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Scaling up the task-sharing of an evidence-based psychological treatment for depression in rural India: an implementation study

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Abstract

Background Majority evidence on task-sharing of psychological treatments for depression is focused on randomized controlled trials with project staff-delivered treatment. Ours is a scaling up of a brief evidence-based psychological treatment, Healthy Activity Program (HAP) by non-specialist providers (NSPs) -Accredited Social Health Activists (ASHAs) in rural India. Objectives included testing the acceptability, feasibility and effectiveness of ASHA-delivered HAP, and to examine implementation outcomes using the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) framework.

Methods ASHA were recruited in three rural districts in Madhya Pradesh, India. During the study duration, 1001 ASHA completed training using the EMPOWER approach (digital curricula and supervision protocols); 458 ASHA went on to deliver the HAP to adults with depression screened opportunistically using the Patient Health Questionnaire-8 (PHQ-8). This paper describes the delivery of the HAP over a one-year period (24–07-2022 till 30–06-2023). The primary outcomes were treatment completion, patient and ASHA satisfaction, and change in depression symptom scores on treatment completion; whether treatment effects were sustained at long-term (i.e., 9 month) among a consecutively recruited follow-up sample (10% of the total participants (n = 246)); additionally, we applied the RE-AIM framework to analyse the implementation process and outcomes.

Results 94.3%(1001/1061) of the non-specialist providers (NSPs) completed the full training. 12.1% of the patients (2208/18195) 2208 patients were screened positive for depression and all 100%(2208) agreed to receive the treatment. A total of 13,008 sessions were delivered with a 97.82%(2160/2208) completion rate. We found substantial reduction in depressive symptom severity from baseline to immediate post-treatment [Cohen's d = 2.52; 95% CI: 2.44, 2.61], which was sustained at 9-month follow-up [Cohen's d = .96, 95% CI: 0.81, 1.11]. Patients with severe symptoms tended to remain symptomatic and stayed in treatment longer. Both ASHA and patients reported high levels of

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satisfaction. Reach, adoption and implementation fidelity were high, as mapped through RE-AIM, which also revealed multilevel facilitators and barriers to scale-up.

Conclusions The scaling up of a brief evidence-based psychological treatment by existing frontline workers through digital platforms for training and supervision is associated with high levels of satisfaction, treatment completion and remission rates. The application of the RE-AIM helped in systematically documenting implementation learnings to inform future scale-up.

Keywords Task-sharing, Depression, Non-specialist providers, Mental health, Digitized training

Background

Task-sharing of the delivery of psychosocial interventions by front-line non-specialist providers (NSPs) has emerged as an evidence-based approach to address the vast unmet needs for mental health care, in particular in low-resource settings. Scores of randomized controlled trials from around the world, including high-income countries, have demonstrated the effectiveness of task-sharing of psychosocial interventions for the prevention and care of a range of mental health conditions [1–3]. These interventions typically incorporate a single or a few “active ingredients” and can be delivered in a few sessions in community or primary care settings, [4] or remotely, by using digital technology [5].

One such intervention is the Healthy Activity Program (HAP), a behavioural activation-based psychological treatment for depression. The HAP is delivered over 6–8 sessions and leads to high rates of remission (63–64%) and recovery over 12 months (Adjusted Mean Difference -4.45 to -7.57) compared to the patients receiving enhanced usual care [6, 7]. The effectiveness of the HAP has been replicated in Nepal [8] and the intervention has been adapted for perinatal depression in North America [9]. Despite behavioural activation being recommended as a first line treatment for depression, [10] the vast majority of persons living with this condition do not have access largely due to shortage of skilled providers and demand side barriers related to stigma attached to seeking mental health care. The scaling up of interventions like the HAP is a priority for global mental health to improve population-wide access after treatments have been found effective in and across similar settings.

In order to make this psychological treatment available at scale, tens of thousands of frontline providers will have to be trained and supervised. Therefore, the conventional face-to-face, expert-led, training and supervision models which dominate the methodology of randomized controlled trials, presents a formidable barrier to scaling up treatment training and delivery. EMPOWER (www.empowerindia.care) is a Harvard-Sangath initiative which deploys a range of digital tools, methods and procedures to rapidly build the capacity of a frontline workforce to deliver evidence-based psychosocial interventions. The program involves selection of

evidence-based interventions, development of competency-based digital learning content followed by digitally delivered supervision, assessment of competencies and continuing quality assurance. [11].

In this study, we describe the first effort to scale up the task-sharing of any psychological treatment in India, and possibly one of a handful of similar efforts from any low-resource country, which has deployed the EMPOWER approach train frontline workers of India's National Health Mission (the Accredited Social Health Worker (ASHA) to deliver the HAP to their communities in three rural districts of Madhya Pradesh. The objectives of this study are to evaluate the acceptability and feasibility of the EMPOWER approach to scale up HAP through delivery by ASHA and the effectiveness of the HAP in promoting remission (at the end of treatment) and recovery (sustained remission 9 months after treatment completion). In addition, we applied the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) framework—to systematically examine implementation processes and outcomes, with the aim of generating insights to inform future scale-up efforts. We also sought to identify patient, provider, and treatment-related predictors of depression at each timepoint.

Methods

Partners and setting

This study was embedded in a large-scale implementation project to address unmet needs for care for depression in rural communities in three districts of Madhya Pradesh, a central India state with a population of about 72 million. The state is one of the least resourced states in India. The scarcity of trained mental health professionals and their concentration in mental health institutions located in urban areas contribute to a treatment gap of 91% for all mental health problems. [12] In the study districts, mental health services are primarily delivered through Outpatient Department (OPD) consultations provided by district psychiatrists appointed under the District Mental Health Program (DMHP). Besides holding weekly outpatient clinics at the district hospital, the district psychiatrist also visits each Community Health Centre (CHC) once a month. These CHCs, which cater to around 80,000 to 120,000 people, also act as referral hubs

for up to four nearby Primary Health Centres (PHCs). There is no mental health service available at the primary health centre (PHC) or at the village level. More recently, a district mental health cell, 'Mann Kaksh' [13], has been established. Patients referred to the district hospital and seen at this cell receive free medication and, when required, counselling from a psychologist.

