



Impact Evaluation of Technology Driven Mental Health Capacity Building in Bihar, India

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Abstract

Task-shifting is an important means to address the barrier of inadequate specialist human resources for mental health in countries such as India. This paper aims to report the impact of one such task-shifting initiative. Twenty-two non-specialist Medical Officers of Bihar, an eastern Indian state were engaged in a ten-month long hybrid (a 15-days onsite orientation to psychiatry and periodic online mentoring in primary care psychiatry) training program to enable them to identify commonly presenting psychiatric disorders in their respective clinics. 20 online sessions (hub and spoke ECHO model) occurred over the next 10 months. Apart from didactic topics, 75 cases covering severe mental disorders, common mental disorders and substance use disorders were discussed (case presentations by the primary care doctors (PCDs)) and moderated by a specialist psychiatrist and clinical psychologist). 12 successive self-reported monthly reports (comprising of the number and nature of psychiatric cases seen by the trainee PCDs) were analyzed. The mean (SD) number of sessions attended was 9 (8.0) and median was 13 (Range: 0–20). Mean number of cases (per PCD) discussed was 3.4 (3.4) (Median: 4; Range: 0–10). Total 20,909 patients were cared for in the 12 months after initiation of the training program. Increasingly, a greater number of patients were cared for as the training progressed. This pattern was mainly driven by more identifications of severe mental disorders (SMDs), common mental disorders (CMDs), dementias and substance use disorders. Mean (SD) number of patients seen per month before and after training was 1340.33 (86.73) and 1876.44 (236.51) ($t = -3.5$, $p < 0.05$) respectively. A hybrid model of training PCDs is feasible and can be effective in identification of persons with psychiatric disorders in the community. Prospective, well designed studies are essential to demonstrate the effectiveness of this model.

Keywords ECHO model · Primary care psychiatry · Primary care doctors · Digital training modes

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Introduction

The National Mental Health Survey [1] revealed that 10% of the general population suffers from mental health disorders which are the 2nd leading cause of years lived with disability (YLD) in India [2]. There are insufficient number of qualified psychiatrists in India to address this huge burden of disease and disability. Ideally 3 psychiatrists are required per 1 lakh population, but we currently have around 0.75 per lakh population. The numbers for other mental health professionals like clinical psychologists and psychiatric social workers is even lower [3]. The time required to fill this gap using qualified psychiatrists, clinical psychologists and psychiatric social workers would be huge.

On another note, among patients who consult their primary care doctors (PCD), the prevalence of psychiatric disorders is found to be around 30–35% [4]. Majority of these patients are often misdiagnosed and hence not treated appropriately even though 60–80% of them can be effectively managed by PCDs only [5]. Integration of mental health into primary care has been one of the main strategies adopted worldwide to address the high burden of psychiatric disorders in PHCs and their effective management [6]. Training PCDs i.e., effective task shifting (and the degree of its success and sustainability) is one of the important success factors in achieving the above-mentioned goal of integrating mental health into primary care. Despite the widespread prevalence of mental health disorders, PCDs receive a negligible amount of psychiatry training in medical school. Psychiatry is considered as a minor subject and as part of their General Medicine rotations. As per the Medical Council of India regulations, (until the time National Medical Council forms its own regulations) Psychiatry has been allotted 20 theory classes and 2 weeks of clinical postings in 3rd year of MBBS. Coming to the evaluation part, psychiatry is part of general medicine section with only 2–3 questions devoted to the subject. This insufficient exposure to the field of psychiatry leads to inadequate knowledge and skills in PCDs and presents a formidable barrier for successful integration of primary mental health care into general healthcare.

Thankfully, there are several initiatives showing demonstrable positive impact of training PCDs in identification and management of psychiatric disorders. Not only the knowledge and confidence about managing psychiatric disorders have improved, but also, patient related outcomes [7–10]. Most of these training programs have occurred in traditional (classroom teaching) in-person mode. Classroom training used to be the default mode of training PCDs till recently. In order to overcome the drawbacks of traditional training approaches, recent initiatives have adopted andragogical techniques and digital technology. These latter approaches seem to have the dual advantages in the form of better retention of skills over extended periods of time and better patient related outcomes [11–15].

