

Original Research Article

Strengthening primary health care in rural western India-team based approach

Kallol Roy^{1*}, Neha Das², Swati A. Roy³

¹Department of Extension Programmes, Amrita Patel Centre for Public Health, ²Department of Community Medicine, Pramukhswami Medical College, Bhaikaka University, Karamsad, Gujarat, India

³Central Research Services, Bhaikaka University, Anand, Gujarat, India

Received: 16 February 2023

Accepted: 17 March 2023

*Correspondence:

Dr. Kallol Roy,

E-mail: kallolr@charutarhealth.org

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Non-communicable diseases (NCDs), such as cardiovascular diseases (CVDs), diabetes, have taken an epidemic form. With a huge population and existing sedentary lifestyle, in developing countries like India, there exists a struggle to deliver quality chronic care. A reorganization of systems in healthcare service delivery is crucial to improve primary healthcare. We have reported our model to address primary healthcare service delivery in rural settings. The SPARSH team-based care approach is designed with the objective of improving adherence to anti-hypertensive and anti-diabetic medications to improve blood pressure (BP) and blood sugar (BS) control among hypertension (HTN) and diabetes mellitus (DM) patients.

Methods: This is a descriptive study describing a model and array on interventions delivered through a team-based care approach from 2016 till 2020 by Shree Krishna Hospital, Karamsad across three districts in Gujarat. Data was collected on case record forms and later was analysed using Microsoft excel.

Results: From the financial year of 2016 till 2020 patients enrolled in SPARSH increased from 932 till 1920 for availing treatment and ongoing care. A total of 108 training sessions were conducted and facilitated by a senior member of SPARSH. Average monthly cost of treatment for hypertensive, diabetic and patients with both conditions was Rs. 38, 78 and 130 respectively.

Conclusions: Our model described here can be tested for effectiveness through a rigorous community trial focusing on objective outcome measures such as BP control and glycemic control.

Keywords: Team based care, NCDs, Primary health care, Rural healthcare, Western India, Model

INTRODUCTION

Non communicable diseases (NCDs), responsible for 6 million deaths every year in India contribute to 62% of all deaths and 50% of all DALYs lost in India.¹⁻² Considering the high socio-economic impact of the NCD burden, the United Nations has set a sustainable development goal (SDG 3.4, Indicator 3.4.1) of reducing one third premature mortality from NCDs through prevention and treatment and promoting mental health and well-being by 2030.³ The national health policy

(NHP) 2017 of the Government of India aims to reduce premature mortality from the four major NCDs by 25% by 2025.⁴ It has also set an ambitious goal of achieving disease control among 80% of hypertensive and diabetic patients by 2025.⁵ High systolic BP and high plasma glucose are responsible for 54.6% and 16.7% of DALYs lost due to CVDs.⁵ Hence effective prevention and control of BP and blood glucose can significantly reduce the burden of CVDs thereby contributing to reduced NCD mortality.

However, the ground situation has a grim picture considering the facts that only 10-20% of patients with HTN and 31% of patients with DM have their BP (BP<140/90 mmHg) and BS (HbA1c<7%) in control. Also the proportions of the population aware of their diagnosis of HTN and DM are 25-40% and 50% respectively.⁶⁻⁸ Health system in India is not yet geared to cater to the sheer numbers of both of these diseases. Hence in order to achieve good disease control rates and reduce the undiagnosed burden of the disease, a primary care intervention based on the chronic care model is required.⁹ The intervention shall require involvement of different cadres of health workers, working in coordination with each other through a team based approach for achieving the goals of BP and BS control among these patients. As per the World Health Organization (WHO) a team based care approach involves a strategic redistribution of work among members of a practice team. In this approach, while the team is led by a physician, different responsibilities are shared by non physician members such as nurses or medical assistants with the purpose of improving patient care.¹⁰ There is evidence that this has contributed to significantly reduced systolic and diastolic BPs (overall median reductions 5.4 mmHg and 1.8 mmHg, respectively), and improved patient adherence to hypertensive medications in a cost effective way.¹¹⁻¹² However there is scanty published literature on models of team based care from India especially in community settings.