In the post-pandemic context, policy makers have recently recognised the need to supplement mental health care delivery through initiatives such as TeleMANAS (Tele Mental Health Assistance and Networking Across States), which provides free-of-cost mental health services, including psychological counselling and psychiatric consultations, via phone and video calls. It is a significant step to reduce the treatment gap, particularly in underserved rural and remote areas.

This EMPOWER project, implemented by Sangath, a non-governmental organization (NGO) with a long history of mental health implementation science and which had developed the original HAP intervention, was conducted in collaboration with the National Health Mission (NHM) and the Directorate of Health Services of the Government of Madhya Pradesh. Spanning a 2-year period (2021–2023), the project involved engaging with the primary health system in these rural districts, obtaining necessary permissions, establishing referral linkages with 'Mann Kaksh' and DMHP, training the ASHAs, screening and delivery of the HAP, independent outcome assessments for a subset of the baseline sample of patients, and public engagement events. This project aims to demonstrate that high-quality mental health services can be embedded within existing health systems using current human resources, requiring minimal investment, and delivered in a non-stigmatizing and acceptable manner to ensure sustainability. We report the evaluation, guided by the RE-AIM framework, of this real-world implementation of the HAP intervention by ASHAs."

Stakeholder/Gatekeeper engagement

Concurrently to the training of ASHAs, we designed a digital course on 'Leadership in community mental health' with the aim of building capacity of health system stakeholders. This course contained lectures from knowledge leaders on community mental health as well as 'case stories' about other community mental health projects across the country. This course was intended to secure buy-in and support from the health system for our on-ground activities.

We also recruited volunteers from the community and trained them to conduct screening for depression in the community. These volunteers included village elders, panchayat (village governing council) members, teachers, social workers, and college students. They also

participated in and contributed to our public engagement activities to encourage a demand for depression care in the community. We worked with Community Health Officers (CHOs) at Health and Wellness Centres (HWCs), which are a new cadre of non-physician health workers introduced under the Ayushman Bharat initiative [14]. The CHOs play a critical role in delivering an expanded range of essential services and serve as the first point of contact for a population of approximately 5,000 individuals in Madhya Pradesh. We trained this cadre in the World Health Organisation's (WHO) Mental Health Gap Action Program (mhGAP) intervention guide, which is a set of evidence-based guidelines and tools for non-specialist health workers to assess and manage mental, neurological, and substance use disorders. [15] A total of 213 CHOs were trained across Vidisha, Raisen, and Narmadapuram. This enabled the ASHAs to refer severe or non-responsive patients for specialist support through the CHOs by utilising the telemedicine infrastructure established under the *Ayushman Bharat* scheme. In collaboration with the District health system, we established referral and support pathways (see Fig. 1). Block Medical Officers (BMOs) supported ASHA training, refreshers, and supervision, motivating ASHAs and participating in training programs. Senior bureaucrats provided guidance, troubleshooting, and progress review, offering insights on navigating challenges like state elections and ASHA strikes. Other grassroots workers, including Auxiliary Nurse Midwives who provide basic healthcare at the village level, and Anganwadi workers who are frontline health workers under the Integrated Child Development Scheme offering health, nutrition, and early education services to children under 6, helped raise mental health awareness during Village Health and Nutrition Days. Local village leaders and panchayat members supported public engagement activities and encouraged families to participate in ASHA-led counselling sessions.

Providers

ASHAs are India's most numerous (nearly 1 million) and widely distributed frontline workers. ASHAs, who are all women by design, are incentive based cadres whose original mandate was to promote maternal and child health in rural communities. With the improvements in these health indicators, thanks in large measure due to their deployment, their roles have expanded to addressing issues related to noncommunicable diseases and, most recently, to the door-to-door Corona Virus Disease 2019 (COVID-19) vaccination campaign. Each ASHA caters to about 500 households, is embedded in the community, reports to the BMO and works in close collaboration with the CHO in which her community is located and enjoys trust of and access to people's homes whom she regularly visits. ASHA routinely visit their assigned

