

Original Research Article

Enhancing diabetes and hypertension management in rural India through a peer support program: evaluating a community-based intervention using RE-AIM framework

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ABSTRACT

Background: The health care system in India lacks an approach targeting individual risk behavior change and self-care practices. Thus, it is imperative to complement the healthcare system's efforts with alternative care management strategies at the grassroots. This paper aims to evaluate the utility of a community-based peer support program facilitated by trained volunteers to better manage diabetes and hypertension in rural areas of Karnataka state, India.

Methods: A semi-structured peer support group approach called Swasthya Samithi (SS) and capacity-building activities empower patients with diabetes and/or hypertension, caregivers, and community health workers for better chronic care management through the ACE-ME program. Glasgow's RE-AIM framework assessed reach, feasibility, and effectiveness. A structured questionnaire based on WHO's STEPS tool, standardized scales, and qualitative checklists (Mixed-method approach) were used to collect data on program processes, output/outcome variables like lifestyle behavior, self-care practices, and clinical values.

Results: The program reached 98% of the intended participants along with the non-patient community members. A total of 56 SS meetings were facilitated. Improved lifestyle behavior with reduction in use of tobacco, alcohol, consumption of processed food and significant improvement in self-care practices affirmed that the program was effective. Metabolic control of disease improved from 27% to 42% and 54% to 76% amongst the participants with diabetes and hypertension, respectively.

Conclusion: The active engagement of participants and the capacity building of local health workers were key to the program's significant success, and the implementation experiences of the ACE-ME model provide pragmatic insights for its expansion in similar contexts.

Keywords: Community health services, Community participation, Lifestyle risk reduction, Peer group, Primary health care, Self-care

INTRODUCTION

Elevated blood pressure and blood sugar levels are two of the leading causes of the increase in disability adjusted

life years (DALY) rates.¹ Both these conditions remain a major public health threat for India because of the huge population and rapid population aging, lack of sufficient infrastructure and skilled health workers; and increased

urbanization with unfavorable climate, built-in environment, living conditions, and lifestyle, particularly in cities and slums.^{2,3} The COVID-19 pandemic has further aggravated the situation for vulnerable populations including the elderly, children and those already suffering from NCDs. In urban or peri-urban regions, lack of appropriate infrastructure for active living, poor living conditions, and lifestyle habits contribute to the NCD epidemic.⁴ Additionally, most primary and secondary facilities in India, both in the public and private sectors, are not adequately prepared to manage NCDs.⁵

Secondary and tertiary care facilities can be offloaded by strengthening the quality of care at the primary care level, especially in resource-poor settings.⁶ For instance, a patient with type 2 diabetes must keep blood sugar levels within normal range through appropriate medications, regular monitoring of blood sugar, diet management, and regular exercise to prevent long-term complications. However, compliance rates with oral anti-diabetic medication are around 56% in developed countries and even lower in developing countries.^{7,8} Poor adherence to medications is linked with poor glycemic control that increases both mortality and co-morbidity besides increasing the cost of care and compromising the quality of life.⁹

In resource-poor settings, it is imperative to provide alternative methods for treatment compliance so that the total burden of complications from chronic illnesses is substantially minimized. We hypothesize that both the community and the frontline health workers (FLWs) can be empowered to complement the healthcare system by transferring the responsibility of ensuring treatment compliance, especially for patients with NCDs, from healthcare facility-led models to community-led models.

About the program

A peer support group-based program called, the ACE-ME (accessing care through empathy, motivation and edutainment) model was designed to empower patients for self-management, as well as caregivers and community health workers for better chronic care management of diabetes and hypertension, thereby, complementing the efforts of primary health care providers.

It included establishing a semi-structured peer support group network called Swasthya Samithi (SS) for a continuum of care within the community and capacity building of the patients, caregivers, community volunteers, and local health care providers. The SS assists members in reinforcing self-management abilities through periodic health promotion sessions via community-led entertaining activities; managing complications and risk reduction monitoring of blood sugar and blood pressure and strengthening the referral linkages between the community and health care centers for timely utilization

of health care services. The program is aimed to assess the changes in selected metabolic parameters of patients with diabetes mellitus (DM) and/or hypertension (HTN). The secondary objectives are, to assess the changes in 1) lifestyle behavior and self-care practices among patients and 2) the level of awareness regarding NCDs and risk factors among patients.

