussions indicated participant focus on ADHD diagnosis.

Conclusions: ECHO ADHD is an acceptable and feasible model in low- and middle-income country (LMIC) setting which improved knowledge and self-efficacy among participants.

Keywords: Capacity building for ADHD, ECHO ADHD, Low- and middle-income country

INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a behavioural disorder with symptoms of hyperactivity, impulsivity, and inattention.¹ The prevalence of ADHD in children and adolescents worldwide and in India is 7.2% and 6.3% respectively, and it is more common in males.^{2,3} Significant functional impact of ADHD on

aspects of life such as relationships with family members, peers, educational achievement, personal safety, mental health and wellbeing make early diagnosis and appropriate management imperative.⁴ However, global literature reveals that up to two-thirds of children fulfilling criteria for ADHD receive neither diagnosis nor services.⁵ The under-referral and diagnosis is because of prevailing attitudes and knowledge about ADHD among

general practitioners who are the primary care providers (PCPs) in many countries.⁵ Scepticism about the construct of ADHD, negative views about pediatric ADHD medication, lack of awareness and acknowledgement of the biopsychosocial basis and impact of the diagnosis were found to be chief barriers to healthcare access for children with ADHD and their families worldwide.⁵ These challenges are amplified in Low- and middle-income countries (LMICs) as practitioners experience a considerable gap in opportunities for training and education in evidence-based practices (EBP) in developmental disabilities.⁶ Clinicians as role models who can demonstrate the use of EBPs within the unique context of LMICs are scarce. This leads to the misplaced belief that EBPs developed in high income countries are not applicable in LMIC contexts.⁷ Finally, lack of time to attend training and the high costs involved are cited as common barriers to seeking appropriate training opportunities in these resource-poor regions.⁶

The ECHO model for building capacity amongst primary care pediatricians

The ECHO model is well suited for capacity building efforts for a complex condition like ADHD.^{8,9} Online delivery at no cost to participants addresses the two important barriers to capacity building of clinicians.

Project ECHO was developed at the university of New Mexico Health Sciences center as a mechanism to improve outcomes for individuals with Hepatitis C virus infection living in underserved areas.¹⁰ In the ECHO model, participants are connected by secure video conferencing technology to a team of specialists. The weekly/fortnightly ECHO Clinics, operate as knowledge networks where specialists provide education in best-practice treatment protocols, case-based learning. Co-management and collaborative learning, coaching, and mentorship from both experts and peers is integral to the approach. The ECHO model is being used globally and in India to train physicians to manage a range of complex medical and behavioral conditions.⁸⁻¹¹

Previously, the ECHO model has been culturally adapted for building physician capacity in India for diagnosis and management of developmental conditions like autism spectrum disorder.¹² A similar program had so far not been developed for training physicians in identification and management of ADHD in India. A pilot ECHO ADHD program was designed by the authors based out of two geographically distinct not-for-profit organisations in India, which incorporated key learnings from ECHO Autism India. These included the inclusion of parent and self-advocates as part of the hub team of specialists as well as focus on a strength based, family centred approach during the didactic and case-based discussions. The ECHO Autism India team had emphasized the importance of ongoing interaction between the hub team and the participants on how EBPs are implemented in low resource settings. Further the

ECHO ADHD pilot round was initiated in the midst of a massive surge of COVID-19 infections in India in 2021. The training curriculum was modified to accommodate some of the novel challenges and issues associated with the practice of telehealth as necessitated by the COVID 19 pandemic. The ECHO ADHD program has been shown to improve self-efficacy among participants in well-resourced settings.⁸ The model's acceptability, feasibility and outcomes are being reported from low resource settings such as India for the first time.

Objectives

The primary objective of the study was to assess the acceptability and feasibility of the ECHO model for training participants in EBPs for ADHD. Additional objectives were to assess a) change in knowledge about ADHD amongst the participants, b) change in self-efficacy amongst the participants in identifying and managing ADHD and its comorbidities, c) change in perception about appropriateness and feasibility of role in diagnosis and management of ADHD, at baseline and end of the program.

METHODS

Type of study

A pre-post interventional study was conducted between June 2021 and December 2021.

Study sample

Participant recruitment

Invitations to participate in ECHO ADHD were emailed to members of professional pediatric bodies in India, international developmental pediatrics association of primarily LMICs, and shared on social media. Participants were enrolled if they were 1. primary care pediatricians, developmental pediatricians, psychiatrists and neurologists (practicing/in training) 2. had access to the internet and a device with a front-facing camera 3. treated children with developmental disabilities including ADHD.