Charutar Arogya Mandal (CAM) [currently the sponsoring body of Bhaikaka University], a private university based in Anand, Gujarat, a state located in western India has developed one such intervention known as SPARSH. SPARSH is an acronym for Shree Krishna Hospital Program for Advancement of Rural and Social Health and literally means “touch” in the vernacular language. SPARSH aims to address the NCD burden by reaching out to the rural community’s doorstep through a plethora of interventions such as risk factor prevention screening, early detection and management and provision of palliative care. The program currently operates in 150 villages across 3 districts of central Gujarat. The population covered is 4.3 lakhs approximately. The intervention involves multiple cadres of the health workforce such as village health workers (VHW), field supervisors (FS), paramedical assistants (PMA), assistant medical officer (AMO) led by a team of general and community physicians. SPARSH employs a team-based care approach involving these cadres for the purpose of screening, early detection and management of NCDs such as HTN and Diabetes. This paper describes the SPARSH team-based care approach in detail.

METHODS

This is a descriptive study describing a model and array on interventions delivered through a team-based care approach from 2016 till 2020 by Shree Krishna Hospital,

Karamsad across three districts in Gujarat. The SPARSH approach is designed with the objective of improving adherence to anti-hypertensive and anti-diabetic medications to improve BP and RBS control among HTN and DM patients visiting routinely the mobile health team (MHT) camps and later expressing interest of being enrolled in the program. There is no fixed sample size or any kind of target that is set in SPARSH. The patient who visits the camps are at their own will (implied Consent). In the healthcare delivery framework, there are village health workers and a MHT at the grassroot level, a secondary care or a primary care hospital (Extension Center) at the intermediate level and a tertiary care teaching hospital (SKH) at the highest level (Figure 1). Each of these levels of care is connected to each other for referral of patients and support in the form of supervision, monitoring and capacity building. The various cadres of staff undergo training every month as per the training calendar approved by the head of the department. The data from field was citing an example, when VHW are supposed to be trained on measuring BP. Senior team, AMO, paramedical staff and FS discuss the various aspects of BP monitoring and measurement with clinicians. They receive the first line of training to measure BP. They are updated with technical aspects of HTN and recent guidelines. The training module is then designed by Senior team members and then VHW are called for their monthly training. The training is conducted in various forms like lectures, demonstrations, role plays and discussions. The training imparted is later assessed in the form of practical examinations. The refresher training is then planned accordingly preferably after every six months.

Each three levels as depicted in the figure have been connected with a customized mobile based healthcare application named as SPARSH application and a case record forms. The application was conceptualized in 2016 primarily for the NCD care component and has been undergoing transient developments since then in a phased manner. The application has four user domains designed as per activity and a dashboard to have an overall view.

Ex-if a patient visits a camp, at the beginning basic information like name, sociodemographic profile can be entered on the registration domain, post which details are forwarded to AMO for history, consultation and further treatment. This plan is forwarded to MO, where they verify/revise the management plan. Based on the final approval of MO, the patient management plan is explained by AMO and medicines are dispensed accordingly. The primary counselling is done by AMO, later followed up by FS and VHW. The patient data (digital) is synced and stored on the server; the hard copy (case record form) is filed and stored in the office premises.

A VHW is a lady identified from the village itself and trained in treating common ailments, measuring BP and BS, conducting group awareness meetings, conducting

surveys, etc. For every 10 VHW there is one FS who supervises and monitors the VHWs by visiting each village, once in a fortnight. For every three such FSs there is a mobile health team (MHT) comprising an AMO and 2 paramedical assistants. Each MHT covers a cluster of 50 villages for organising screening and treatment camps at a frequency of once in two months. A MO, a general practitioner with a graduate medical qualification (MBBS) is responsible for supervising the work of the MHT teams. Roles of different team members are described in Table 1.

