

# Contribution of community health care volunteers in facilitating mobilization for diabetes and hypertension screening among the general population residing in urban puducherry – An operational research study

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## ABSTRACT

**Introduction:** Non-communicable diseases (NCDs) have contributed to almost half of the global disease burden. Many countries have experimented with Community Health Volunteers (CHVs) to provide necessary care for NCDs. We aimed at evaluating the contribution of CHVs in mobilizing adults for the Diabetes and Hypertension screening in a selected Primary Health Centre (PHC) of Puducherry, India. **Methodology:** A community-based operational research study was conducted, where five volunteers from each of the 13 anganwadis functioning under the PHC were chosen as study participants. They were interviewed before enrolment for willingness. Four batches of sensitization and training sessions were conducted to provide the necessary training. CHVs were then given 3 months to mobilize the individuals for NCD screening. This model was evaluated using the Theoretical underpinning technique. **Results:** Of the total 85 CHVs suggested, around 65 (76.5%) showed willingness for rendering services. Approximately 32 (49.2%) discontinued during the initial weeks of the intervention due to various reasons. The remaining CHVs could reach 363/1470 (24.7%), eligible individuals, among them, 303 (83.5) were convinced to visit the health centre for screening. From the total members who were screened, approximately 52 (17%) and 31 (10%) were diagnosed to have diabetes and hypertension respectively and were initiated on treatment as per national guidelines. **Conclusion:** About half of the CHVs who volunteered, remained till the end and effectively contributed to a screening of NCDs. The involved volunteers aided in improvising the NCD coverage under the PHC.

**Keywords:** Community health volunteers, health promotion, non-communicable diseases, operational research, primary health care

## Introduction

Community participation is one of the major pillars of Primary Health Care.<sup>[1]</sup> Many countries have adopted the model

of involving the community through Community Health Volunteers (CHVs) for delivering health services.<sup>[2,3]</sup> Witmer *et al.* (1995) defined CHV as “community members who work almost exclusively in community settings and who serve as connectors between health care consumers and providers to promote health among groups that have traditionally lacked access to adequate care”.<sup>[4]</sup> There is ample evidence to forecast the contribution of CHVs in enhancing service delivery, thereby improving health outcomes.<sup>[5,6]</sup>

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Urban Health Mission in India has emphasized the involvement of the community in increasing the quality of health care provided. The Universal health coverage has also focused on areas like i) Providing equity access to health care ii) Improving better quality services iii) protecting people against financial risks.<sup>[7]</sup> Coverage of these essential services can be shouldered by suitably training Community Health Volunteers, who might help us in enhancing referral support and continuity of care, in rural and urban areas.

By the end of the 20<sup>th</sup> century, Non-communicable Diseases (NCDs) have contributed to almost 60% of worldwide deaths and 43% of the global burden of disease.<sup>[8,9]</sup> NCDs result in grievous morbidity and mortality in both urban and rural India, especially causing a considerable loss in potentially productive age group (aged 35–64 years).<sup>[10]</sup> The village health workers namely ASHAs, Rogi Kalyan Samities members, Community Health Volunteers (CHV) are entitled to these activities at the village, block, and district level envisioning up-gradation of public health infrastructure.<sup>[11]</sup>

For addressing this huge burden of NCDs our prime focus should be on primary and secondary prevention in which comprehensive primary health care plays a pivotal role.<sup>[12]</sup> Population-Based Screening (PBS) is an effective strategy advocated by the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) for increasing awareness among the community members on NCD risk factors, has prioritized periodic screening as an eminent tool. This process of early detection of NCD cases would help us in addressing the health inequity issues, increase survival rates, and limit deaths and disabilities.<sup>[13]</sup> This effective screening would also try to reduce the disease burden and also reduce the proportion of cases seeking late care. It is also important to note that government health expenditure on NCD's curative and rehabilitative care is very high, therefore an effective population-based preventive approach would also prove to be cost-effective.<sup>[14]</sup>

Based on a previous study from the same setting, it was observed that around 36% of the population were not screened for diabetes/hypertension over the past 2 years.<sup>[15]</sup> On further analysis, it was found that younger adults (30–44 years) and males constituted the major portion. This population being active and engaged in employment, it was difficult for the health centre to reach them during the working hours i.e., between 8 am to 4.30 pm. It was thus felt that support from CHVs will be useful to screen the difficult-to-reach population.

