Original Research

Primary healthcare system preparedness for tackling rising trend of non-communicable diseases among tribals: a study from resource-limited setting in India

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Abstract

Introduction: The burden of non-communicable diseases (NCD) is increasing in tribal and rural areas along with urban areas in India. This highlights the importance of preparedness of health system for managing NCD as well as incorporating and implementing preventive strategies in comprehensive primary health care services.

Objectives: To assess the existing primary health system regarding provision of NCD related services to the community along with the needs of the community in context of NCD

Methods: This was a cross-sectional study conducted in a tribal district using multiple strategies, such as a desk review of NCD related data (human resource availability, their capacity to cater to NCD patients, services provided for NCD, and logistics and medicine availability for NCD related services) and an on-site assessment of health and wellness centres (HWC) providing primary level care for NCDs in the community.

Results: The HWCs served a larger population than the expected norms, which could affect the quality of services being provided. Human resources at all HWC were filled and trained for NCD management. Infrastructure needed improvement as one-fourth of the centres had limited space for examination of the patients or for laboratory investigations compared to the available guidelines. Logistics related challenges showed availability of stock of hypertension and diabetes related medicines in almost one third of the centres. This remote tribal region faces telephonic connectivity related issues hampering service delivery through teleconsultation at 51.5% of the centres. Awareness raising activities pertaining to NCD were initiated by 76.5% of the HWCs.

Conclusions & Recommendations: NCD related services are available at primary healthcare level in this tribal community, but improvement is needed in infrastructure, equipment and medicines availability, provision of preventive services and teleconsultation.

Key words: *Non-Communicable Diseases, Tribal community, Health system assessment*

Introduction

Non-communicable diseases (NCDs) are a major public health challenge in the 21st century. Every year, globally, three-fourth of the total deaths are contributed by NCDs, including premature deaths, out of which 82% of deaths occur in low- and middle-income countries (1). India is also facing an increasing burden of NCDs such as cardiovascular diseases, diabetes and cancer, contributing to a major proportion of deaths (63%) (2). Latest national survey reflects the burden of hypertension as 24% and 21.3%, and of diabetes as 15.6% and 13.5% among adult males and females, respectively (3).

In community, crucial aspects of managing NCDs involve screening, provision of treatment and ensuring compliance along with preventive and promotive approach. Providing comprehensive primary healthcare (CPHC) reduces the economic burden and prevents complications related to NCDs. In India, under the wider umbrella of Ayushman Bharat, delivery of CPHC is expected through Health and Wellness Centres (HWC) which are the transformed subcentres and primary health centres (PHC). They form the backbone for primary healthcare provision to community specifically in resource-limited settings in India (4). Community Health Officer (CHO) posted at HWC is responsible for providing NCD related services including preventive, curative and referral services for the population above 30 years (5). As per guidelines, CHO is a mid-level healthcare provider from a nursing cadre or an Ayurveda practitioner who has the capacity to dispense medicines to NCD patients once the diagnosis is confirmed and the relevant prescription is issued by the PHC medical officer (4).

Accredited Social Health Activist (ASHA), the field-level healthcare provider in villages, is responsible for screening the population above 30 years of age for NCDs and completing the Community Based Assessment Checklist (CBAC) under the guidance of CHO (6). The CBAC contains details of NCD risk factors such as age, family history, addiction, waist-hip ratio and symptoms of common cancers. Scoring is given to each component and as per a pre-decided cut-off, the individuals are referred for further diagnostic work-up. It further provides vital guiding points for preventive and promotive counselling of the screened individuals (5).

Recent data indicate an epidemiological transition among tribals in the Gujarat state. The National Family Health Survey (NHFS-5) of Dang -a tribal district- showed that the prevalence of hypertension and diabetes was 22.9% and 24.1%, and 6.7% and 9.2% among adult females and males respectively, which are almost similar to the state prevalence (7-8). This increasing trend of NCDs in the tribal community along with their common health problems such as undernutrition, anaemia and infectious diseases, makes it imperative that attention is also needed for NCDs in these settings (9). Though HWCs are expected to cater to the rising demands of NCD care among tribals, challenges pertaining to service provision regarding the capacity building of care providers and availability of medicine and infrastructure remain (10). This study was conducted to assess the existing NCD related health services provided in a tribal district through HWCs and explore the health needs related to NCDs.

Methods

This cross-sectional study was conducted from April 2022 to March 2023, predominantly in the tribal district - Dang, located in Southern Gujarat of Western India (11). It is a hilly, forested geographical terrain with socio-cultural beliefs of tribals affecting the health service provision in the district.