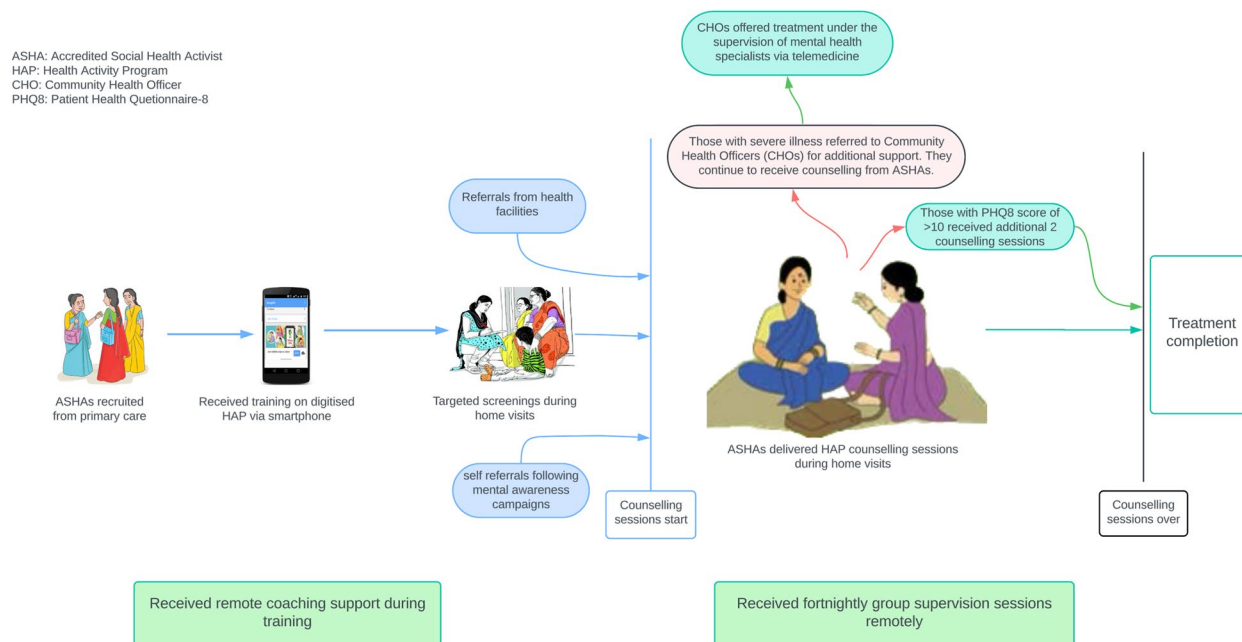


Fig. 1 Psychosocial treatment of depression in the community: Referral and support pathways

households to provide a range of health services, actively engage with the communities and are well versed with the health needs of the households where they serve as a ‘last mile’ health worker. ASHAs are affectionately called ‘Didi’ which means elder sister by the community members.

We recruited ASHAs through purposive sampling (based on their availability, access to a smartphone and digital literacy). They were required to use their phones to complete a fully digitized course to learn the HAP. This digitised course had previously been tested [16] in a nearby district; two trials observed that the effects of digitised training with coaching support on provider competencies was non-inferior to the gold standard of expert-led in-person training. [16, 17] We conducted a 4-h orientation session in local health facilities in which the project team guided the ASHAs to download the Learning Management System (LMS) and navigate its features. Subsequently, ASHAs were required to follow the digital curriculum to learn the HAP. The project team monitored their progress and offered remote coaching for troubleshooting and address queries. As the learner progressed through each module, she undertook an end-of-module assessment. On completion of all the modules, a ‘course completion certificate’ was triggered by the LMS. Following the digital training, ASHAs were required to complete an internship phase involving delivering treatment under supervision by HAP trained counsellors of Sangath team to a minimum of two patients.

We provided the ASHAs with a casebook, which contained prompts on session content to be delivered during

each visit as part of the structured HAP counselling package. As they delivered counselling sessions, they received fortnightly group supervision sessions and refresher trainings in which they participated in role plays to further reinforce their counselling skills. The supervision sessions were conducted remotely via zoom calls, with each supervision session bringing together 6–8 ASHAs. Supervision sessions were facilitated by trained HAP supervisors who had either a postgraduate qualification in psychology or in social work. During every supervision session, one of the ASHAs presented a session of one of her patients and all group members then discussed the case and gave feedback. As some of the ASHAs gained experience and skills, they were invited to lead the supervision sessions in line with the evidence-based peer supervision strategy for scale-up and sustainability. [18, 19] ASHAs received incentives for undertaking training, conducting counselling sessions and attending supervision sessions as per the local health system rates.

Patient recruitment

We administered the Hindi version of Patient Health Questionnaire-8 (PHQ-8) [20] to identify patients; while the full version of the PHQ has nine items, the ninth item, referring to suicidal ideation, was removed systematically because local experience demonstrated that this item was rarely endorsed and led to discomfort for both the ASHA and the respondent. Even so, the PHQ-8 is a widely used measure for assessing symptoms of depression and has good sensitivity and specificity; [21] further, the 8-item version has been validated among Hindi-speaking

populations [22]. ASHAs received training on suicide risk management as part of the HAP digital training, reinforced during refresher sessions and supervision. According to Sangath's standard operating procedure (SOP), if an ASHA became aware of suicidal ideation, the patient would be assessed by a HAP supervisor or psychologist and referred to district mental health services.

ASHAs were encouraged to screen adults during their routine household visits. Individuals scoring 10 or above were considered to have clinically significant depressive symptoms and were offered the 6-session HAP. After completion of the treatment, the PHQ-8 was reassessed, and those still scoring 10 or above were provided with 2 additional counselling sessions. If high scores persisted after the 8th session, referral to a CHO was initiated, with treatment overseen by a mental health specialist (Fig. 1). The patient being referred to the CHO for consultation is accompanied by the ASHA, who can access mental health specialist through the health department's tele-medicine portal. She continues to provide counselling to them and either accompanied or facilitated the appointment at the district health facility if referred further.

Patient and public involvement

Patients played a crucial role in the planning and implementation of our project, significantly influencing the delivery of psychological treatment. Patients' feedback on issues related to.

(a) Stigmatization i.e. apprehension about receiving mental health-related services in public health facilities and (b) accessibility issues of the health facilities being located at considerable distances, posing challenges, particularly for women, prompted to adopt a visit-at-home strategy for treatment delivery. At times, patients suggested alternative locations such as nearby temples, schools, or panchayats, due to discomfort in discussing their confidential issues in presence of other family members.

Community members actively participated in dissemination events designed to raise mental health awareness. These events included street plays and a reel-making competition, both of which were well-received and effectively engaged the community in mental health discourse.

Data collection

We collected a range of data:

ASHA training and supervision session attendance

We generated back-end data from the LMS to estimate the number of days taken to complete the online training. Attendance logs for supervision were maintained by the project team for all the ASHAs who were delivering sessions.