Our model focuses on the much-needed human resource utilization to deal with major NCDs. The model only evaluates the contribution of CHVs in facilitating the mobilization of hard-to-reach community for early NCD screening. Thus, our study aimed at evaluating the contribution of Community health volunteers with respect to mobilization for NCD screening using the Logic model.

## Methodology

An operational research study was conducted in the Urban Health Centre (UHC) service area of a tertiary care hospital in Puducherry, India. The centre provides comprehensive primary care services to a population of around 8500, with four wards and 13 anganwadis functioning under it. Approximately 600 patients attend the NCD special clinic every month to collect their drugs. The centre runs NCD clinics on a weekly basis: where around 140–150 patients attend every week

The present study was conducted during the months of August – December 2018. This article is part of a larger study which was planned to involve CHVs for facilitating the delivery of various health care services like i) motivating people to undertake diabetes and hypertension screening in the primary health centre ii) educate adolescents regarding the services delivered in the weekly adolescent clinic and encourage them to avail necessary services from the centre iii) motivate and mobilize volunteers for blood donation camps and iv) work closely with their community members and facilitate necessary actions for the reduction of mosquito breeding sites. In this article, we have described the contribution of CHVs for facilitating screening for diabetes and hypertension from the community alone.

### The need and existing infrastructure

The study setting did not have designated ASHA workers during the study period, so we decided to recruit CHVs on a voluntary basis to cover for the same. The 4 wards of the service area were split up into two batches A&B respectively for operational purposes. A-batch consisted of 6 anganwadis and B-batch had 7 anganwadis under it. Each batch was supervised by a staff nurse along with a field health worker coordinating under her. In consultation with the community, we had planned to involve 5–6 volunteers from each Anganwadi area (which constitutes a population of around 600–800). A list of 65 individuals volunteered from all the 13 anganwadis. These community volunteers were chosen in consultation with the community (through focus group discussions) and their expression of willingness to act as community volunteers. The volunteers were not given any honorarium for their involvement but were adequately motivated by the Principal Investigator and the health staff during the intervention.

The socio-demographic characteristics of the volunteers were captured using a semi-structured questionnaire. The CHVs were invited to attend the sensitization and training sessions regarding diabetes and hypertension screening. Approximately four batches of sensitization meetings (each batch consisting of 15–20 volunteers) were conducted to enable them, understand the importance of diabetes/hypertension screening, and to familiarize them with the health staff. Later 4 batches of training sessions were conducted at the centre during which the CHV were given health education regarding the burden and epidemiology of NCDs, high-risk strategy, the importance of population-based screening strategy and their possible ways

to contribute. The volunteers were requested to maintain a line list of the eligible individuals they met, motivated and referred to the health centre for undertaking necessary screening. A register was maintained in the centre to track the individuals who reported to the health centre for undertaking screening following sensitization.

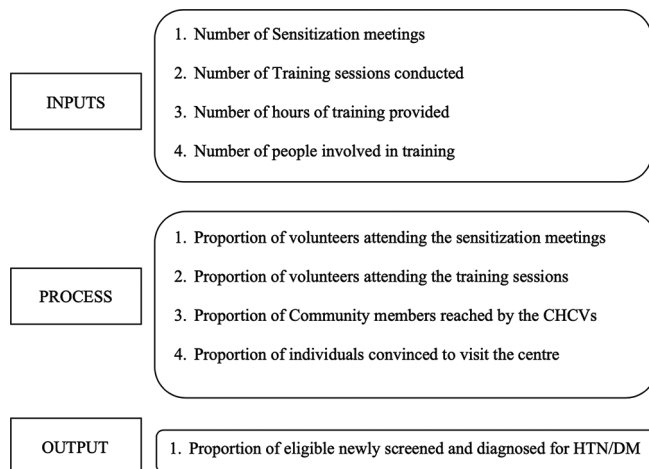
Measurement of blood pressure measurement and the diabetes screening was done according to the JNC-8 and ICMR guidelines respectively.<sup>115,161</sup> The inclusion criteria for adults to be screened was chosen based on ICMR 2018 guidelines which recommend that individuals 30 years and above, who were not known to be suffering from Diabetes/Hypertension.