Public mental health scenario of Bihar State and the need for this training program: Bihar is an eastern state of India, with 9.9 crore population and is likely to have around 1 crore Persons with mental illness (figures extrapolated from the National Mental Health Survey of India, 2016) [1]. In order to cater to this, 31 psychiatrists were present in various public health institutions as of 2017 [16]. Bihar Initiated the District Mental Health Program (DMHP) program in 2015 but no psychiatrist could be recruited until 2017. It is in this background, Govt. of Bihar approached National Institute of Mental Health and Neurosciences (NIMHANS) to train PCDs with the goal of providing basic mental health services at the District level. In response to the same, this training program was designed for 1 year (details elsewhere) [17]. This paper gives a retrospective analysis of

the monthly reports on the number and type of patients (with mental illnesses) cared for by the trained PCDs, during the entire duration of the 10-months long training program.

Methodology

22 PCD's (with MBBS qualification; a basic graduate medical degree in India) from selected 11 districts of Bihar were nominated for this training program by the Bihar Govt. Details of the training program are given elsewhere [17]. To summarise, this was a hybrid course lasting 10 months with an initial onsite (in-person) component of 14 days and the rest was online. After the onsite training the participants gained confidence in taking a psychiatry history and conducting a brief mental status examination. Online sessions consisted of topic discussion on common and severe mental disorders. Substance use disorders were not included as there was another concurrent training program being held on substance use disorders. Online sessions were conducted in Hub and Spoke model by a team of psychiatrist and a clinical psychologist (ECHO model) [18]. The training included both synchronous and asynchronous learning modules. Online sessions were held fortnightly from June 2017 to March 2018. Each session consisted of a didactic and a case presentation followed by group discussion. The doctors so trained would send us the report about the number of patients (those with mental illnesses) seen at their respective districts where the doctors were working. We have done the retrospective review of the monthly reports sent and analysed the same. Descriptive analysis has been carried out for each variable. Continuous variables were reported in terms of Mean (SD) or Median (Range) and categorical variables were reported in terms of percentages. Paired t-test has been used to test the difference between the average patients seen per month between the pre and post-intervention for each district. Then the districts were divided into two groups namely 'well performing' and 'average performing'. 'Well performing' districts are those where there was significant increase in number of patients seen per month post training and rest were 'average performing' districts. Chi-square test has been carried out to find out the association between the performance status (well performing V/s average performing) and attendance status in terms of the number of sessions attended and missed. To explore the difference in the distribution of the mean number of patients discussed in online sessions between well performing and average performing districts Mann Whitney U test was used. Friedman test was used to investigate the difference in the average patients seen across the observation period of one year. The study was permitted by the ethics committee of NIMHANS, Bengaluru.

Results

Total of 22 PCDs participated in the study, mean (SD) age of doctors was 45.3 (8.2) years with mean (SD) clinical experience of 18 (7.8) years and all were males. Nineteen participants (86.3%) had not done any postgraduation and had only MBBS degree, rest 3 (three) had done post-graduation in various subjects (ENT, Paediatrics, and Psychiatry). Six participants were also trained in addiction psychiatry from NIMHANS through another training programme and two others had very brief orientation training in psychiatry. 13/22 (59%) participants attended more than 50% of sessions. Reasons for dropping out of the training program were (a) transferred to non—DMHP districts (n=2)

(b) left the government service ($n=3$) and (c) some were involved in too many health programs and couldn't take time out for the sessions ($n=3$) [17]. There were total of 20 sessions that the participants were supposed to attend through the training program. The mean (SD) number of sessions attended was 9 (8.0) and median was 13 (Range: 0–20). Mean number of cases (per PCD) discussed was 3.4 (3.4) (Median: 4 Range: 0–10). Totally, 75 cases covering severe mental disorders (schizophrenia and bipolar affective disorder, common mental disorders and substance use disorders) were discussed.

Doctors who attended more than 10 sessions were significantly younger [Mean (SD) age = 42.1 (5.4)] than those who attended lesser than 10 [Mean (SD) = 48.4 (8.7)] ($t=2.2$; $p=0.04$). However, this was not the case when the number of cases presented was analysed [mean (SD) age of those who presented 5 or more cases was 46.5 (8.4) years while that of those who presented less than 5 was 44.0 (8.0); $t=0.73$; $p=0.47$]. Years of experience was similar among those who attended more than 10 sessions or lesser [20.1 (8.9) years vs 16.1 (5.9); $t=1.2$; $p=0.11$]. Same [17.5 (8.7) years of experience vs 18.6 (7.5) years; ($t=-0.31$; $p=0.76$)] was the case with respect to who presented at least 5 cases or less than 5 cases respectively during the training.