Patient treatment engagement and outcome scores: We collected process data on screening numbers, patient recruitment, baseline and end-of-treatment PHQ-8 scores, counselling session counts, duration of treatment. Nine-month PHQ-8 scores were collected through independent assessors by deploying consecutive sampling to achieve a follow-up sample subsample size of 10% of the baseline sample original cohort from within the original cohort. Outcome data could not be collected for treatment dropouts ($n=48$, 2.17%).

Satisfaction questionnaires

We administered satisfaction questionnaires to a subsample of ASHAs and patients. The ASHA questionnaire comprising 6 items rated on a five-point Likert scale was administered to a subset of the providers ($n=256$). The patient questionnaire comprising 5 items was administered to a subset of the patients ($n=755$). The ASHA Satisfaction Questionnaire and Patient Satisfaction Questionnaire were developed specifically for this study and can be accessed as Supplementary Material 1 and Supplementary Material 2, respectively.

Analyses

All analyses were conducted on STATA version 17. We ran a descriptive analysis on the socio-demographic, i.e., ASHA (education, age, marital status) and patient (age) data. Descriptive analysis was also deployed to analyse the project implementation data of ASHA performance metrics (days taken to complete HAP course, number of patients seen) and therapy metrics (Baseline PHQ-8, Post treatment PHQ-8, Independent PHQ-8, treatment duration).

Responses to ASHA and patient satisfaction questionnaires were analysed descriptively. A two-level mixed-effect regression model was employed to examine the relationship between various factors—including baseline PHQ-8 score, patient age, gender, treatment duration, ASHA age, ASHA education, supervision sessions attended by the ASHA—and the end-of-treatment PHQ-8 score. This model addressed the clustering of data by ASHAs, capturing both correlated effects and variations between different providers. The Wald chi-square test detected a significant effect ($\chi^2=30.43$, $p<0.001$), highlighting the importance of addressing variability at the group level. Our model, which achieved a log likelihood of -3811.788 , demonstrated superior fit compared to alternative approaches.

Results

ASHA (Table 1) and Patient characteristics (Table 2)

We received permission from the health system to train 1061 ASHAs. Of these, 1001 ASHAs completed the EMPOWER training. The average duration to complete

Table 1 Provider (Accredited Social Health Activist or ASHA) (N = 458) characteristics

ASHA highest education level	N	%
Less than 10th grade	47	10.26%
School completion	225	49.13%
College education	186	40.61%
ASHA marital status	N	%
Married	456	99.56%
Unmarried	1	0.22%
Others (includes divorced/separated/widowed etc.)	1	0.22%
ASHA performance metrics	M	SD
Days to complete HAP course (n = 445)	43.91	34.62
Number of patients seen	4.72	2.48
Supervision sessions attended (n = 452)	3.33	2.19

Note. N = Sample; M = Mean; SD = Standard Deviation

Table 2 Patient sociodemographic characteristics

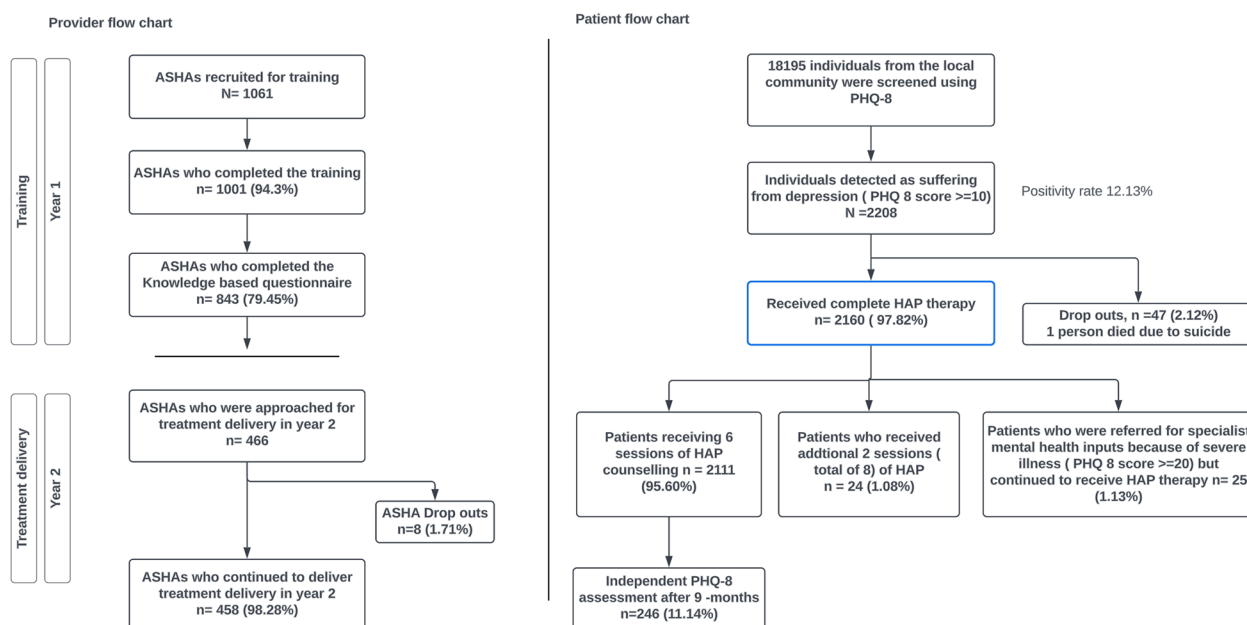
Patient demographics	Baseline sample (N = 2160)		Follow-up sample (n = 246)	
	N	%	n	%
Male	620	28.7	74	30.18
Female	1540	71.3	172	69.91
Patient demographics	M	SD		
Age of the patient (years)	38.92	12.07	37.65	10.73
Treatment duration (weeks)	8.43	0.71	8.24	0.32
ASHA-completed baseline PHQ-8 score	13.17	2.23	13	2.10
ASHA-completed post-treatment PHQ-8 score	6.17	1.72	6.08	1.62
Independent 9-month follow up PHQ-8 score	–	–	3.90	1.97