This paper evaluates the ACE-ME program's strategies and processes in improving the management of diabetes and hypertension with a special focus on the program's reach, feasibility, and effectiveness along with participants' perceived support, satisfaction, and willingness to continue the program activities.

METHODS

Study design

This quasi-experimental single-arm intervention study was carried out between October 2022 to February 2024 in the rural areas of five districts of Karnataka, a state in southern India. One primary health center (PHC) and village/s under it were chosen in consultation with the District/Taluka Health Officers from each of the five districts, namely Tumakuru (Baluvaranahalli, Tiptur taluk and Chinakavajra, Madhugiri taluk), Chikballapur (Kandanahalli and Mylapura, Chintamani taluk), Bengaluru rural (Koirahalli, Devanahalli taluk), Ramanagara (Koonagere, Channarayana taluk) and Kolar (Doddavallabhi, Kolar taluk).

The participants were those diagnosed with diabetes and/or hypertension, aged between 18 and 80 years, and staying in the village for more than six months before enrollment in the program. Patients with cognitive difficulties, terminal illness, a history of severe cardiac illness and currently undergoing dialysis were excluded. On enrollment, participants were assessed for their lifestyle behaviors, self-care practices, NCD-related knowledge, and clinical parameters. A follow-up assessment was made after eight months.

We used an online available web-based tool named the Shiny CRT calculator to determine the sample size.¹⁰ A total of 435 individuals were estimated to enroll in the program in four phases over two years (108 individuals in each phase) to detect a 5% minimum difference in the participant's metabolic control of diabetes and/or hypertension compared to that in baseline with an intra-cluster correlation of 0.05, cluster autocorrelation as 0.8 and 20% loss to follow-up at 80% power and 95% significance level.

Program operations

The program activities included screening of individuals, enrolment, and formation of Swasthya Samithi in the selected villages. For screening, individuals were visited based on the list of people previously known to have

diabetes and/or hypertension, received from the Frontline health workers.

Further, the Indian diabetes risk score (IDRS), was used to identify individuals at risk. Those individuals at risk were checked for a history of screening for diabetes and hypertension in the past 6 months.¹¹ If such medical records were available, they were noted in the program's MIS. However, irrespective of such medical records, on-spot testing of random blood sugar and blood pressure was conducted for at-risk individuals in the community. Once screened, eligible individuals were enrolled in the program and Swasthya samithis was formed by the local volunteers designated as health resource officer (HRO) and trained by the program team. The training of HROs included a comprehensive understanding of the technical details of the program, intervention, clinical skills, research methodology, and data management along with community mobilization and communication skills. All the HROs were compensated monthly for facilitating the SS meetings and travel by the program team.

The primary intervention included facilitating monthly peer group (SS) meetings where community members who enrolled in the program got together to discuss their health issues, lifestyle habits, and self-care practices. HROs facilitated the discussion and provided information on better chronic care management. They also measured the capillary blood glucose and blood pressure of all participants, gave appropriate advice, referred those with extreme values to a healthcare facility, and regularly followed up with them. The SS members were not provided any monetary allowances; however, a budget was set aside for each SS meeting for the refreshments that included healthy snacks, and a beverage prepared locally by volunteers. An additional intervention included capacity building of healthcare providers in association with the local health teams and administrators in relevant programmatic and technical domains.

Figure 1 presents the program activities till the follow-up assessment at eight months since inception. A training and operational manual, with a step-by-step process plan, was developed to standardize the flow of activities and ensure quality.

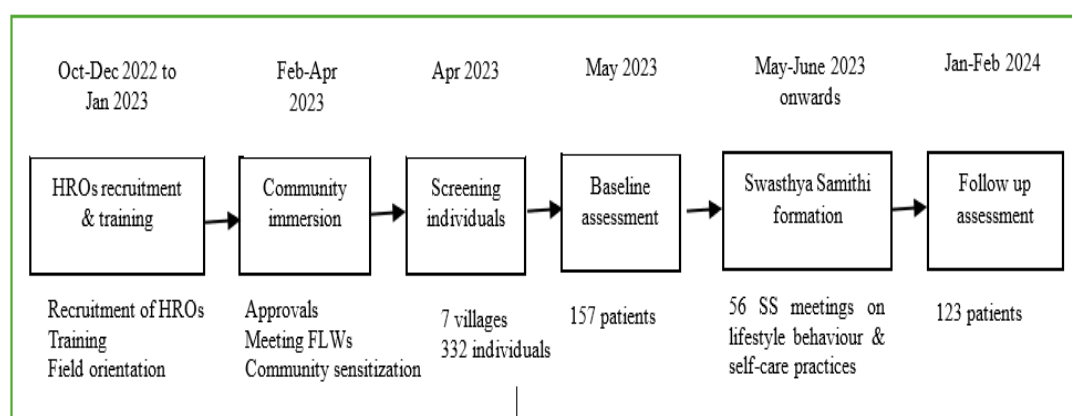


Figure 1: Program activities.