After the training sessions, the CHVs were then given a time period of 3 months to render their services by mobilizing eligible community members. The line list of the individuals reporting the centre for diabetes and hypertension screening was compared with the line list approached by the CHVs to verify if they had reported to the centre following CHVs motivation.

Being an operational research study, we decided to evaluate this volunteer-led mobilization for NCD screening by Theoretical underpinning technique and devised a Logic model by framing input, process, output and outcome indicators.

Figure 1 Schematic diagram explains the Logic model for evaluating the service by volunteers.

Data were entered into Microsoft Excel and analysis was done using SPSS version 19. Continuous variables such as age were summarized as mean and standard deviation (SD). Categorical variables such as gender, education, the occupation were summarized as proportions. A schematic diagram depicting the Logic model was prepared and reviewed by the authors. The study was approved by the Institute Ethic Committee (JIP/IEC/2017/0264).



**Figure 1:** Schematic diagram explaining the Logic Model for evaluating the services by volunteers

## Results

A total of 65 nominated and willing volunteers were called to the health centre for sensitization and training sessions. The training was provided by the PI, medical officer, and the other health staff posted at the centre. Table 1 depicts the socio-demographic profile of the nominated CHVs, out of the total 85 CHVs who were nominated by the community members, around 65 (76.5%) showed a willingness to undergo training sessions and render services. (Not shown in tables) Of the 65 who volunteered, majority (67.7%) belonged to the 18- to 45-year group, mean age of  $35.3 \pm 6.8$  years, and one-third 22 (33.8%) were males. Approximately 50 (76.8%) had a minimum education of primary schooling and approximately 40 (61.6%) were not actively involved in employment. Around 56 (86.2%) were married and 43 (66.2%) belonged to the middle class or above socioeconomic class according to the modified BG Prasad scale.

Out of the 65 who volunteered there were 8 (12.3%) dropouts who moved out of the field service area thus were excluded from the intervention. Out of the 57 volunteers who remained with us, all 57 (100%) attended the sensitization meetings and approximately 48 (84.2%) attended the training sessions. Approximately 24 (39.6%) discontinued the study during the initial weeks of the intervention due to various reasons. The reason for dropouts as elicited from the volunteers were inadequate family support, lack of time due to work stress, and absence of remuneration. Thus, the final retention rate was found

**Table 1: Socio-demographic characteristics of the Community Health Care Volunteers among the selected villages of Urban Puducherry, (n=65)**

Variable	Category	Frequency (%)
Age	18-30 years	20 (30.7)
	31-45 years	24 (37)
	46-50 years	16 (24.6)
	51-65 years	5 (7.7)
Gender	Male	22 (33.8)
	Female	43 (66.2)
Education	No Formal Education	5 (7.6)
	Primary	10 (15.4)
	Higher Secondary	41 (63)
	Graduate	9 (13.8)
Employment status	Unemployed	40 (61.6)
	Employed	25 (38.4)
Marital Status	Married	56 (86.2)
	Unmarried	9 (13.8)
Socio economic status	Lower class	3 (4.6)
	Lower middle class	19 (29.2)
	Middle class	25 (38.5)
	Upper middle class	12 (18.4)
	Upper class	6 (9.3)
Prior involvement in social service activities	Yes	11 (17)
	No	54 (83)
Women Self Help Group member	Yes	11 (17)
	No	54 (83)

to be 50.8% at the end of the intervention. These volunteers during the three months intervention period did all necessary fieldwork to reach the unreached and unscreened population residing in the community.