Sampling technique

Study sample was derived from population of physicians who were recruited for program, using voluntary response technique of non-probability sampling.

Inclusion criteria

Participants who voluntarily completed evaluation measures before the start and at the end of the training program were included in the study.

Exclusion criteria

Enrolled participants who did not attend any session and/or did not fill the evaluation measures at the end of the training program were excluded from the study.

ECHO ADHD model

The ECHO ADHD clinics used high-quality secure video conferencing technology to connect participants and experts of a hub panel. The hub team comprised three developmental pediatricians, mental health professionals, occupational therapists, who practiced in 2 different states within India, 2 parent advocates and adult ADHD self-advocates. The clinicians practiced in two not for profit organizations and brought their experience of working with families from low resource settings. The self-advocates and parents shared lived experiences of having or supporting a child with ADHD, and their presence also reinforced the adherence to the family centred approach.

Fourteen clinics each of 2 hours duration were conducted fortnightly. Each clinic consisted of a 40-minute didactic session and a case presentation by one of the participants, followed by discussion, to facilitate collaborative learning, peer support and guided management of the child and family. Each session emphasized adoption of a biopsychosocial, family centred approach and EBPs for identification and management of ADHD and comorbid conditions. Case presentations included de-identified clinical information, discussion, recommendations from the expert panel, and discussion among all the participants.

Ethics approval

The study was approved by the Sethu institutional ethics board (Approval No..02/2021, dated 14th May 2021)

Measures

Participants completed a pre-test questionnaire (during the 2 weeks prior to attending the first ECHO ADHD clinic) and post-test (2 weeks following the final ECHO ADHD clinic). These measures (described below) were completed online using web-based data collection.

Provider information: socio demographic form

Baseline demographic information included age, gender, specialty, geographical location, years of practice, and previous training in ADHD.

Acceptability and feasibility of the ECHO model for the participants

Participant acceptability and feasibility of the program content and delivery was assessed through metrics like mean attendance and an anonymous feedback survey with a mix of closed and open-ended questions to obtain qualitative information. These included participant

perceptions about the extent to which they have derived benefit in various aspects of identification and management of ADHD, feasibility of attending the training program (e.g., duration, timings) and their additional suggestions and comments.

Knowledge questionnaire (KADDS)

Participants filled a modified version of the “KADDS at baseline and endline, to assess the change in their knowledge.¹³ The KADDS is a 39 item rating scale originally developed and widely used to assess ADHD knowledge of teachers in three specific areas: symptoms/diagnosis of ADHD, treatment of ADHD, and associated features (i.e., general information about nature, causes, and prognosis of ADHD). The scale uses a true (T), false (F), or don't know (DK) format, to allow differentiation of what participants do not know from what they believe incorrectly (i.e., misconceptions). It was culturally adapted for use with physicians in the Indian context. Cognitive interviews were conducted with 3 Indian pediatricians from private and Government health sectors, to assess the content, and contextual relevance.¹⁴ The modifications suggested by the interviewees were implemented after discussing the same with the author.

Participant knowledge was also assessed by analysis of the cases presented in the clinics. The questions posed to the hub team and the skills implemented in identification and management were assessed by reviewing details of the cases submitted by participants who volunteered to present.

Self-efficacy-knowledge, skills and competency questionnaire

A self-report questionnaire using a 6-point Likert scale to assess physician self-efficacy in key domains relevant to the project objectives was administered at baseline and endline. Items included physicians' perceived knowledge, skills, and competence in identification and management of ADHD and it's common comorbid developmental and psychiatric conditions (Figure 1). This was a questionnaire used with permission from a previous ECHO Chicago ADHD program.¹⁵ Participants reported the degree to which they felt confident in their ability to effectively provide care in each domain.

Appropriateness and Feasibility of role questionnaire

Participant perceptions about the appropriateness and feasibility of adopting a significant role in identification and management of ADHD as proposed in the program was assessed through a self-report questionnaire earlier used in ECHO Chicago ADHD program,¹⁵ administered at baseline and end of training (Figure 2).

Perceived Self-Efficacy Questionnaire in diagnosing and managing ADHD and its co morbidities *

Mark only one oval per row.