Note. N = Baseline sample; n = Follow-up sample; M = Mean; SD = Standard Deviation

the training was 43.8 days (95% CI: 40.66, 47.04). Due to health system and budgetary constraints and ASHAs' existing workload, only 458 of the trained ASHAs engaged with the delivery of the HAP in their catchment areas. During the study period, these 458 ASHAs conducted community screenings of depression with 18,195 individuals among whom 2208 (12.1%) screened positive and were offered HAP therapy. (Fig. 2) The socio-demographic characteristics of providers and patients is described in Table 1 and Table 2 respectively. All ASHAs were women with a mean age of 35.88 years (95% CI: 35.33, 36.43). The majority of patients were female (71.3%; n = 1540) with mean age of 38.92 years (95% CI: 38.42, 39.43).

Implementation

In the sample of those who scored > 9 on the PHQ-8, 75% (1624/2160) had moderate depression (PHQ-8 score 10–14) and the remainder (n = 536) had moderately severe depression (PHQ-8 score 15–19); 25 persons with severe depression were referred to a mental health specialist while also continuing to receive HAP from the ASHAs. There was one death due to suicide – this patient was detected as having severe depression; however, this patient died by suicide before any formal therapeutic help could be organized. 42 patients were referred by the volunteers and 6 by the health facilities; the remainder were screened by the ASHA. Of the 2208 patients who started therapy, 48 patients dropped out; 2160 (baseline sample) received 6 counselling sessions, with 24 (1.11%) needing an additional 2 sessions of counselling as per the HAP protocol. A total of 13,008 counselling sessions were

**Fig. 2** Provider and patient flow changes

delivered and the average duration needed to complete the treatment was about two months (mean 59 days). Nearly all of the sessions were conducted in patients' homes; less frequently used sites were the local panchayats, schools and places of worship. 452 ASHAs engaged with group supervision conducted on a fortnightly basis.

Acceptability of the ASHA delivered HAP (Fig. 3)

Overall, the ASHAs reported high scores of satisfaction level (>4) for all individual items implying high levels of acceptability with the HAP training and delivering HAP counselling. Similarly, patients reported a high satisfaction score (>4) for all individual items implying higher level of acceptability of receiving HAP therapy.

Effectiveness of the HAP delivery

The mean PHQ-8 score reduced from 13.17 to 6.17, representing a reduction of about 50% from the baseline [$t(2159) = 117.28, p < 0.001$] to the end-of-treatment. This translates to a large effect size [Cohen's $d = 2.52$; CI: 2.44, 2.61]. These findings were replicated for the independent follow-up at 9 months after treatment ($n = 246$) at which time we observed a sustained reduction in depressive symptom severity [$t(248) = 15.21, p < 0.001$] which also translates to a large effect size [Cohen's $d = 0.96$, 95% CI: 0.81 to 1.11].

We conducted two level mixed-effects regression analyses (Table 3) to examine the relationship between patient and provider characteristics and depression outcomes, adjusting for clustering at the ASHA level. Our dependent variable was the end-of-treatment PHQ-8 score, and the independent variables consisted of both provider (ASHA) and client level factors. ASHA level factors that we examined as a part of our model were ASHA age, ASHA education status and the supervision sessions attended by the ASHAs while delivering HAP therapy. Client level factors that we examined were Baseline PHQ-8 score, treatment duration in weeks, patient gender and patient age. ASHA age, ASHA education status, patient gender and patient were taken as categorical

variables in our model and others were continuous. Supervision records were unavailable for 6 ASHAs, and hence we excluded the data of all patients ($n = 18$) treated by these providers from the regression analysis. Thus, the final number of patients included in the model was $n = 2142$.

In Model 1, the dependent variable was the PHQ-8 score assessed at the end of the intervention. We found that a higher baseline PHQ-8 score was significantly associated with a higher end-of-treatment PHQ-8 score ($\beta = 0.037, p = 0.013$; 95% CI: 0.008, 0.067), suggesting that patients who started with more severe symptoms tended to remain more symptomatic, even after receiving treatment. Longer treatment duration was also significantly associated with higher end-of-treatment scores ($\beta = 0.194, p < 0.001$; 95% CI: 0.100, 0.288), likely reflecting that patients with more persistent symptoms stayed in treatment longer. Patients aged 60 years and above had significantly higher end-of-treatment PHQ-8 scores compared to the reference age group (18–29 years) ($\beta = 0.303, p = 0.014$; 95% CI: 0.062, 0.543), indicating older persons may benefit less from the intervention. We did not find any significant associations for patient gender, other age groups, or any ASHA-level variables (age or education). Although the number of supervision sessions was not significantly associated, it is worth noting that the coefficient was negative, indicating that increase in supervision tended to cause decrease in PHQ-8 scores. In Model 2, using the independent PHQ-8 score, we found that higher baseline PHQ-8 scores ($\beta = 0.137, p = 0.018$; 95% CI: 0.023, 0.250) remained significantly associated with the outcome score (at 9-month follow-up). Additionally, having an ASHA aged 40–49 years ($\beta = 1.282, p = 0.024$; 95% CI: 0.169, 2.396) was significantly associated with the outcome score. Other variables, including participant gender, age groups, Supervision sessions attended by the ASHA and ASHA education level, were not significantly associated with independent PHQ-8 outcomes. Many of these non-significant estimates had wide confidence