Program evaluation

A team of independent researchers evaluated the program using Glasgow's RE-AIM framework which includes five dimensions i.e., Reach (R), Effectiveness (E), Adoption (A), Implementation (I), Maintenance (M). Reach was measured by the number of individuals screened and enrolled in the program.¹² The effectiveness of the program was assessed by observing the changes in lifestyle behavior & self-care practices, self-efficacy, medication adherence, NCD-related knowledge levels, and clinical measurements. Program acceptance and satisfaction of participants were observed under effectiveness. Adoption of the program was observed via the perception of the stakeholders who were willing to sustain or replicate the program activities in their areas. Under the implementation dimension, processes carried out to deliver the initiative as intended as well as their feasibility were observed. Since the program is in its

preliminary stage, information on the maintenance dimension of the RE-AIM framework is not included in this study.

Output/outcome variables

The lifestyle behaviors considered in the program were - physical activity, dietary practices, tobacco use, and alcohol consumption. The self-care practices were assessed using the "Self-efficacy for managing chronic disease 6-item scale" and "Morisky medication adherence 8-item scale".^{13,14} The clinical measurements included systolic and diastolic blood pressure levels and fasting and post-prandial blood sugar levels. The definitions and categories used for output/outcome measures are described in Table 1.

The information on the program processes and effectiveness were captured via 1) a real-time electronic

management information system (MIS), 2) In-depth qualitative interviews with study participants (n=21), HROs (n=6), frontline health workers (n=6), and Taluka Health Officers (THOs) (n=4) using a newly developed interview guide, and 3) a baseline and follow-up quantitative survey with program participants.

The qualitative data collection methodology followed the COREQ (consolidated criteria for reporting qualitative research) checklist, and standards for reporting qualitative research (SRQR). The quantitative data for the output/outcome measures were collected from patients using a structured questionnaire based on the WHO's STEPS tool, and standardized scales as mentioned above. Blood sugar (fasting, postprandial, and random) and blood pressure (systolic and diastolic) levels of program participants were formally checked during screening, baseline, and during follow-up by pricking the patient's finger using a standard digital glucometer and digital Sphygmomanometer, respectively, after proper informed consent. Both survey rounds were administered using the computer-assisted personal interview (CAPI) technique.

Statistical analysis

Statistical analysis was performed using the statistical package software SPSS version 22.0.¹⁵ Changes in lifestyle, self-care practices, and clinical values are analyzed by comparing baseline and follow-up values. The continuous variables were analyzed using the Paired t-test/ Wilcoxon signed rank test based on the normality of data and categorical variables were analyzed using McNemar's test. A two-tailed p value <0.05 was considered statistically significant. The qualitative data was analyzed using ATLAS.ti software. The process of coding involved an inductive approach, and the themes based on the RE-AIM framework were identified and triangulated with the quantitative results.

RESULTS

Reach

Across the seven villages (of 5 districts) identified for the program implementation, 332 individuals were screened by the HROs, of which, 269 were eligible for the program. Based on the sample size estimation, 160 eligible individuals (about 23 per village) were approached using a simple random sampling technique and 157 agreed to join the program. Amongst the enrolled participants, 45% had diabetes, 36% had hypertension and 19% had both. The mean age of the participants was 56±10.5 years, 57% were females, 61% had at least primary-level education and 38% were agricultural workers (Table 2).

Effectiveness

Of 157 enrolled participants, 123 (78%) came for the follow-up assessment. The participant's lifestyle

behaviors and self-care practices improved from baseline to follow-up. Participants reported improved medication adherence, food, and lifestyle habits after their interactions at SS meetings. They also highlighted an improvement in their perceived health conditions and intent to discontinue habits like intake of tobacco/alcohol or processed food items. Assessment of knowledge related to symptoms, risk factors, and complications of diabetes and hypertension also showed significant improvement. Metabolic control of disease improved significantly from 18% to 42% at follow-up amongst the participants with diabetes and 45% to 75% amongst the participants with hypertension (Table 3) (Figure 2).