Table 2 represents the logic model depicting the various indicators used for evaluating our framework. The inputs constituted manpower, materials, money, and minutes that were represented as i) the number of sensitization meetings conducted ii) the number of training sessions conducted iii) number of hours spent for training the volunteer's iv) the number of people involved in training. We had arranged 4 batches of sensitization and training sessions (each batch constituted around 15-20 volunteers) before the start of the intervention. Totally approximately 2.5 to 3 hours were spent for each session in training the volunteers. About nine health staff like the Principal Investigator (PI), co-investigators, medical officers the staff nurses, and ANMs posted in the centre were resource persons for the training. The process indicators finalized are given in Figure 1. We evaluated the contribution of the 33 volunteers alone.

We found that all the 33 volunteers belonged to 6 Anganwadi areas (Batch A). In the rest 7 Anganwadi areas (Batch B), where a few volunteers discontinued earlier, others also discontinued later. The total population of the 6 Anganwadi areas was 4471 as elicited from the enumeration data. Based on the National health profile report, it is expected that individuals aged 30 years and above constitute around 43% of the total population in urban India. Extrapolating these figures to the 6 Anganwadi areas where the volunteers contributed, we expected to screen around 1922 individuals. In those 6 Anganwadi areas we already had 450 diabetes and/or hypertension cases availing treatment from the health centre/private sector. We thus expected to screen around 1470 individuals. Through the CHVs we could reach 363 (24.7%) individuals in a 3 month period. This information was collected from the line list obtained from the volunteers. From the health centre records, it was found that only 303 (83.5%), out of 363 members who were motivated by the CHVs, actually visited the health centre for screening.

Finally, the outcome indicators were picked based on the feasibility to evaluate the model. Data for the outcome indicators were collected from the registers maintained in the

centre and by comparing it with the line list obtained from the volunteers. We found that of the 303 individuals who visited the centre everyone (100%) was screened for hypertension and approximately 270 (89%) were screened for diabetes. From the total members who were screened, approximately 52 (17%) and 31 (10%) were diagnosed to have diabetes and hypertension respectively, and were initiated on treatment as per guidelines.

## Discussion

This study was undertaken to evaluate the effectiveness of CHVs in supporting primary health care activities. Similar utilization of CHVs in health is not naïve; there is evidence from various studies, especially from resource-poor settings.<sup>[17,18]</sup> A systematic review by Woldie *et al.* assessing the role of CHVs in primary care services has shown their involvement in various health programs like HIV prevention, malaria control, reproductive health services, and Tuberculosis control.<sup>[19]</sup> However, these contributions are often country-specific, and thus needs further evaluation across varied settings. To prove this, we undertook a community-based operational research study to evaluate the contribution of CHVs towards Diabetes and hypertension screening among the selected wards of urban Puducherry, India. Their contribution towards mobilization for Diabetes and hypertension screening was evaluated using the Logic model.

The volunteers helped in mobilizing approximately 363 (24.7%) of the total eligible population for NCD screening over a period of 3 months. We found that out of the 363 individuals approached by the volunteers only 303 (83.5%) reported at the health centre. It is expected that the 60 individuals who did not visit the health centre could have visited any other health facility/private lab to get themselves. Of the 303 who visited the centre, everyone was screened for hypertension whereas 270 (89%) were screened for diabetes. The reasons for some people not getting screened for diabetes could not be elicited as the provision to document the reasons was not anticipated prior. Of the 303 individuals who got themselves screened, approximately 17% and 10% among them were diagnosed with diabetes and hypertension respectively.