All the CHO of HWCs of the Dang district were included as study participants. To gather reliable information, multiple methods of data collection were adopted, namely an interviewer-administered questionnaire for the CHOs, site visits to HWC to observe existing service provision environment and review of data obtained from the District NCD Cell.

The questionnaire included basic information on the role and capacity building of CHO in NCD management, screening process, follow-up, formats used for reporting process, referral mechanism, community engagement activities, perceived operational challenges, supportive supervision, feedback from higher authorities regarding quality of work and improvements needed. It was prepared based on the NCD programme guidelines, literature review and feedback of the district health authorities. For content validity, the questionnaire was assessed by subject experts of public health and the district NCD coordinator and the ambiguous questions modified and context specific parameters added after their feedback. The revised questionnaire was pre-tested in 10 CHOs from a nearby district, after which further minor linguistic and structural changes in the flow and format of questions were made based on their feedback. The questionnaire was administered to CHOs at the respective HWC to minimize disruption of service provision.

Data analysis

Data entry and analysis were done in Microsoft Excel (Office 365, v16.0). For quantitative data, frequency distribution and proportions were calculated and presented in tabular format. From qualitative responses of open-ended questions, similar codes were grouped into common categories, emerging themes were identified and written in a descriptive manner.

Results

All 68 functional HWCs in Dang district were administered the questionnaire. As per the guidelines (4), one CHO was available at each HWC, along with one male and one female multipurpose health workers. The average number of villages and population served by an HWC was 4.6 and 4366, respectively. The block-wise (Ahwa, Waghai and Subir) distribution of HWCs (Table 1) indicates that HWCs in tribal areas serve a larger population than the population norm of 3000 per centre (12). This distribution was also not uniform; the farthest block of the district (Subir) was allotted 25% of the total HWCs.

Table 1: Block-wise characteristics of health & wellness centres (HWCs) in Dangi District

Characteristics	Ahwa	Waghai	Subir
Number (% out of all in the district) of HWCs	29 (43%)	22 (32%)	17 (25%)
Average number of villages per HWC	4.37	4.52	5.18
Average population per HWC	4193	3790	5407

The post of CHO was filled at all the HWCs in district, with predominantly females (n=53; 77.9%). Average years of experience and duration of work at current HWC were 2.3 and 1.96 years, respectively. Almost all CHOs (94.12%) were trained for NCD in district level training. Out of the total trained CHOs, 58 (90.6%) replied that they feel confident in managing NCD in community. Training of ASHAs for CBAC was completed in 60 (88.24%) HWCs, and 58 of them (96.7%) replied that ASHAs could fill CBAC forms on their own.

Table 2 describes the infrastructure availability for NCD management in HWCs (Table 2). Almost 25% of the centres did not have adequate space for performing outpatient serves, patient examination or laboratory investigations as per the guidelines, while only 45.6% of the centres had designated space available for yoga sessions, which is a lifestyle modification intervention for NCDs (4). Further, only 67.7% of the centres had functional toilets, of which 65.2% did not have separate male and female toilets. This infrastructure limitation hampered basic laboratory investigation such as urine sugar estimation.

Table 2: Infrastructure availability for non-communicable disease (NCD) management at health & wellness centres (HWCs) (N=68)

Infrastructure component	No. (%)*
Adequate space available for conducting the outpatient department	61 (89.7%)
Proper space available to examine patients	50 (73.5%)
Adequate space available for laboratory work	49 (72.1%)
Adequate space available for storage of medicines	59 (86.8%)
Designated proper space available for Yoga sessions	31 (45.6%)
Functional toilet available	46 (67.7%)
Separate toilets for male, female available (n=46)	16 (34.8%)
Health education and material available for NCD awareness	54 (79.4%)

*Percentages calculated out of the total HWCs of 68

In contrast, basic equipment for NCD management were available at all the HWC (Table 3), while only interrupted supply of glucometer strips was identified as an issue with non-availability on average for 2.9 months. As for medicines, all medicines were supplied by the PHC to HWCs, however, 52.94% and 33.82% of the centres reported medicine stock-out for hypertension and diabetes respectively. Highest medicine stock-out during last year was observed in Subir block for both hypertension (64.7%) and diabetes (52.9%).