	None or no skill at all	Slight knowledge, skills, or competence	Average among my peers	Competent	Very competent	Expert, teach others
1. Ability to identify school-age children at risk for ADHD during well child and sick visits	☐	☐	☐	☐	☐	☐
2. Ability to obtain evidence of core ADHD symptoms from parents/caregivers when evaluating children for ADHD	☐	☐	☐	☐	☐	☐
3. Ability to diagnose ADHD accurately in school age children	☐	☐	☐	☐	☐	☐

Figure 1: Self-efficacy questionnaire: sample questions.

Acceptability (Appropriateness of role) and Feasibility Questionnaire

This section of the survey is to help us understand how primary care providers see their role in caring for patients with ADHD.

Under "Appropriate for Role", please indicate the extent to which you feel that each of the following activities are appropriate for you in your practice, if there were enough time and resources.

Under "Feasible for Role" indicate the extent to which you feel each activity is practical or feasible for your practice.

3. 1. Obtain behavior ratings from parents for the initial assessment *

Mark only one oval per row.

	Not at all	Somewhat	Much	Very much
• Appropriate for Role	☐	☐	☐	☐
• Feasible for Role	☐	☐	☐	☐

4. 2. Obtain behavior ratings from teachers for the initial assessment. *

Mark only one oval per row.

	Not at all	Somewhat	Much	Very much
• Appropriate for Role	☐	☐	☐	☐
• Feasible for Role	☐	☐	☐	☐

Figure 2: Appropriateness and feasibility of role questionnaire: sample questions.

Records of the case presentation parameters

A case record and presentation template was provided to the participants, focusing on a biopsychosocial approach based on the international classification of functioning, disability and health (ICF) framework.¹⁶ Details about the cases like age, gender, presenting features in various settings, individual and family strengths, influence of the environmental and personal factors on the individual's activities and participation, assessment, diagnosis, comorbidities and common questions asked by the case presenters or participants were recorded.

Data analysis (statistical tests)

The sociodemographic information of the participants, practice parameters and attendance for the sessions were analysed using descriptive statistics. Mean attendance and qualitative information from the anonymous feedback form was used to assess the acceptability and feasibility of the program.

Wilcoxon's signed-rank test for paired samples was applied to examine the pre and post-test change in knowledge, perceptions about self-efficacy and appropriateness and feasibility of role, because the data did not fit normal distribution. This is a non-parametric analysis that statistically compares the average of two dependent samples and assesses for significant differences.

RESULTS

Participant characteristics

Sixty four percent (57/88) of the participants who enrolled in the program completed the questionnaires at baseline and endline and were included in the study. Pediatricians and developmental pediatricians constituted a majority of the participants (Table 1). Thirty-one participants attended the program but were not included in the study, as they did not complete the post evaluation questionnaire. Of these 31 participants, 11/31 (35.5%) had attended 7 or more sessions and an equal number attended fewer than 3 sessions, while the remaining 9/31(29%) attended 3-7 sessions (Table 1).

Acceptability and feasibility of ECHO ADHD program

Eighty four percent (48/57) and fifty three percent (30/57) of the participants attended 7 and 10 or more out of 14 sessions respectively. Five participants attended all 14 sessions. The total attendance in the first 7 sessions was over 80% (46/57) and 57% (33/57) in the remaining 7. The average attendance for the overall program was 67% with maximum attendance in a session being 87%.

In the anonymous feedback survey with a mix of closed and open-ended questions to obtain qualitative information, 85% of participants opined that the topics presented by the hub team and its content were relevant to their clinical practice. Case presentations, opportunities for interactions with the hub team and fellow participants and the presence of a parent/self-advocate in the session were identified as being useful for learning. 98.5% of the participants responded affirmatively to the question "Would you recommend this training to a colleague?" Between 90-100% of the 57 participants included in the study reported benefitting to a moderate to maximum extent in all aspects of ADHD covered in the program.

Eighty one percent of the participants felt that the duration of the program was right. Challenges regarding

feasibility in attending the sessions were shared by 7 participants, who suggested that the sessions could be conducted on weekends, or in the mornings or late evenings (Table 2).

Change in knowledge

KADDS questionnaire parameters

On analysis of the pre and post program KADDS questionnaire responses using the Wilcoxon's signed-rank test, a statistically significant improvement was noted in participant knowledge related to ADHD symptoms and diagnosis, while no significant improvement was noted in the knowledge related to ADHD treatment as well as the associated features (Table 3).