It was noted that only 50% of the volunteers (33 out of 65 who consented to become CHVs) contributed to this screening

**Table 2: Logic model depicting the contribution of CHVs towards Diabetes and Hypertension screening, over 3 months period, among the selected wards of Urban Puducherry**

Activity	Inputs	Process n (%)	Output n (%)
Diabetes and hypertension screening	1. Number of Sensitization meetings=1* 2. Number of Training sessions conducted=1* 3. Number of hours of training of training provided=2.5-3 h 4. Number of facilitators for training=9 health care personnel	1. Proportion of members attending the sensitization meetings*=57 (100) 2. Proportion of members attending the training sessions <sup>†</sup> =48 (84.2) 3. Proportion of community members reached by the CHCVs <sup>‡</sup> =363 (24.7%) 4. Proportion of members who visited the centre <sup>§</sup> =303 (83.5%)	1. Proportion of adults newly screened for Diabetes <sup>  </sup> =270 (89%) 2. Proportion of adults diagnosed as Diabetes=52 (17%) 3. Proportion of adults started on treatment for diabetes=52 (100%) 4. Proportion of adults newly screened for Hypertension=303 (100%) 5. Proportion of adults diagnosed as Hypertension=31 (10%) 6. Proportion of adults started on treatment for hypertension=31 (100%)

\*A total of 4 batches of sensitization and training sessions were held: each batch involved 15-20 CHVs. <sup>†</sup>Out of the 57 members who were present in the field practice area. <sup>‡</sup>Out of the community members who were age >30 years, non-diabetic/hypertensives and not screened in the past 2 years (n=1470). <sup>§</sup>Out of the community members those who were reached by the volunteers. <sup>||</sup>Among the people who were convinced to visit the centre

program. It was also interesting to note that all the volunteers from the Anganwadis that had early attrition, dropped out during the intervention. This shows that the team of the 5 CHVs as planned, for each Anganwadi area initially, either performed (6 anganwadis – A batch) or did not perform (7 anganwadis – B batch) at all. Thus among the two batches, we observed that one team successfully carried out the screening program whereas the other team failed. These findings probably reflect cohesive teamwork among the CHVs that affected their contribution.

The government of India (GoI) has formulated the NPCDCS program under the National Health Mission. Two important strategies advocated by the program are i) Opportunistic screening and ii) Population-based screening (PBS). This PBS is envisioned keeping the grass root levels workers in the forefront. The front-line workers like ASHAs, ANMs, MPWs and the CHVs are expected to undertake enumeration, fill up Community Based Assessment Checklist (CBAC), organize screening days, conduct health education, and coordinate with the health system for service delivery.<sup>[13]</sup> The health workers are expected to cover at least 50% of the target population in their respective areas by the end of 1 year. Our study showed that the volunteers covered approximately 24.7% of the eligible population during their 3 months intervention period which is in line with the program target. This process of involving CHVs in PBS would enable us to reach the marginalized and hard to reach individuals who are usually neglected from health care services. Such community-based screening programs, using community participation, would reduce the burden on primary care physicians and also would help them to identify cases early and prevent them from ending up in complications. The findings from our study also emphasize the importance of CHV in accreditation and the expansion of universal health care.

Our study had a positive impact on facilitating mobilization for Diabetes and hypertension screening by CHVs. Similar studies involving CHVs in NCD prevention are not too many. Based on the literature available, CHVs have effectively contributed to the COmmunity-Based Intervention (COBIN trial) for the management of Diabetes in Nepal.<sup>[20]</sup> As a part of the trial, they rendered services for diabetes screening, provided counselling, and facilitated treatment in their respective communities.<sup>[21]</sup> A similar CHV model was also utilized for a community-based diabetes prevention trial in Kerala, South India.<sup>[22]</sup> CHVs also played a crucial role in the implementation of community-based intervention programs for hypertension control in Nepal.<sup>[14]</sup> Recent research works have ventured on the effectiveness of community health volunteers in NCD screening in low–middle-income countries using both qualitative and quantities approaches.<sup>[23-27]</sup>

The major strength of our study was the fact that we employed a logistic model that involved the evaluation of inputs, process, and output indicators for diabetes and hypertension screening by CHVs. Our study also adds to the limited literature evaluating CHV's contribution to health promotion activities especially

towards NCD prevention in South India. This model of involving community members in the delivery of health care strengthens community engagement in ownership of community health.