Table 3: Availability of equipment and medicines for non-communicable disease (NCD) management at health & wellness centres (HWCs) (N=68)

Medicine and equipment components	Description*
Equipment:	
Blood pressure apparatus available	68 (100%)
Blood pressure apparatus available but not functional	2 (2.9%)
Glucometer available	67 (98.5%)
Glucometer available but not functional	3 (4.5%)
Glucometer strips available	60 (88.2%)
Medicine for hypertension:	
Medicines of hypertension in stock currently	67 (98.53%)
Medicines of hypertension supplied regularly	63 (92.65%)
Stock out of hypertension medicines during last one year	36 (52.94%)
Medicines that were stocked out	Amlodipine, Atenolol
Average duration of stock out	4.25 months
Medicine for diabetes:	
Medicines of diabetes in stock currently	67 (98.53%)
Medicines of diabetes supplied regularly	66 (97.06%)
Stock of diabetes medicines during last one year	23 (33.82%)
Medicines that were stocked out	Metformin, Glimipride, Glipizide
Average duration of stock out	4.05 months

*Percentages calculated out of the total HWCs of 68

Table 4 describes the NCD screening and treatment processes at HWCs. The proportion of screened population by HWC was 76.82%, and only eight centres (11.76%) reported that few of their patients were getting treatment from private clinics, while for majority of the patients, government health system (through HWCs) remained the main source of treatment. Majority of the patients were on regular treatment, but still treatment interruption was faced by many centres. Patient compliance was ensured by CHO through monthly digital tracking through online NCD portal in which monthly data entry was done, and if any patient misses the monthly follow-up, it gets immediately reflected in the portal.

Table 4: Screening and treatment facilities available for non-communicable diseases (NCDs) at health & wellness centres (HWC)

Screening component	Description
Average frequency of organizing NCD camps Average patient load per NCD camp	2.88 per month 48 patients
Average number of NCD patients registered at HWC	33 per HWC
Average number of persons >30 years of age per HWC	1740
Average percentage of over 30-year-old persons screened for NCDs in last 6 months	76.82% per HWC
Average percentage of patients on regular treatment	93.9% (31 patients) per HWC
Average number of NCD patients referred in last 6 months	21.5 per HWC
Places of referral	Primary health centres, Community health centre, District hospital
System of back referral (referral centre sending information regarding confirmed diagnosis back to HWC)	No exact system developed

Reasons for not taking regular treatment, as given by the CHO during their interviews, included seasonal migration, irregular supply of medicines, lack of awareness, forgetfulness and poor interest as well as alcohol consumption.

"There is no specific reason. Patients are not ready to take treatment and most of the times they do not give any reason for that."

"Patients do not accept that they have NCD or they don't want to take medicines."

"Seasonal Migration in this region has major impact on treatment continuation. Many registered patients leave the district for a few months every year for the purpose of employment which leads to treatment interruption."

"Irregular medicines supply is also another major issue. Though this issue is being taken care of by the health department, still sometimes due to stock-out of medicines, interruption in treatment can happen for 1-2 months."

"Old age patients often forget to take medicines. Tribal community doesn't consider NCD serious enough to give much importance. Family members also forget to remind the patients to take medicines regularly."

"Alcohol consumption is common among tribals, and they are not willing to come to health centres regularly for taking medicines every month."

"There is lack of awareness regarding consequences of treatment interruption and complications. So, the patients stop taking treatment once they start feeling better, thinking they are cured of the disease and again come back for medicines once they start suffering from symptoms."

Teleconsultation was started in majority of the centres (98.53%) and on average, 22 patients per month per HWC were provided teleconsultation with medical specialists. However, this region faces challenges in providing teleconsultation with no proper phone network availability in 35 (51.5%) HWCs. There were also issues such as patients not having mobile phones and their reluctance in waiting for their turn at the HWC for teleconsultation, as it generally takes few hours to get connected with the specialist.

All CHOs were trained in conducting regular yoga sessions at their HWCs, which were established at all HWCs, with almost six (5.7) yoga sessions being conducted monthly at each HWC. One-fourth of the centres had created self-help groups for NCD patients, but their meetings were not conducted regularly. Other lifestyle modification activities were initiated by 52 (76.5%) centres, including IEC material being displayed at prominent places in villages, conducting health talks to raise awareness and role plays.

By each HWC, monthly data reporting was done to the district and state levels through various formats and mobile application based NCD portal. Each CHO entered the data in NCD portal and sent reports to the PHC in hard copies. Major issue faced in this regard was the unavailability of the mobile network as reported by 20.6% of the HWCs, and Subir block (64.3%) reportedly faced most of mobile network issues. Data reported by CHOs was reviewed periodically at the PHC, block and district levels during staff meetings but the feedback mechanism for addressing ground-level issues and quality of service delivery have room for improvement.

Discussion

The current study assessed the provision of NCD related services to the population and their limitations in a tribal district – Dang. Disparity in population-wise allocation of HWCs was observed in Dang district with HWCs serving almost twice the recommended population. Higher burden per centre specifically in a remote tribal block can influence the NCD related services as HWC is the closest community link for getting health services in such places. A study conducted in Chhattisgarh showed similar findings where 42.3% of the HWCs were serving the population more than the norms (13).