Total number of patients identified was reported to us district wise and the monthly breakup is shown in Fig. 1. It may be noted that we did not get the patient break up individual PCD wise. Total of 20,909 patients were seen from April 2017 to March 2018 across all the districts by all the doctors who underwent training. Increasingly, a greater number of patients were cared for as the training progressed. This pattern was mainly driven by more identifications of SMDs, CMDs, dementias and substance use disorders (Table 1). Mean (SD) number of patients seen per month before and after training was 1340.33 (86.73) and 1876.44 (236.51) ($t=-3.5$, $p<0.05$).

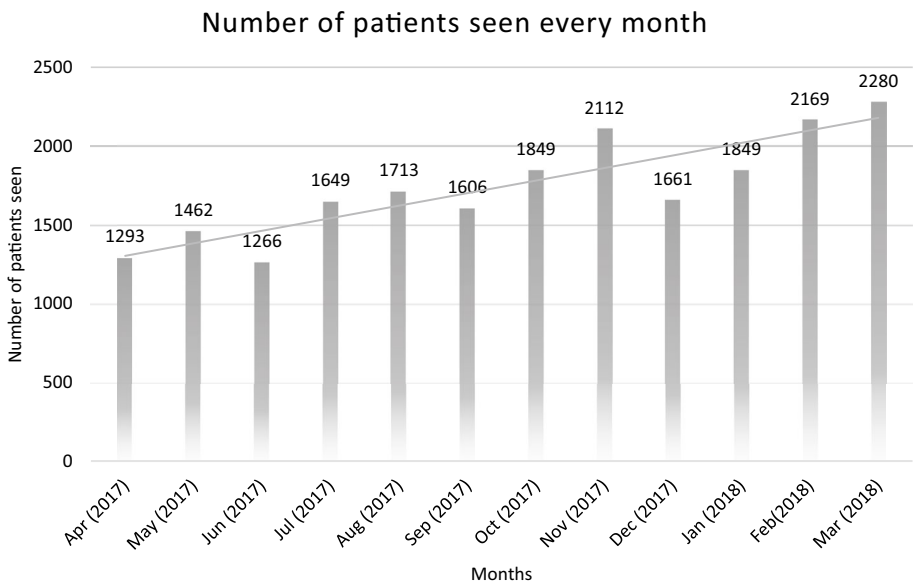


Fig. 1 Number of patients seen every month

Table 1 Distribution of patients identified before and after training

Diagnostic category	Number of patients seen [Mean (SD)]		t	p
	Pre training (3 months)	Post training (9 months)		
SMD	275.33 (52.4)	370 (48.0)	-2.9	0.02
CMD	708 (20.5)	957.9 (114.1)	-3.7	0.004
Epilepsy	74 (19.0)	109 (32.4)	-1.7	0.11
Dementia	13 (4.4)	59.2 (27.8)	-2.8	0.02
Substance use disorder	46.7 (11.7)	76.8 (20.7)	-2.3	0.04
Intellectual developmental disorder (IDD)	132 (23.3)	105 (30.8)	1.4	0.19
Autism	10.33(2.3)	10.7 (6.3)	-0.1	0.93
Other psychiatric disorders in children and adolescents	81 (18.2)	187.9 (89.9)	-1.9	0.07

Though not statistically significant, identification of mental health issues in children also increased considerably (81 vs 187.9). As can be made out in Fig. 2, all major categories of mental illnesses were identified by trained PCDs.

Table 2 shows us the performance of districts in terms of engagement in the training and the number of patients identified by the doctors who were trained. Each doctor had 20 sessions to cover. 'Average performing districts' saw significantly more attendance (105/200; 52.5% of the total sessions attended) than the 'well performing districts' (97/240; 40.4% of the total sessions attended) (Chi-square=30.9; P=0.001). Mean number of cases presented by the well performing and average performing districts were also compared by using Mann Whitney U test, which showed no significant difference between the two groups (Z= -0.37. p=0.79).

We examined if the number of patients seen over the course of 1 year increased progressively across the state. Four data points were created by making blocks of 3 months each viz 1st 3 months, 2nd 3 months, 3rd 3 months and 4th 3 months. The median was compared using the Friedman's test, which showed that there was a numerical increase in the mean rank as shown in Table 3. However, this did not reach the statistical significance (p=0.08).