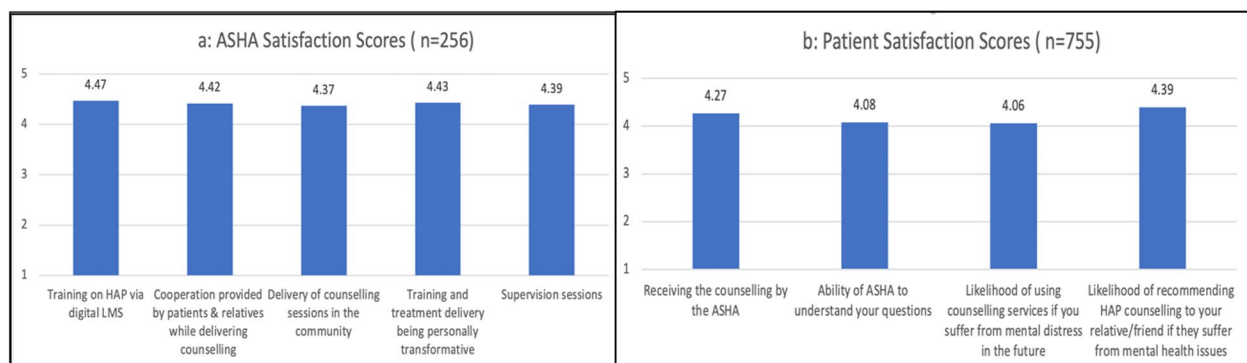


Fig. 3 Provider (ASHA) and Patient Satisfaction scores

Table 3 Predictors of depression severity at the end of treatment (Results of two-level mixed-effect regression model)

Main sample (n = 2142)					Sub-sample (n = 246)				
Variable (end-of-treatment PHQ-8 score) n = 2142	Coefficient	Standard Error (S.E.)	95% CI	P-value	Variable (Independent PHQ-8 score) N = 246	Coefficient	S.E	95% CI	P-value
Intercept	4.258	0.524	(3.231, 5.285)	0.000	Intercept	−0.718	3.690	(−7.951, 6.514)	0.846
Baseline PHQ-8 score	0.037	0.015	(0.008, 0.067)	0.013	Baseline PHQ-8 score	0.137	0.058	(0.023, 0.250)	0.018
					End-of-treatment PHQ-8 score	0.088	0.083	(−0.076, 0.251)	0.294
Treatment duration (weeks)	0.194	0.048	(0.100, 0.288)	0.000	Treatment duration (weeks)	0.144	0.451	(−0.740, 1.028)	0.749
Supervision sessions attended by ASHAs	−0.029	0.029	(−0.088, 0.029)	0.324	Supervision sessions attended by ASHA	−0.093	0.067	(−0.224, 0.037)	0.162
Patient gender (Ref = Male)	−0.011	0.065	(−0.138, 0.115)	0.861	Patient gender (Ref = Male)	0.468	0.242	(−0.006, 0.943)	0.053
Patient age (Ref = 18–29)					Patient age (Ref = 18–29)				
30–39	0.044	0.077	(−0.107, 0.195)	0.567	30–39	0.130	0.283	(−0.425, 0.684)	0.647
40–49	0.099	0.083	(−0.063, 0.263)	0.229	40–49	−0.002	0.305	(−0.600, 0.597)	0.995
50–59	0.043	0.101	(−0.155, 0.242)	0.668	50–59	0.344	0.422	(−0.484, 1.172)	0.415
Above 60	0.303	0.123	(0.062, 0.543)	0.014	Above 60	0.193	0.550	(−0.886, 1.271)	0.726
Asha age (Ref = 18–29)					ASHA age (Ref = 18–29)				
30–39	−0.034	0.199	(−0.425, 0.355)	0.862	30–39	0.511	0.518	(−0.503, 1.526)	0.323
40–49	−0.035	0.223	(−0.472, 0.402)	0.874	40–49	1.282	0.568	(0.169, 2.396)	0.024
50–59	0.165	0.506	(−0.828, 1.158)	0.745	50–59	1.782	1.404	(−0.969, 4.534)	0.204
Above 60	0.693	0.944	(−1.157, 2.543)	0.463	Above 60	−0.319	1.925	(−4.093, 3.454)	0.868
Asha Education (Ref = Below matriculation)					ASHA Education (Ref = Below matriculation)				
Matriculation	0.044	0.265	(−0.475, 0.562)	0.868	Matriculation	1.026	0.543	(−0.038, 2.090)	0.059
Higher Secondary	−0.355	0.240	(−0.826, 0.115)	0.139	Higher Secondary	0.338	0.489	(−0.621, 1.297)	0.490
Graduate	−0.147	0.248	(−0.633, 0.339)	0.554	Graduate	0.274	0.515	(−0.734, 1.283)	0.594
Above graduate	−0.096	0.268	(−0.621, 0.428)	0.718	Above graduate	0.426	0.603	(−0.756, 1.608)	0.480
Main sample (n = 2142)					Sub-sample (n = 246)				
Group variable	Estimate	Standard error	95% CI		Group variable	Estimate	Standard error	95% CI	
Intercept (ASHA)	1.5134	0.1261	(1.2853, 1.7819)		Intercept (ASHA)	1.482	0.361	(0.918, 2.390)	
Residual	1.3787	0.0475	(1.2887, 1.4750)		Residual	1.882	0.239	(1.467, 2.414)	

The coefficient represents the estimated effect of a predictor variable on the outcome, holding all other variables in the model constant