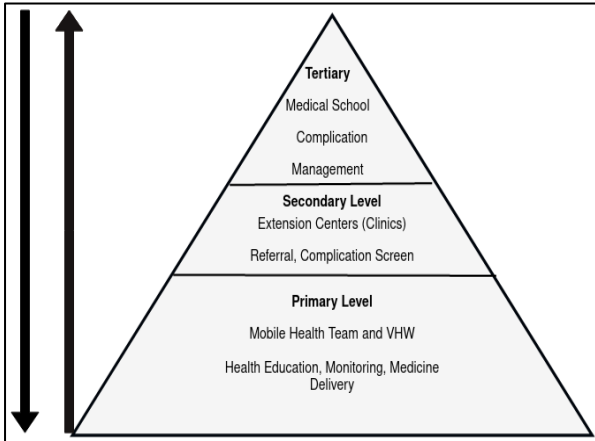


Figure 1: SPARSH health care delivery model.

Process flow

The process flow for screening, monitoring and referral of NCD patients is depicted in Figure 3. NCD screening camps are organised by the MHT every one to two months in a village. In the camp height, weight, BP measurement (Omron HEM-7121J-), assessment of medical and treatment history and addiction history are done by a paramedical assistant and random capillary blood glucose (CareSens N-GM505PAD) measurements by a trained VHW. If the patient’s BP is more than 140/90 a repeat measurement is done after 5 minutes and if it is still elevated a third measurement is done by the AMO using a manual sphygmomanometer. The patient is assessed by the AMO and managed further in consultation with the MO. The AMO identifies the medications for the patient as per the treatment protocol and the MO verifies the same remotely through the SPARSH app. Medicines are dispensed to the patient only after verification by the MO. After undergoing consultation by the AMO, the patient is counselled by the FS in the camp on lifestyle modification, further management plan or referral needs, advantages of enrolment and any other queries of the patient are addressed. If the patient has elevated BP or RCBG readings but immediate treatment is not warranted (E.g., BP-150/90) a follow up visit is done by the VHW at the patient’s home for a repeat measurement of BP or fasting and postprandial capillary blood glucose (FCBG and PP2CBG) to confirm the diagnosis and decide on the need for treatment. Those patients who agree to get

enrolled in the program are monitored at their homes on a monthly basis by the VHW. The VHW assesses BP, fasting and postprandial capillary blood glucose levels(quarterly), symptoms and medicine adherence using a checklist and documents the information in the app which transmits the data to the AMO. If the disease is controlled, the ongoing medicines for a month are sent in a packet to the patient’s home through the VHW. If the disease is not in control the patient is discussed with the MO and medications changed or the patient referred to a higher facility based on the clinical judgement of the MO. The entire process is documented on case record forms and also a customized App called as SPARSH app. The patient pays for the cost of the medicines while other services are offered free of cost. The program is currently funded by Sir Dorabji Tata Trusts and GMM Pfaunder. In the past it was funded by the Shamdasani foundation.¹³

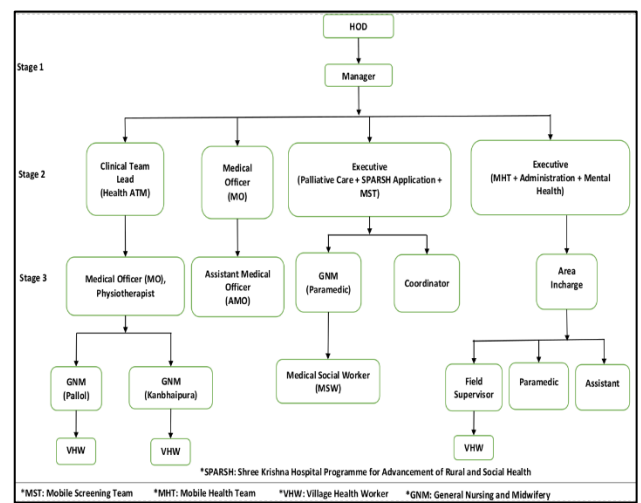


Figure 2: Organisational structure of SPARSH village health workers, field supervisors and mobile health team in SPARSH.