Nevertheless, our study had certain limitations. This paper discusses only involvement of CHVs in diabetes and hypertension prevention using specific indicators. We had only a short intervention period of 3 months, further follow-up is necessary to evaluate their long-term participation and retention. We could not ascertain a control group to compare our results as we planned this intervention as a service component in the service area. We observed a high attrition rate among whom the CHVs where we also observed a cohort effect (which was not foreseen by us), in which we found that in the Anganwadi areas in which the volunteers dropped out initially, everyone discontinued. This could be tackled by close monitoring and supportive supervision by the health staff.

## Summary and Conclusion

About half of the CHVs who volunteered for imparting health care services remained with us during the end of the intervention. Almost four in every five elected volunteers attended the training sessions. The involved volunteers were able to reach about one in every four eligible individuals in the community. Selection of appropriate CHVs and necessary team-building activities might maximize the contribution of CHVs. This process of PBS through effective community participation would enable us in tackling Indicators 11 and 12 of the Global Monitoring frameworks on NCDs. Hence CHVs can function as a vital tool in strengthening service delivery, thereby taking services closer to the community.

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## Ethical statement

Study protocol was reviewed and approved by Institutional Ethics Committee for observational studies. (JIP/IEC/2017/0264).

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

## References

- Four Major Pillars of Primary Health Care System (PHC). Nursing Exercise. 2017. Available from: <http://nursingexercise.com/primary-health-care-pillars/>. [Last accessed on 2019 Jul 22].
- Bridges J, Lucas G, Wiseman T, Griffiths P. Workforce characteristics and interventions associated with high-quality care and support to older people with cancer: A systematic review. *BMJ Open* 2017;7:e016127.
- Vareilles G, Pommier J, Kane S, Pictet G, Marchal B. Understanding the motivation and performance of community health volunteers involved in the delivery of health programmes in Kampala, Uganda: A realist evaluation protocol. *BMJ Open* 2015;5:e006752.
- Witmer A, Seifer SD, Finocchio L, Leslie J, O'Neil EH. Community health workers: Integral members of the health care work force. *Am J Public Health* 1995;85:1055-8. doi: 10.2105/ajph.85.8\_pt\_1.1055. PMID: 7625495.
- Kironde S, Kahirimanyi M. Community participation in primary health care (PHC) programmes: Lessons from tuberculosis treatment delivery in South Africa. *Afr Health Sci* 2002;2:16-23.
- Dongre AR, Deshmukh PR, Garg BS. A community based approach to improve health care seeking for newborn danger signs in rural wardha, India. *Indian J Pediatr* 2009;76:45-50.
- Universal health coverage (UHC). Available from: [https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc)). [Last accessed on 2019 Jul 22].
- WHO | Global Action Plan for the Prevention and Control of NCDs 2013-2020. WHO. Available from: [http://www.who.int/nmh/events/ncd\\_action\\_plan/en/](http://www.who.int/nmh/events/ncd_action_plan/en/). [Last accessed 2019 Jul 22].
- WHO | NCD mortality and morbidity. WHO. Available from: [http://www.who.int/gho/ncd/mortality\\_morbidity/en/](http://www.who.int/gho/ncd/mortality_morbidity/en/). [Last accessed 2019 Jul 22].
- Field-Richards SE, Arthur A. Negotiating the boundary between paid and unpaid hospice workers: A qualitative study of how hospice volunteers understand their work. *Am J Hosp Palliat Care* 2012;29:627-31.
- National Rural Health Mission : National Health Mission. Available from: <https://nhm.gov.in/index1.php?lang=1&level=1&sublinkid=969&lid=49>. [Last accessed on 2019 Jul 22].