**Random effects

Table 4 Application of RE-AIM Implementation Framework

Domain	How it was applied in this study	Key findings/Metrics
Reach	● % of screened individuals identified with depression and offered HAP ● Identified community stigma, cultural perceptions, accessibility barriers affecting uptake of the services by the beneficiaries	○ 12.1% (2208/18195) screened positive and offered treatment ○ Majority of the sessions delivered at patient's home ○ Alternative venues used (panchayat, schools) ○ We trained CHOs (easily accessible trained medical professionals) to serve as referral support ○ Health services played an active role in supporting the study by assisting with planning and troubleshooting during critical disruptions, including the state elections and the ASHA strike
Effectiveness	● Evaluated reduction in PHQ-8 scores, satisfaction ● Assessed satisfaction of ASHAs and patients	○ PHQ-8 reduced from 13.17 to 6.17 ($d=2.52$) ○ Sustained at 9 months ($d=0.96$) ○ High satisfaction reported by both ASHAs and patients
Adoption	● Adaptability of HAP into ASHA routine, simplicity of digital training platform ● % of trained ASHAs who delivered therapy ● ASHA's motivation, digital literacy ● Supervision structures, integration into workflows ● How the project aligned with existing public health events	○ High rate of completion of digital training (94.3% completion) ○ 458/1001 trained ASHAs (45.7%) delivered HAP ○ Mean age 35.9 years ○ 40.6% (186/458) ASHAs had college education ○ All could operate a smartphone ○ Health system provided access to the ASHAs ○ Health system allowed the project team to align the mental health awareness campaigns with existing health events e.g. the Village Health and Nutrition Days (VHNDs)
Implementation	● Reviewed session completion ● Protocol adherence ● Supervision participation	○ 13,008 sessions delivered ○ 97.82% (2160/2208) therapy completion rate ○ 98.68% (452/458) ASHAs attended supervision ○ 25 patients referred
Maintenance	● Continuation of HAP delivery post-project in some areas ● Mapped engagement activities, supervision, stakeholder buy-in	○ Interest by health system in adding ASHA delivered counseling to their work schedule in 1 district on a pilot basis ○ Interest by policy makers to train CHOs in HAP ○ Stakeholder training (CHOs). We trained 214 CHOs who worked with and provided referral support to the ASHAs delivering HAP ○ Community engagement events in each districts ○ Policy makers attended dissemination events ○ Ongoing policy advocacy

intervals, suggesting substantial uncertainty in their effects.

Application of implementation frameworks

In addition to the primary outcomes, we applied the RE-AIM implementation science framework to examine the implementation processes and outcomes of the project. (Table 4) We estimated reach by calculating the proportion of screened individuals who were offered, and accepted treatment. Effectiveness was captured by symptom reduction and satisfaction metrics. Adoption was represented by the proportion of trained ASHAs who actually delivered therapy. Implementation fidelity was explored through supervision attendance and adherence to SOPs. The maintenance aspect was proactively addressed through regular engagement and policy advocacy with health system stakeholders to promote institutional ownership. These efforts focused on integrating the delivery of HAP into the ASHA's official work schedule and incentivized tasks, as well as exploring the involvement of CHOs in its delivery and supervision.

Discussion

This paper describes the experience of the scaling up an evidence-based psychological treatment by existing community health workers in rural populations in India. The scaling up was catalysed by using a digital platform that is accessible via smartphones, to enable large-scale training of ASHAs. This approach was remote coach-supported, allowed ASHAs to complete the training in a self-paced manner, and attend supervision sessions remotely. We observed high feasibility and acceptability as evidenced by a range of provider and patient metrics including high levels of completion of the digital training; high levels of patient engagement and completion of the ASHA delivered multi-session treatment; and high levels of provider and patient satisfaction with the program. Overall, we observed large improvements in depression severity at the end of treatment. We found that lower baseline depression severity and longer treatment duration predicted lower depression scores at treatment completion. Moreover, we found a sustained effect on patient depressive scores nine months later. Patient age and gender and the ASHA age and education levels were not associated with the intervention effectiveness indicating the

applicability of the delivery to a diverse patient group and by a wide range of community-based providers.

This study builds upon the large, randomized controlled trial, evidence base on the effectiveness of frontline worker delivered mental health care [3, 4, 23] by providing real-world evidence on the scaling up of such interventions through deploying existing government health providers and a digital platform for training and supervision. There are many barriers to addressing the unmet needs for care for depression in India [24]. These include both supply side barriers (notably the lack of skilled providers) but also, importantly, demand-side barriers such as lack of awareness, stigma attached to mental health care, delay in identification and cost of seeking treatment [25–27]. Our program addressed both these sets of barriers and capitalized on the fact that the ASHAs shared the same lived experiences as the individuals receiving treatment and enjoyed deep historic relationships with their community members. Their existing health promotion roles allowed for seamless integration of the session delivery schedule into their routine community errands, effectively relieving patients from the burden of travel or needing to take time off work. The strategy of administered treatment through home visits significantly contributed to the achievement of high completion rates.

The effectiveness of the HAP offsets concerns that the original trial findings testifying to its efficacy in controlled trial settings [7] might not generalize in a real-world scale-up. We attribute the implementation success of this project to the high treatment completion rates fostered by the existing rapport, trust, and interpersonal skills between ASHAs and their communities. Moreover, our findings underscore the enduring effectiveness of the intervention, as patients continued to exhibit relief from depression nine months after the conclusion of therapy, demonstrating the sustained utilization of activation skills acquired during treatment [28]. Notably, the active engagement of key stakeholders in the overall program design and implementation also played a role in ensuring support for the ASHA to play these new roles and to enable referral pathways for the small number of patients who needed more specialized care.

Our study had two significant constraints. Firstly, the inability to independently assess sustained outcomes for all participants due to limited resources, as the project was not initially intended as a research study. Although our follow-up sample ($n=246$) was similar to the baseline sample with respect to the variables, this similarity does not guarantee representativeness, as other unmeasured differences may exist. Yet, the similarity across key variables does provide reassurance that there was no major systematic bias in terms of the measured characteristics. Second, we did not use the full nine item version of the

PHQ due to community level feedback about the low acceptability of this item. That said, the PHQ-8 has very high concordance with the Patient Health Questionnaire 9 (PHQ-9) in screening for depression [21] and we do not expect that the omission of this one item will materially impact our findings [29].