Program acceptance and satisfaction

Participation of study participants in the SS meetings ranged from 53% to 75% across the seven SS groups. Qualitative interviews suggest that participants had a favorable perception of SS meetings and reported that SS meetings had taught them about health, yoga, eating locally grown vegetables, limiting caffeine consumption, and helping them in managing their health conditions better particularly, blood pressure and/or blood sugar levels. "This program is good for us. They (HROs) do BP and Sugar tests every month and after knowing that it was controlled, we felt happy. They explain what to eat, how much vegetables and fruits to eat, and they ask us to do walking."

A 65-year-old female patient from Koira village family members of 48% of participants also attended the SS meetings and demonstrated improved understanding and support towards the patients' diagnosed conditions.

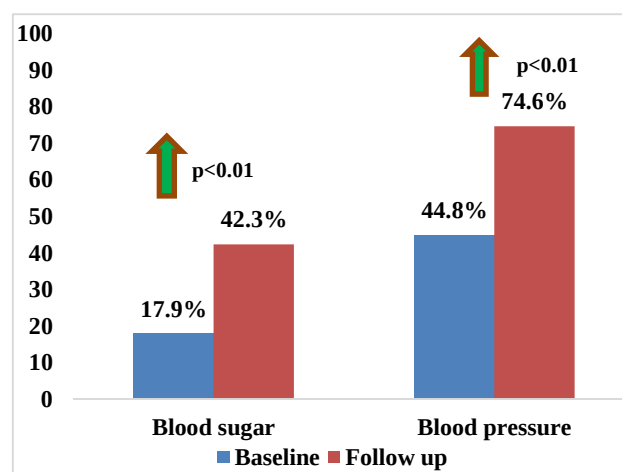


Figure 2: Participants with metabolic control of diabetes and hypertension.

Adoption

All four interviewed taluka health officers (THOs) mentioned that the program had met their expectations and showed interest in expanding the program to other geographies.

“My expectation is to replicate the same program in all of the sub-center villages initially and later to the other parts of the Taluka. I heard that people in Chinkavajra village are benefiting from this (ACE-ME) program.” - Taluk Health Officer.

All FLWs also found the program helpful for the community as well as for themselves in terms of improved capacity in managing NCD care. They showed interest in facilitating the SS meetings with support from the program team. *“We request you (program team) to continue this program as it is; and we look forward to participating in this program in the future. SS meetings can be continued if the program team discontinues but we need you (the program team) to come and support as you are doing it now” - ASHA worker.*

Similarly, all the HROs highlighted that working as a resource person in the community built their confidence, improved their knowledge of NCDs, and motivated them to deliver the program activities effectively. *“I didn't have much experience earlier, but now I can say that if the community has any questions or doubts, I am able to answer their questions. I am happy about it. After attending the program training and conducting SS meetings, I have learned more about diabetes and hypertension”- HRO.*

“I learned a lot from this program. Before this, I don't have any knowledge on checking BP and sugar but now I am able to do everything, and I am managing everything. This is a good experience and great learning for me. I have also gained knowledge on medicines, and I am able to explain about the medicines to the community” -HRO. Most of the program participants also wished to continue participating in the future and were willing to pay a nominal fee for blood sugar/blood pressure testing in the SS meetings.

Implementation

Swasthya Samithi formation and facilitation

In each village, eight SS meetings were facilitated by HROs (a total of 56 SS meetings across the seven villages till the follow-up assessment) usually at a public place like the Panchayat (local self-government) meeting hall, school premises, or a participant's front yard. There were daily stand-up meetings of the field and administrative teams, regular troubleshooting, and monthly technical

training on the themes of SS meetings and skill development for the HROs. The meetings provided awareness on various issues (Table 4) for health promotion and behavioral modification. In SS meetings, an attempt was made to develop a recreational and affective environment so that participants exchange not only their health issues but also their personal and emotional experiences. For program sustainability, 13 peer leaders (named Swasthya Bandhus (SBs)), who exhibited leadership qualities and adhered to the program protocols were selected from seven Swasthya Samithis and trained by HROs to manage the Swasthya Samithi meetings.