Case presentation parameters

Participants were invited to present cases (with anonymized details) along with questions they wished to discuss with the hub team in each session after the first. Of the 13 cases presented, 7 were presented by developmental pediatricians, 3 by general pediatricians, 2 by psychiatrists and 1 by a pediatric neurologist. The average age of the children whose challenges were discussed was 7.2 years (range 4 years-23 years). The wide age range offered an opportunity to highlight the differences in ADHD presentation from preschool age to young adulthood. The male to female ratio was 9:4 in case discussions and no child was identified as belonging to any other gender. In 10/13 cases, predominantly inattentive and combined presentations of ADHD were identified in an equal proportion and in 3 presentations the presenters could not confirm the diagnosis; 3/10 cases were classified as simple ADHD and 7/10 were complex ADHD. Comorbidities such as specific learning disability with and without anxiety, autism spectrum disorder, anxiety disorder were discussed in presentations where complex ADHD was identified. Child and family strengths, impact of the presenting concerns on functioning and participation in various settings, and the role of environmental factors in the presentation as well as for management were focused on by the participants in all the cases presented.

The common questions posed by the presenter to the hub team in the 13 cases presented were related to diagnosis (7), medications (7), the use of ADHD rating scales (4), behaviour management (5), comorbidities (5) and home strategies (4). It was noted that discussions related to diagnosis continued till the end of the program. Case discussions in latter sessions saw consistent use of ADHD scales by the participants. Besides the hub team, the perspectives of the parents and self-advocates were also shared during case discussions, along with active participation from the participants.

Change in self-efficacy in diagnosing and managing ADHD and comorbidities

On analysis of the pre and post program self-efficacy questionnaire responses using the Wilcoxon's signed-rank test, a statistically significant improvement was noted (Table 4).

Change in perceived appropriateness of role and feasibility in identification and management of ADHD

On analysis of the appropriateness and feasibility of the role questionnaire responses pre as well as the post program, a statistically significant improvement was noted (Table 4).

Table 1: Participant characteristics, (n=57).

Parameters	N	Percentage (%)
Age (Years)		
<35	17	29.8
36-45	32	56.2
46-55	6	10.5
>55	2	3.5
Gender		
Female	47	82.5
Male	9	15.8
Prefer not to mention	1	1.7
Geographical location*		
Metropolitan regions	24	42.1
Urban regions	22	38.6
Semi-urban regions	5	8.7
Rural regions	3	5.3
International	3	5.3
Specialty		
General pediatrician	27	47.5
Developmental pediatrician	28	49.1
Pediatric neurologist	1	1.7
Psychiatrist	1	1.7
Years in service (experience) (Years)		
<10	39	68.4
10-20	14	24.6
21-30	3	5.3
>30	1	1.7
Practice includes children with developmental conditions		
Yes	55	96.5
No	2	3.5
Prior training received in ADHD		
Yes	37	64.9
No	20	35.1

*Footnote: (rbi.org.in: Classification of regions in India - i. Rural: population less than 10,000; ii. Semi-Urban: 10,000 and above and less than 1 lakh; iii. Urban: 1 lakh and above and less than 10 lakh; iv. Metropolitan: ten lakh and above).

Table 2: Participant feedback regarding program acceptability and feasibility.

Focus	Participant comments
Program content and delivery	“Extremely well thought, well designed, organized, interactive and enriching learning.” “Helped delve into finer nuances of recognition and assessment of Neurodevelopmental disorders, gained new insight.” “Extremely good management of the program and very helpful speakers and guides.”
Practical relevance	“I would like to attend repeat sessions as I am from general pediatrics and trying to develop a center in central Madhya Pradesh.” “Presence of a parent and self-advocate in the session has added great value in understanding practical aspects of management for a family.” ” Case discussions have been very helpful.”
Program duration, session day/ time	“The session timings were suitable to attend during workdays.” “The duration of the program and sessions was right.”.
Suggestions for future programs	“The program can be made shorter.” “It will be great if we can have the session by Saturday instead of Thursday.” “Timing of session will be more feasible if they are in the evening.” “Having the sessions on weekdays is good to manage, but if morning timings could be planned, it will be better.”

Table 3: Change in knowledge at baseline and end of the program based on KADDS questionnaire parameters.

Variables	Knowledge related to ADHD symptoms and diagnosis		Knowledge related to ADHD treatment		Knowledge related to ADHD associated features	
	Pre-intervention raw score	Post-intervention raw score	Pre-intervention raw score	Post-intervention raw score	Pre-intervention raw score	Post-intervention raw score
Median	6.000	6.000	5.0000	5.000	8.000	8.000
SD	1.282	0.940	1.8567	1.279	2.335	2.150
Z	5.955		0.698		0.403	
‘P’ two-tailed	<0.00001		0.485		0.343	
Conclusion	Significant improvement after intervention.		No improvement after intervention.		No improvement after intervention.	