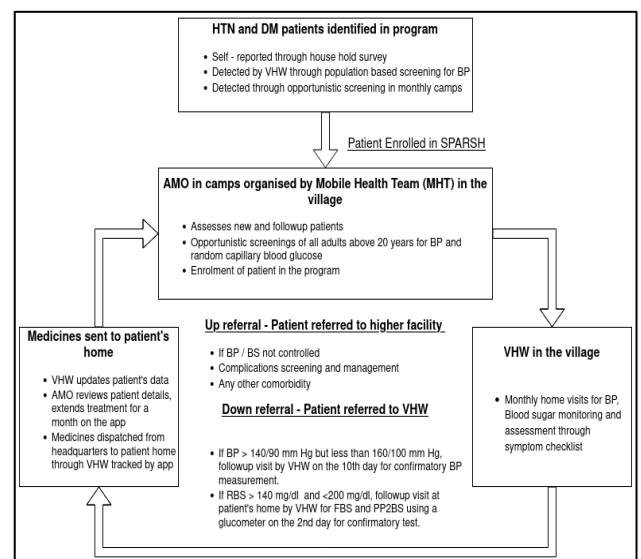


Figure 3: Flow of activities in SPARSH for NCD patient management.

Table 1: Roles of different team members of SPARSH.

Cadre	Qualification	Role	Trainings imparted
VHW	Ability to read and write with understanding	Measuring BP and BS, conducting group awareness meetings, conducting surveys, escorting referred patients to higher facility, confirmatory tests for BP and BS through follow up visits at patient homes after camps	BP and RBS measurement using digital instruments Basic concepts related to NCD prevention and care Conducting group meetings Conducting surveys Use of SPARSH app
AMO	BHMS/BAMS - (Bachelor of homeopathic medicine and surgery/bachelor of ayurvedic medicine and surgery)	Responsible for patient assessment and administrative tasks associated with the camp team. To counsel the patient about treatment and lifestyle changes Crosscheck medicine packets prepared at headquarters Conduct meetings with village key persons and home visits for bedridden patients	Protocol based approach to HTN and diabetic patients Use of SPARSH app
PMA	1 year health care assistant or paramedical assistant certificate course	Registration and vital measurements in camps Responsible for inventory management of and camp related items. Responsible for providing medicines to patients in camps and preparation of packets of enrolled patients	Measuring height, weight and vital parameters Identification of common hypertensive and diabetic medicines used in the protocols. Use of SPARSH app
FS	At least 12 years of schooling	Act as a bridge between all field activities and office activities. Counselling patients in camps Implementation of all field activities, supervision and monitoring and reporting of activities done in field in 10 villages	All trainings given to VHWs Counselling Data collection for management information system
MO	MBBS (Bachelor of Medicine and surgery)	Approval of all medicines advised to patients using the SPARSH app (Medicines cannot be dispensed in camps without the MO's approval on the app) training of AMOs Development and updation of treatment protocols for different conditions	All clinical protocol-based trainings

Institutional permission to publish this model is available. Because the paper does not reveal any patient information, ethical approval was not applied for.

RESULTS

SPARSH camps are aimed to cater the needy and marginalized populations in 150 villages across three districts of Gujarat. In the financial year 2016-2017, a total of 932 patients had enrolled in SPARSH, gradually

the number had increased to 1144 in 2017-2018, till April 2019 a total of 1513 patients had enrolled in our program. During the conception of SPARSH we had decided to have a monthly training for our staff where topics like BP measurement, blood glucose measurements, awareness sessions, conducting household surveys etc. were to be taught. Till date a total of 108 such training sessions were conducted where each session was facilitated by a senior member of the SPARSH team. During the initial phase of the program, we were not able to record any baseline

control rates, as it was just in preliminary stages, however in year 2 we had designed an evaluation component planned within our program such that we had follow ups in intervention and control villages after our intervention delivery. The baseline survey has been completed and analysis is ongoing.