Training of local health officers

As part of capacity-building activities, primary/community health officers, FLWs, medical officers, pharmacists, and senior nurses of both primary and secondary public sectors were trained on acute emergency response, chronic disease management, common primary care medications, etc. (Table 5).

Referrals to healthcare centers

From May 2022 to January 2023, 620 individuals received treatment in higher care centers as a result of referrals made by HROs, from the intervention areas and nearby places, as reported by the program MIS.

Implementation barriers

Most of the HROs recalled challenges related to community immersion for the program as they were new to the community. However, these challenges were overcome through support from the Government health officials and local health workers. Barriers related to organizing SS meetings, managing uncertainties and risks such as attrition, and gathering participants at a common time and place, were well managed through support from local health workers.

“I (HRO) first discussed with ASHA workers about our program and Swasthya Samithi meetings. They (ASHA workers) came with us to every house, explained the program to community members, and invited them to the Swasthya Samithi meeting. Some participants drop when there is some emergency, but we keep encouraging them to come to every meeting and follow everything that we say or explain.” - HRO.

Table 1: The definitions and categories used for output/outcome variables.

Measure	Category	Definition
Physical activity	Recommended physical activity	Weekly engagement in ≥ 150 minutes of moderate-intensity physical activity OR ≥ 75 minutes of vigorous-intensity physical activity OR an equivalent combination of moderate-and-vigorous intensity physical activity accumulating ≥ 600 MET minutes per week ²² .

Continued.

Measure	Category	Definition
Tobacco use (smoke and smokeless)	Current tobacco use	Consumption of tobacco products in the last one week of assessment
	Daily tobacco use	Consumption of tobacco products daily
Alcohol consumption	Current alcohol consumption	Consumption of alcohol in the last one week of assessment
Dietary practices	Consumption of recommended servings of fruits or vegetables per day	Consumption of ≥ 5 servings of fruits or vegetables per day ²³
	Often/always consume processed food high in salt	Food items that have been altered from their natural state, such as packaged salty snacks, canned salty food including pickles and preserves, salty fast-food cheese, papad etc ²⁴
Health seeking behaviour	Testing of blood pressure	Testing of blood pressure at least once in one month
	Testing of blood glucose	Testing of blood sugar at least once in one month
Self-efficacy	High self-efficacy	A score ≥ 45 indicates high self-efficacy from a total score ranging from 0–60 ^{25,26}
Medication adherence	Low medication adherence	A score below 6 indicates low adherence from a score ranging from 0–8 ^{27,28}
Knowledge and awareness	Diabetes risk factors	Know at least two risk factors for diabetes
	Diabetes symptoms	Know at least two symptoms of diabetes
	Hypertension risk factors	Know at least two risk factors for hypertension
	Hypertension symptoms	Know at least two symptoms of hypertension
Blood pressure (BP)	Systolic BP	Mean and Standard deviation of systolic BP (mmHg)
	Diastolic BP	Mean and Standard deviation of diastolic BP (mmHg)
	Metabolic control BP	Systolic BP <140 and Diastolic BP <90 ²⁹
Blood sugar (BS)	Fasting BS	Mean and Standard deviation of fasting BS (mg/dl)
	Post Prandial (PP) BS	Mean and Standard deviation of PPBS (mg/dl)
	Metabolic control BS	Fasting ≤ 125 and PP ≤ 180 ²⁹

Table 2: Socio-demographic characteristics of the study participants at the time of recruitment (n=157).

Characteristics of the study participants	Categories	N	%
Sex	Male	68	43.5
	Female	89	56.6
Education	Not literate	61	38.8
	Primary	37	23.6
	Middle	20	12.7
	High	30	19.1
	Intermediate	6	3.8
	Graduate or higher	3	1.9
	Not employed/homemaker/retired	79	50.3
Employment	Agricultural worker	59	37.6
	Others (govt. Employees, self-employed, business)	19	12.1
	Bpl card	142	90.4
Type of ration card	Apl card	6	3.8
	No card	9	5.7
Have Ayushman Bharat card	Yes	73	46.5
	No	84	53.5
Diagnosed health condition	Diabetes	71	45.2
	Hypertension	57	36.3
	Both	29	18.5

Table 3: Comparison of Lifestyle, self-care practices, and clinical measurement of the participants, Baseline and follow-up (n=123).