- Committed to advancing the agenda of Universal Health Coverage through affordable and accessible healthcare for all. Available from: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=174423>. [Last accessed 2019 Jul 22].
- National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke. Training Module for Medical Officers for Prevention, Control and Population Level Screening of Hypertension, Diabetes and Common Cancer (Oral, Breast & Cervical). National Centre for Disease Control Directorate General of Health Services Ministry of Health and Family Welfare, GOI; 2017.
- Neupane D, Mclachlan CS, Gautam R, Mishra SR, Thorlund M, Schlütter M, *et al.* Literacy and motivation for the prevention and control of hypertension among female community health volunteers: A qualitative study from Nepal. *Global Health Action* 2015;8:28254. doi: 10.3402/gha.v8.28254.
- Bello NS. Implementing a home-based blood pressure monitoring program to improve hypertension management 2017;29-30.
- ICMR Guidelines for Management of Type 2 Diabetes 2018. Indian Council of Medical Research. Available from: <https://medibulletin.com/wp-content/uploads/2018/05/ICMR.diabetesGuidelines.2018.pdf>. [Last accessed on 2019 Jul 22].
- Jacobs C, Michelo C, Chola M, Oliphant N, Halwiindi H, Maswenyeho S, *et al.* Evaluation of a community-based intervention to improve maternal and neonatal health service coverage in the most rural and remote districts of Zambia. *PLoS One* 2018;13:e0190145.
- Iron-Segev S, Lusweti JN, Kamau-Mbuthia E, Stark AH. Impact of community-based nutrition education on geophagic behavior and dietary knowledge and practices among rural women in Nakuru town, Kenya: A Pilot Study. *J Nutr Educ* 2018;50:408-14.e1.
- Woldie M, Feyissa GT, Admasu B, Hassen K, Mitchell K, Mayhew S, *et al.* Community health volunteers could help improve access to and use of essential health services by communities in LMICs: An umbrella review. *Health Policy Plan* 2018;33:1128-43.
- Gyawali B, Neupane D, Vaidya A, Sandbæk A, Kallestrup P. Community-based intervention for management of diabetes in Nepal (COBIN-D trial): Study protocol for a cluster-randomized controlled trial. *Trials* 2018;19:579.
- Gyawali B, Mishra SR, Neupane D, Vaidya A, Sandbæk A, Kallestrup P. Diabetes management training for female community health volunteers in Western Nepal: An implementation experience. *BMC Public Health* 2018;18:641.
- Sathish T, Aziz Z, Absetz P, Thankappan KR, Tapp RJ, Balachandran S, *et al.* Participant recruitment into a community-based diabetes prevention trial in India: Learnings from the Kerala diabetes prevention program. *Contemp Clin Trials Commun* 2019;15:100382.
- Safary E, Mwandeti M, Matanje B, Beiersmann C, Mtaita C, Shiroya V, *et al.* Role of community health volunteers in identifying people with elevated blood pressure for diagnosis and monitoring of hypertension in Malawi: A qualitative study. *BMC Cardiovasc Disord* 2021;21:361.
- Gyawali B, Sharma R, Mishra SR, Neupane D, Vaidya A, Sandbæk A, *et al.* Effectiveness of a female community health volunteer-delivered intervention in reducing blood glucose among adults with type 2 diabetes: An open-label, cluster randomized clinical trial. *JAMA* 2021;4:e2035799.
- Parmar PK, Rawashdah F, Al-Ali N, Al Rub RA, Fawad M, Al Amire K, *et al.* Integrating community health volunteers into non-communicable disease management among Syrian refugees in Jordan: A causal loop analysis. *BMJ Open* 2021;11:e045455.
- Tan J, Xu H, Fan Q, Neely O, Doma R, Gundi R, *et al.* Hypertension care coordination and feasibility of involving female community health volunteers in hypertension management in Kavre District, Nepal: A qualitative study. *Global Heart* 2020;15:73.
- Rajaa S, Sahu SK, Thulasingham M. Contribution of community health volunteers in facilitating mobilization for nutritional screening among adolescents (10-19 years) residing in urban Puducherry, India - An operational research study. *Int J Community Med Public Health* 2021;8:4506-12.