Table 4: Change in self-efficacy and appropriateness and feasibility of role at baseline and end of the program.

Variables	Self-efficacy in identification and management of ADHD		Appropriateness and feasibility of role in diagnosis and management of ADHD	
	Pre-intervention raw score	Post-intervention raw score	Pre-intervention raw score	Post-intervention raw score
Median	36.000	44.000	90.000	97.000
SD	10.982	316.414	16.299	17.298
Z	-5.329		-4.271	
‘P’ two-tailed	<0.00001		0.000019	
Conclusion	Significant improvement after intervention.		Significant improvement after intervention.	

DISCUSSION

The ECHO model has been found to be acceptable for building physician capacity to identify and manage ADHD in high income country contexts.⁸ This is the first paper to describe the use of the ECHO model for building capacity amongst physicians for identification and management of ADHD in an LMIC context. We found many similarities between findings reported by the ECHO Autism India team and our own pilot round.

Similar to ECHO Autism, an equal number of general pediatricians and developmental pediatricians participated in our program as well, suggesting a need for such capacity building efforts for both groups of physicians.¹² Greater enrolment by physicians who had 10 years of clinical experience or less suggests that there is a felt need for capacity building initiatives like ours among the recently trained/ graduated physicians. There has been growing awareness about developmental conditions in children in India in the last decade or two,¹⁷

and perhaps the enrolment patterns are reflective of the need for more in depth training opportunities that the awareness building efforts have created.

We assessed the acceptability and feasibility of the program content and its delivery through participant attendance, dropout rates, perceptions about benefits obtained from the program, likelihood of recommending it to peers, qualitative feedback about the program content and delivery. Our dropout rates were similar to those reported in ECHO trainings conducted for other medical conditions previously in India, like ECHO training for cancer screening.¹⁸ Place of employment, workload and internet connectivity issues have been reported as reasons for non-continuation in other ECHO programs.¹⁸ Participants were keen on presenting and discussing diagnostic challenges in ADHD. The focus of the first half of the program was closely aligned with participant interests. The second half of the program covered topics such as pharmacological and therapeutic management, monitoring progress, advocacy and long term outcomes and were not related to ADHD diagnosis. We believe that the overall length of the program and the focus of the sessions may have contributed to the drop in attendance in the 2nd half of the program. Further participants also provided qualitative feedback about content and delivery of the program. There was a significant pre-post difference in how participants perceived their role in various aspects of identification and management of ADHD (appropriateness and feasibility of role).

The KADDS scores and themes emerging from case discussions were used for assessing change in participant knowledge levels. Increased participant knowledge about ADHD identification and its comorbidities was evident through change in KADDS subdomain scores and the case-based discussions respectively. However, KADDS focuses on ADHD and its presentation in schools and has been infrequently used to assess physician knowledge.^{13,19} There was limited correlation between the content covered in our program and that addressed by the KADDS. Given these challenges, the change in knowledge scores in only one domain of KADDS is not surprising. We could assess increased participant awareness about ADHD management in simple and complex ADHD through the discussions initiated by the participants about identification and management of ADHD. This was further reflected in the enhanced self-efficacy scores. Participant perceptions about their role in identifying and managing ADHD also changed significantly between baseline and completion. Improved perceptions of self-efficacy, appropriateness and feasibility of role and knowledge (in ADHD diagnosis) indicates that the training program helped participants understand, accept, and feel confident about the role they have to play in diagnosing and managing ADHD.

This study demonstrates that there is a need for capacity building initiatives for complex developmental conditions

like ADHD. A case-based peer mentoring model as offered by the ECHO model was acceptable and feasible to the participants and contributed to improved knowledge and self-efficacy. A limitation of the study was the lack of a single measure to capture the change in knowledge of the participants. The number of measures used increased the time required to complete them at baseline and endline, and may have contributed to participant fatigue and non-completion of endline measures despite attending more than half of the sessions.

CONCLUSION

The ECHO ADHD is an acceptable and feasible program that positively changes knowledge and self-efficacy in diagnosing and managing ADHD. The feasibility of the program can be further improved by shortening the duration of the program and reducing the burden of self-evaluation at baseline and endline of the program for the participants. Further, it will be important to assess the impact of improved knowledge and self-efficacy on practice behaviours of the participants in the future.

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