Discussion

This report shows that training and mentoring PCDs for a period of 9 months did result in progressive increase in the number of persons with psychiatric disorders who were cared for. Moreover, all major categories of psychiatric disorders got identified. This can be construed as a good sign and can act as a starting point for scaling up public mental health service delivery mechanisms in underserved areas. Mentoring and providing support to PCDs over an extended period of time likely played a role in achieving this feat. Absence of continued support to the PCD has been well-recognised as an important barrier for successful integration of primary mental healthcare into the general healthcare. The program has been able to provide continuous support over a 9-month period, and the reasonable success (in terms of the progressive increase in the

Number of patients identified across different diagnostic categories month wise

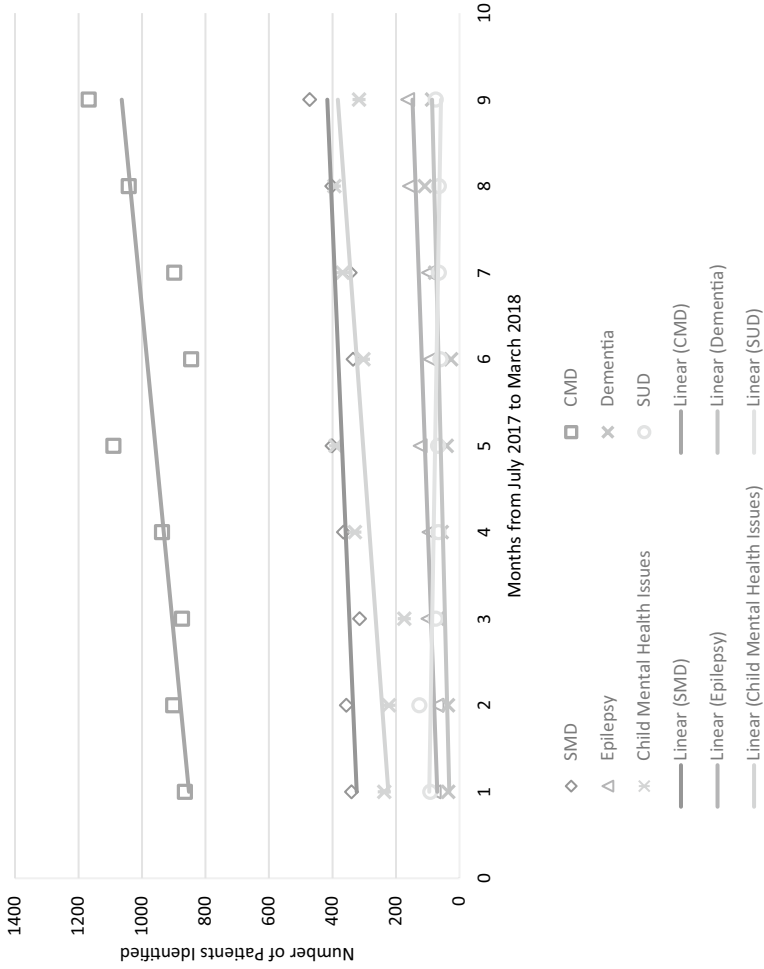


Fig. 2 Number of patients identified across different diagnostic categories month wise. X-axis indicates months 1–9 (July 2017–Mar 2018) and Y-axis indicates number of patients identified

Table 2 Demographic details and the patients identified across 'Well performing' and 'Average performing' districts

District	Mean age	Average years of experience	Total sessions attended	Total no of cases presented	Mean no of cases seen		t	p
					Pre training	Post training		
Average performing districts								
1	48.5	23.5	35	12	75.3	101.1	-1.40	0.09
2	49.5	23.0	22	12	148.3	87.8	2.91	0.01
3	49.0	19.0	15	0	212.0	182.0	1.69	0.06
4	37.0	7.5	14	1	69.0	67.1	0.26	0.40
5	44.5	18.5	19	6	313.0	158.6	2.4	0.02
Well performing districts								
6	43.5	15.0	11	5	15.0	229.8	-10	0.01
7	61.0	32.0	4	1	219.0	316.4	-2.42	0.02
8	37.5	13.0	34	16	173.7	256.3	-2.83	0.01
9	44.0	16.5	17	7	17.7	43.9	-2.9	0.01
10	41.5	15.5	14	10	42.7	121.6	-3.4	0.01
11	43.0	16.0	17	6	54.7	311.9	-8.1	0.01