Applying the RE-AIM framework helped us gain valuable insights into the complex factors that shaped implementation outcomes in this real-world scale-up. It helped broaden our interpretation of success by including not just clinical outcomes but also reach, adoption, and sustainability. This exercise also illuminated gaps—for instance, although reach and effectiveness were high, maintenance beyond the project period is dependent on the policy environment. The delivery of the low-intensity psychological intervention by ASHAs was found to be both feasible and acceptable, owing to the high acceptability and trust towards the ASHA, their embeddedness in communities and their ability to deliver sessions during routine home visits without significantly increasing their workload. However, since ASHAs are compensated based on service-linked incentives, expecting them to continue delivering counselling sessions in the absence of dedicated funding is not sustainable. Accordingly, we initiated policy engagement to advocate for the inclusion of psychological counselling in the government's incentive package for ASHAs. Encouragingly, health authorities have expressed interest in institutionalizing this component, and one of the study districts is being considered as a pilot site for integrating ASHA-delivered counselling into the national incentive structure. Additionally, there is interest among policy makers in involving CHOs in delivering the intervention, potentially strengthening supervisory and delivery capacity. While long-term follow-up data are not yet available, these early signals of policy engagement and system-level responsiveness suggest a promising trajectory for sustained delivery of the intervention beyond the project period.

This study demonstrates that it is feasible to use the EMPOWER approach of deploying digital platforms to train and supervise frontline workers at scale to deliver psychosocial interventions and that mental health care by these frontline workers was highly acceptable to themselves and their communities and associated with large clinical benefits. We hope that our findings can inform the strategic planning of the health system to make quality mental health care available and accessible in rural communities. The ASHA being a relatively well-established cadre was a natural choice for delivering the intervention; however, future efforts may also expand this provider base to include other frontline workers in the health system, notably the recently minted CHOs who, unlike the ASHA, are full-time employees of the health system. Although our study demonstrates that

community treatment of depression via existing front-line workers can be delivered effectively at scale, we note that the project paid the equivalent incentive fee to the ASHA and that sustained scale-up will need adequate budgetary allocation to compensate them to deliver counselling sessions, and support supervision and referral systems.

Abbreviations

ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activist
AWW	Anganwadi Worker
BMO	Block Medical Officer
CI	Confidence Interval
CHO	Community Health Officer
CMHO	Chief Medical and Health Officer
COVID-19	Corona Virus Disease 2019
DMHP	District Mental Health Program
HAP	Healthy Activity Program
HWC	Health and Wellness Centre
ICMR	Indian Council of Medical Research
IRB	Institutional Review Board
LMS	Learning Management System
NGO	Non-Governmental Organization
NHM	National Health Mission
NSP	Non-Specialist Provider
OPD	Out-Patient Department
PHC	Primary Health Centre
PHQ	Patient Health Questionnaire
RE-AIM	Reach, Effectiveness, Adoption, Implementation, Maintenance
S.E.	Standard Error
SOP	Standard Operating Procedure
VHND	Village Health and Nutrition Days
WHO	World Health Organization

Supplementary Information

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Supplementary Material 1.

Supplementary Material 2.

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Authors' contributions

Ravindra Narayan Agrawal led the project implementation and was responsible for conceptualizing and drafting the manuscript. Prashant Sharma, Vandana Shukla and Balkrishan Tripathi were responsible for data collection and implementation of the project activities at district sites. Tanushri Sharma, Jigyasa Kaur, Harshita Yadav and Smita Kumari were responsible for ASHA training and supervision, data cleaning, and project implementation. Mohit Sood was responsible for designing the data collection forms, project implementation, data cleaning and conducting data analysis. Anushka

Patel was responsible for conducting data analysis and providing critical inputs to the manuscript. Namdeo Dongare was responsible for running the regression analysis and providing critical inputs for data analysis. Vikram Patel mentored the team, provided critical inputs for data analysis and reviewed the manuscript. Anant Bhan was co-lead of the project and reviewed the manuscript. Nityasri Sankha reviewed the manuscript. Sharad Tiwari and Shailesh Sakalle were responsible for supervision of the project processes, guidance to mitigating the implementation challenges and helped embed the program within the health system. All authors have critically reviewed this manuscript and provided consent for publication.

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Data availability

Data is provided within the manuscript can be provided (in an anonymised form) by writing to the corresponding author.

Declarations

Ethics approval and consent to participate

The research study was approved by the Sangath Institutional Review Board (IRB) [protocol number: RA_2023_90]. The Sangath IRB adheres to the National Ethical Guidelines for Biomedical and Health Research Involving Human Participants (2017) by the Indian Council of Medical Research (ICMR). These guidelines align with the Declaration of Helsinki and include additional considerations to emphasise the cultural sensitivity and diversity in India, Community engagement in research, and Compliance with Indian legal and regulatory frameworks, such as the Drugs and Cosmetics Act and clinical trial regulations. The Sangath IRB is registered with the Department of Health Research, Government of India (Registration No. EC/NEW/INST/2022/3063) since December 2022. All procedures were performed in accordance with the relevant guidelines and regulations of the IRB. Study participants provided informed consent, signed by him/herself or by a proxy, before participating in the study. Since this study was not a clinical trial, clinical trial registration was not applicable.

Consent for publication

As this research study does not include any identifiable participant details, informed consent for publication was not required. All data has been anonymized and analysed in a manner that participant privacy has been protected, ensuring no individual can be recognized within our study findings.

Competing interests

The authors declare no competing interests.

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