In the program, we had recorded our control rates of HTN and diabetes in year 3, the control rates of HTN among our enrolled patients was 69% and for DM it was 37%. At the end of March 2020, 1920 NCDs patients were enrolled in SPARSH for availing treatment and ongoing care. Average monthly cost of treatment for hypertensive, diabetic and patients with both conditions was Rs 38, 78 and 130 respectively. Among the enrolled patients, 67% of HTN and 48% of diabetic patients had their disease in control (BP<140/90 and FBS<130 mg/dl and PP2BS<180 mg/dl).

Table 2: Socio demographic details of enrolled patients in the program from financial year 2016 till 2020.

Variables	2016-2017, n=932	2017-2018, n=1144	2018-2019, n=1513	2019-2020, n=1920
Age (Years)				
20-35	468	598	801	954
36-50	323	393	530	754
51-65	108	118	137	148
66-70	33	35	45	64
Gender				
Males	448	538	630	979
Females	484	606	883	941
Religion				
Hindu	606	721	908	1152
Muslim	140	172	257	326
Christian	186	251	348	442

DISCUSSION

Our paper briefly describes a model of team-based care (TBC) for NCDs in a rural setting in three districts of Gujarat state in Western India. The model comprises different cadres of personnel ranging from a community health worker (CHW) to a general practitioner (GP) and can be adopted to a primary health care setting. The need for addressing NCDs in India through its primary health care network has been perceived since long.¹⁴⁻¹⁶ The comprehensive primary health care (CPHC) component of the Ayushman Bharat initiative of the Government of India aims to achieve the same through the 1.5 lakh health and wellness centers (HWCs) across the country. However, there is a dearth of effective models in primary health care in India for addressing NCDs. In such a situation our model can generate valuable learnings to support implementation of an effective TBC approach to NCD management through the HWCs. Some of the strengths of our model include well defined service delivery framework with clear roles for different cadres,

clearly defined communication flow channels, support of a mobile android based application and extending services to the patient's doorstep.

While there is evidence showing effectiveness of a TBC approach for BP and glycemic control from different parts of the world, there are some differences in the way the approach is implemented at different places in terms of size and structure. The team includes both clinical (ex. medical officers, nurses, pharmacists and medical assistants) and non-clinical (ex. Social workers, CHW) members.¹⁵ The WHO HEARTS package report describes TBC models in different settings like Cuba, Thailand, Nepal and Ethiopia.¹⁶ Almost each of these models comprise 7-8 different cadres of health manpower with clearly defined roles as BP measurement, measurement of height and weight, counselling, refilling medications, telephonic reminders, etc. Doctor has a minimal role related to diagnosis and initial prescription for the clinical condition. The SPARSH model has 5 cadres of health workers (CHW, FS, PAS, AMO and MO). Each of cadres are connected with each other through SPARSH mobile application allowing real time transfer of electronic medical records. While other models have major reliance on facility-based care, SPARSH approach has major reliance on community based care.¹⁷

While implementing the SPARSH model, certain challenges are encountered as well. Firstly, maintaining an acceptable level of skills and motivation among the team to ensure higher quality in the services provided. The tasks and skills involved become monotonous over time as once mastered they do not need much cognitive involvement. Also, the team members may experience a lack of professional growth potential in this type of work as compared to working in a tertiary or a secondary care setting. Generally primary care work is perceived as inferior to secondary and tertiary care work by health workers. Considering the size of the program, viability of the program always remains a major concern. The program is an experiment which is being implemented with support from external funding. The experiment is continuously evolving with new learnings and avenues for application of the learnings for different health problems. In order to continue the experiment, a continuous source of external funding is required as there are not many avenues for generating income from the services provided from the program to meet the recurring costs. One other challenge encountered by us and supposedly by other TBC models is patient perception. Since team providing care does not have any specialists directly involved, some patients may view them as of inferior quality and may want to prefer to continue treatments with their private specialist providers in spite of higher costs and irrational practices in some cases.