number of patients with mental health issues who were cared for) can be thought of as secondary to the continued support and mentoring. Easily accessible and affordable digital technology was a key factor towards the initiative. Considering the depth of internet and smartphone penetration across the length and breadth of the country, digital technology can be easily exploited in the endeavour of providing ongoing support to PCDs. At a larger level, when we consider the number of tertiary care mental health institutes across India (n=47), tertiary care academic centres (meaning medical colleges) with psychiatry departments and secondary care centres manned by psychiatrists (more than 500 spread across the country), the task of mentoring PCDs is imminently feasible by distributing the workload among specialist psychiatrists. The goal of widespread implementation of such a hybrid model is that PCDs, over a period of time, get proficient in identifying and managing patients who present to their clinics (primary health centres). This, in itself (if occurs satisfactorily), has the potential to bring down the treatment gap (for psychiatric disorders) to a considerable extent. A couple of initiatives are notable in this regard [12, 15, 19]. Another notable point is the launch of Health and Wellness Centres (HWCs) under the AYUSHMAN BHARAT scheme of the Govt. of India [20]. Under this, the existent sub-centres are getting upgraded into HWCs, the nerve centres of providing Comprehensive Primary Healthcare (CPHC). Mental Health is an integral part of CPHC, and HWCs should form the next focus of training and mental health capacity building.

Training of PCDs (task shifting) has long been thought of as one of the solutions to overcome the address the grossly inadequate number of psychiatrists in India. To the best of our knowledge, this is one of the first training programmes in hybrid mode where ongoing support was provided for about a year. Most of the past studies have assessed the impact of the psychiatry training in terms of the knowledge gained [21–23] and few more have conducted specific disorder oriented training and measured the outcome in terms of the short-term improvement in those patients [24, 25] but there are no studies to our

Table 3 Comparison of number of patients seen in each quartile

	n	Percentiles			Mean rank	Chi square	P
		25th	50th (median)	75th			
q1	11	128.0	226.0	636.0	2.00	6.818	0.08
q2	11	174.0	319.0000	768.0	2.09		
q3	11	289.0	489.0	771.0	2.64		
q4	11	324.0	542.0	869.0	3.27		

knowledge which have assessed the impact in terms of covering a broad range of psychiatric disorders and that too, over a fairly long period of training time.

Another notable finding of the study was that better overall engagement with the training program (both in terms of higher attendance and more case-presentations by the trainee PCDs) did not translate into better numbers of patients that were cared for. In fact, in some of the average performing districts, the identified cases post training has significantly reduced. This counterintuitive finding could be due to a variety of factors. First and the foremost, we do not have the number of patients mapped to individual PCDs negating the possibility of ascribing any finding to individual PCDs. This is an important limitation of the study apart from this being a retrospective report. Having data matched to individual PCD would have given us the opportunity to analyse individual PCD related factors influencing these patient related outcomes. However, this was primarily a training initiative planned upon the request of the State Government. Even though we insisted individual PCDs to send details of the patients identified by them, we could get only the district wise data and not otherwise. Notwithstanding the above aspect, several factors could have contributed to the negative finding. Apart from knowledge and skills, factors such as attitudes, acceptability and appropriateness of the training and mentoring program (as perceived by the PCDs), intrinsic motivation of PCDs to change, clinical and administrative workload of individual PCDs, local leadership responsible for integrating mental health into primary health care, financial resources etc. might have played roles [26]. However, this negative finding may not take away the general positive impact the sustained training program has had on the overall outcome. This issue also emphasizes the urgent need for in-depth research in the area of primary mental health care and capacity building. For example, what is the ideal training and mentoring model that is not only easy (on both trainees and trainers), but also sustainable (both in terms of finances and longevity), scalable and impactful? Robust prospective randomized effectiveness trials can give answers to these complex questions.

Another observation was that the identification of almost all disorders improved after training except for IDD and autism. This could be because they were identifying IDD even before the training and identification of autism would have been difficult even after training. Quite interestingly however, identification of child and adolescent psychiatry cases got doubled post training. The above point indicates that training PCDs to identify specific mental health issues of children might be possible and feasible. This is another encouraging starting point considering that roughly about 40% of Indian population comprises of children and adolescents. The same logic can be extended to other psychiatric specialties too, including perinatal psychiatry, addiction psychiatry and geriatric psychiatry. Specific modules can be designed and implemented to suit the ground reality of primary care practice.

Finally, we used a software that was easy to access (even through a smart phone without consuming much data and power) and affordable too. This aspect is crucial in sustaining any training initiative in peripheral healthcare setups. PCDs for this training program came from district hospitals where understandably, internet availability and digital literacy will not be an issue. We cannot be sure of this in peripheries. Using digital technology seamlessly appear to be still some time away [27]. Another important limitation is that the data were all self-reports sent by PCDs and thereby carrying along with them, all the associated biases.

To conclude, hybrid model of training PCDs can be effective in identification of persons with psychiatric disorders in the community. Prospective, well designed studies are essential to establish this in a more decisive way.

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Declarations

Ethical approval Not applicable.

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Conflict of interest All authors declare that they have no conflict of interest.

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