Indicators	Total		
	Baseline	Midline	P value
Physical activity (%)			
Recommended physical activity (%)	69.9	76.4	0.229
Tobacco use (%)			
Ever consumed tobacco (%)	32.5 (n=40)		
Current tobacco use (smoke/smokeless) (%) (among those who ever consumed tobacco)	87.5 (n=35)	32.5 (n=13)	<0.001
Daily tobacco use (%) (amongst the current smokers)	91.4 (n=32)	61.5 (n=8)	1
Alcohol use (%)			
Ever consumed alcohol (%)	22.8 (n=28)		
Current alcohol use (%) (among those who ever consumed alcohol)	82.1 (n=23)	7.1 (n=2)	<0.001
Dietary practices (%)			
Consume recommended servings of fruits and vegetables per day (%)	4.9	4.9	
Often/always consume processed food high in salt (%)	16.3	3.3	<0.001
Health-seeking behaviour (%)			
Those who get blood sugar tested at least once in one month (%)	13.8	80.8	<0.001
Those who get blood pressure tested at least once in one month (%)	30.8	85.1	<0.001
High confidence levels in managing routine activities (%)	43.1	48.0	0.221
Low medication adherence (%)	33.3	17.1	<0.001
Knowledge & awareness (%)			
Know at least two risk factors of diabetes (%)	31.5	93.5	<0.001
Know at least two symptoms of diabetes (%)	32.5	78.9	<0.001
Know at least two risk factors of hypertension (%)	35.0	86.2	<0.001
Know at least two symptoms of hypertension (%)	30.9	74.8	<0.001
Blood pressure (amongst those having hypertension)	N=67		
Mean systolic blood pressure (mmhg)	122.84	128.9	0.003
Mean diastolic blood pressure (mmhg)	94.8	82.29	0.002
Metabolic control bp (%)	44.8	74.6	<0.001
Blood glucose (amongst those having diabetes)	N=78		
Mean fasting blood glucose (mg/dl)	171.44	137.21	<0.001
Mean pp blood glucose (mg/dl)	246.01	206.03	0.001
Metabolic control bs (%)	17.9	42.3	0.003

Table 4: Topics covered in Swasthya Samithi meetings.

Domains	Topics discussed
Nutrition	Introduction to various food groups and nutrition-related myths & facts
	Foods to limit/avoid in diabetes and hypertension (what not to eat)
	Healthy eating plate and portion sizes (how much to eat)
	Health twist in traditional recipes (culturally acceptable healthy tips)
Physical activity and mental health	Physical activity vs exercise
	Yoga in diabetes, hypertension & mental wellness
Tobacco & alcohol cessation	Quitting smoking and alcohol (ways to cope)
Medication adherence	Importance of medication adherence, exploration of factors for medication non-adherence and tips to address them
Complications of diabetes and hypertension	Common complications of type-2 diabetes mellitus and hypertension, strategies to prevent them, screening and management of such complications.

Table 5: Details of capacity-building activities conducted during program implementation.

Trainees	Number	Topics
Medical doctors from public and private sector, Tiptur district at Ramaiah multi-specialty hospital, Bengaluru	35	First responder training - Risk assessment of a collapsed victim, Cardiopulmonary Resuscitation, active bleeding control, extrication, and transportation of victims of trauma and cardiovascular emergencies.
Doctors & Nurses from Government Hospital, Tiptur district	42	Active bleeding control
Medical Officers, FLWs, and health staff from all PHCs of Tiptur district	Over 200	Community Empowerment and Health Systems Strengthening Workshop
FLWs of Devanahalli, Chintamani, Tiptur, Kolara talukas	68	Asynchronous online training on 'Basic understanding of common primary care medications'
FLWs including CHOs, PHCOs and Pharmacists from 12 PHCs of Madhugiri taluk	83	Basic understanding of common primary care medications
CHOs of Ramanagara district	65	Basic understanding of common primary care medications
Medical officers, staff nurses and FLWs from PHCs, taluka and district hospital of Ramanagara district and Tiptur taluk	80	Basic course in Preventive cardiology including common risk factors, clinical manifestations, complications and preventive strategies of cardiovascular conditions, fundamentals of cardiac rehabilitation.