CONCLUSION

Our model described here can be tested for effectiveness through a rigorous community trial focusing on objective

outcome measures such as BP control and glycemic control. If found effective the model can be replicated in other health care settings-private and public for making NCD care accessible to a larger population and for other conditions like palliative care, nutrition in maternal and child health.

Funding: No funding sources

Conflict of interest: This work was supported by Sir Dorabji Tata Trust [Grant ID: SDTT/MUM/HEA/CAM/2017-2018/0054] and GMM Pfaunder Ltd.

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- Dandona L, Dandona R, Kumar GA, Shukla DK, Paul VK, Balakrishnan K, et al. Nations within a nation: variations in epidemiological transition across the states of India, 1990-2016 in the Global Burden of Disease Study. *Lancet.* 2017;390:2437-60.
- Charlson FJ, Baxter AJ, Cheng HG, Shidhaye R, Whiteford HA. The burden of mental, neurological, and substance use disorders in China and India: a systematic analysis of community representative epidemiological studies. *The Lancet.* 2016;388:376-89.
- SDGs. Sustainable Development Knowledge Platform, 2020. Available at: <https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals>. Accessed on 10 January 2023.
- Cabinet approves National Health Policy, 2017. Available at: https://www.pmindia.gov.in/en/news_updates/cabinet-approves-national-health-policy-2017/. Accessed on 10 January 2023.
- The changing patterns of cardiovascular diseases and their risk factors in the states of India: the Global Burden of Disease Study 1990-2016. *Lancet Global Heal.* 2018;12:e1339-51.
- Anchala R, Kannuri NK, Pant H, Khan H, Franco OH, Di Angelantonio E, et al. Hypertension in India: a systematic review and meta-analysis of prevalence, awareness, and control of hypertension. *J Hypertens.* 2014;32:1170-7.
- Anjana RM, Pradeepa R, Deepa M, Datta M, Sudha V, Unnikrishnan R, et al. Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: phase I results of the Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study. *Diabetologia.* 2011;54:3022-7.
- Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness: the chronic care model, Part 2. *JAMA.* 2002;15:1909-14.
- Organization WHO. Technical package for cardiovascular disease management in primary health care: healthy-lifestyle counselling, 2018. Available at: <https://apps.who.int/iris/handle/10665/260422>. Accessed on 10 January, 2023.
- Jacob V, Chattopadhyay SK, Thota AB, Proia KK, Njie G, Hoplins DP, et al. Economics of Team based Care in Controlling Blood Pressure: A Community Guide Systematic Review. *Am J Prev Med.* 2015;49:772-83.
- Team-Based Care and Improved Blood Pressure Control, 2020. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4672378/>. Accessed on 10 January 2023.
- SPARSH Programme. Available at: <https://youtu.be/E7fhFQTqdmE>. Accessed on 10 January, 2023.
- Rao CR, Kamath VG, Shetty A, Kamath A. A study on the prevalence of type 2 diabetes in coastal Karnataka. *Int J Diabetes Dev Ctries.* 2010;30:80-85.
- Nguyen KH, Chien AT, Meyers DJ, Li Z, Singer SJ, Rosenthal MB. Team-Based Primary Care Practice Transformation Initiative and Changes in Patient Experience and Recommended Cancer Screening Rates. *Inq J Med Care Organ Provis Financ.* 2020;57:46958020952911.
- WHO | HEARTS Technical Package, 2021. Available at: https://www.who.int/cardiovascular_diseases/hearts/en/. Accessed on 10 January 2023.
- Roy K, Dutt B, Patel JM, Raithatha SJ. SPARSH electronic sub-health centers (e-SHCs)-A model of nurse-run SHCs supported by general practitioners through telemedicine. *J Family Med Prim Care* 2022;11:5556-62.

Cite this article as: Roy K, Das N, Roy SA. Strengthening primary health care in rural western India-team based approach. *Int J Res Med Sci* 2023;11:1303-8.