DISCUSSION

In this paper, we provide a comprehensive description of the processes used in implementing a community-based peer support group program along with the pragmatic evidence of the feasibility and effectiveness of the program designed to prevent and manage complications of diabetes mellitus and hypertension in rural areas of Karnataka, a state in southern India. Peer support is a collective intervention at the community level, in which the information related to personal experiences of disease management are shared and may also include assisting others in managing the same.

It provides a sense of purpose amongst community dwellers and encourages first-hand discussion of management approaches for the disease.¹⁶ Studies have shown peer support programs are feasible and acceptable at the community level and provide some important benefits and outcomes, particularly for hard-to-reach patient groups.^{17,18} Owing to the proven potential of peer support programs, the ACE-ME model was designed to bring positive change in at-risk behaviors, and the community's cognitive enhancement.

The interim assessment of the ACE-ME program implementation showed encouraging results. The program reached the intended number of participants predefined to fulfill the research criteria. The program also included other (non-patients) community members and caregivers to attend the Swasthya Samithi (SS) meetings and benefitted from increased community buy-in and a sense of shared ownership to improve health. To elevate the impact, health programs increasingly are recognizing the importance of engaging community members along with the target population in their

operations.¹⁹ Community-based programs in the past identified health promotion activities, referrals, and capacity building of local health professionals as success strategies to mobilize the community and build community ownership of the program.²⁰ Our program utilized all these strategies while the active engagement and satisfaction of study participants and community members indicated the acceptability of the program. The program was also successful in connecting the community to seek medical care at the healthcare centers and supported them with systematic follow-up care. The capacity building of local volunteers, health workers, and FLWs explained the significant success of the program.

Diabetes and hypertension management often involves lifestyle changes, including diet modifications, regular exercise, and weight management.²¹ The present study shows that the designed peer support program helped participants to adopt and sustain lifestyle modifications, leading to a trend towards an improvement in overall health. There was an appreciable shift in the metabolic control of blood pressure, and blood glucose levels, before and after the intervention.

Our observations are similar to those of a study conducted in the slums of Kochi City, Kerala, India, that aimed to determine the effectiveness of community-based education and peer support programs run by women's self-help group (SHG) members in reducing blood pressure among patients with hypertension.²² Another study on peer-educator diabetes self-management education programs implemented among low-income Mexican Americans with type 2 diabetes showed that patients in the peer group outperformed those in the control group in terms of blood glycosylated hemoglobin

levels, knowledge about using insulin, and capacity to manage their diabetes.²³

Solomon et al, reported that peer support can enhance recovery, empowerment, social support, and hope among people with mental health conditions.²⁴ Similarly, a study by Chinman et al, found that peer support can reduce hospitalizations, increase engagement in treatment, and improve self-care and symptom management for people with mental illness.²⁵ Walker and Bryant et al, found that peer support can enhance the therapeutic alliance, shared decision-making, and satisfaction with care for people with mental illness.²⁶ Our study, though not a randomized control trial, aligns with the findings of other studies that document the positive effect of peer support on blood pressure, glycemic control, and cholesterol levels.^{27,28} The implementation challenges at an interpersonal, community, and systemic level were anticipated and were overcome with collaborative assistance from district health officials, local primary health center staff, FLWs, and community members. Some of the expected obstacles like the waning motivation of participants and frontline health workers, poor program fidelity, and hurdles from the health department were mitigated with the proactive engagement of the program team with all relevant stakeholders. This concerted effort resulted in the cultivation of purposeful community involvement, enhancing the overall success of the program.

CONCLUSION

This study's main strength was the participation of most of the eligible participants from the selected rural regions, which improved the generalizability of the results to this area. This process evaluation has a few limitations to note. Because of the early stage of the program, we could not measure its public health impact score, as proposed in the original RE-AIM evaluation framework. Further, the limitations of peer support interventions have been reported by other researchers earlier. Peer support interventions may vary in their components, delivery modes, intensity, duration, frequency, and outcomes, leading to heterogeneity and inconsistency in their effectiveness. Also, peer support interventions may encounter challenges such as low recruitment, retention, engagement, and satisfaction of peer supporters and recipients.

In our study, bias in the observed effectiveness of the program due to self-reported information and socially desirable responses by the study participants cannot be ruled out. Despite the limitations, the results of the study contribute to the growing body of research about the design, implementation, and evaluation of community-based interventions to promote health. The experiences of the implementation of the ACE-ME model reported in this study offer pragmatic information to expand and scale up the program for the better management of diabetes and hypertension in similar contexts.

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