Similar to our study observations, full staff availability pertaining to CHOs was observed in a study conducted in Chhattisgarh (13). However, these findings regarding human resource availability differed from another study conducted in Odisha, in which only 60.4% of the total sanctioned posts at HWCs were filled (14). Observational study in Bihar also showed that majority (68.75%) of HWCs were facing human resource availability related issues (15). Trained human resources in adequate numbers is essential for seamless health services provision. Similar to human resource capacity building in this study, a study from Gujarat also showed good coverage of training among CHOs with 68% trained in NCD screening and 80% trained in yoga (16).

The current study indicated that HWCs in the Dang district provide all relevant NCD services to its tribal population by CHOs available in full capacity and trained for NCD. It further found out that all ASHAs were well-trained and were competent in filling up NCD screening formats. In contrast, a study conducted in eastern India showed that NCD screening services were provided by only 37.5% of the HWCs (15). Another study from Himachal Pradesh showed gaps in practical implementation of skills by CHO. It also showed that CBAC forms for NCD screening were not filled by the ASHAs as well as the role of CHO in guiding and supervising the ASHAs was not fulfilled satisfactorily (17). In concurrence, another study conducted in north-eastern state of India reported that ASHAs were not filling CBAC forms completely and were performing screening only in high-risk persons without much guidance to ASHAs regarding the screening process, highlighting the need for capacity building of field-

level health care providers for NCD screening and referral in these areas (18). In summary, it can be concluded that trained human resource is satisfactory for effective NCD related service provision in the Dang district compared to many other districts in India, which is a strength, on which the policy makers can improve the service provision for the tribal population.

Similar to the current study, infrastructure-related challenges were reported in the study conducted in eastern Indian state, with 75% of the HWCs having limited infrastructure and resources, and 68.75% of the HWCs with issues related to diagnostic services provision (15). A study conducted in Punjab also showed similar observations, with no available space for examination and only half of the HWCs having separate toilets for males and females (19). Similarly, male-female separate toilet availability was observed in only 41% of the HWCs in Chhattisgarh (13). A study in Himachal Pradesh also found that infrastructure of the HWCs was not upgraded as per the guidelines (17).

Interrupted glucometer strips supply and longer duration of medicine stock-out disrupts the continuum of care and impede the trust and rapport that CHOs have built with the community regarding regular medicines intake. A study in Odisha however, showed that NCD related medicines were available in the majority of HWCs (antihypertensive medicines in 95% of the centres and oral hypoglycaemic medicines in 91%) (14). A study in Chhattisgarh showed good availability of NCD related medicines, with none of the HWCs reporting stock-out for anti-diabetic medicines and only 1.5% for cardiovascular medicines (13). Insufficient infrastructure and unavailability of medicines and equipment hinder the effective healthcare service provided to the population, despite the availability of well-trained human resource. Hence, it is imperative that the policy makers make prompt action in tribal districts to improve the physical conditions of HWCs for effective NCD care provision.

NCD related awareness activities and health education were being conducted at all the HWCs of the Dang district. Similarly, a higher proportion (92%) of HWCs of Jamnagar district reported to have conducted NCD related activities (16). Availability of government health centres like HWC acts as a determining factor behind community getting screened. Research evidence shows that communities where HWCs were available, the probability of getting screened for NCD increased by 25%. Our research study showed similar pattern of good coverage of the population for NCD screening i.e. 76.82% (20). As the health service coverage by the HWCs expands, the utilization of private clinic services by the community declines, as shown in our study, with only 11.76% obtaining treatment from private clinics, mainly in Ahwa block (20). Possible reasons for this observation could be the proximity and availability of private clinics in Ahwa block, which is the district headquarters.

Issues related to the availability of the internet connection were faced by 51.5% HWCs, which is commonly observed among HWCs located in many rural areas of India. This poses difficulty in accomplishing tasks like teleconsultation and data reporting in NCD portal (21). Similar observations were reported in a study conducted in Odisha, where teleconsultation was available in 60% of the rural HWCs, however, internet connection facilities were available in only 31% of the centres (14). Similarly, a study conducted in Patna showed that telemedicine services were provided by only 6.25% of the HWCs (15). It is important that CHO are functioning under the supervision of the medical officers of PHC for the provision of comprehensive NCD care for the tribal population. In order to achieve comprehensive care provision and in emergencies, it is important that they are able to contact the medical officers of PHCs without any service interruptions. Hence, policy makers need to make necessary arrangements to ensure the availability of uninterrupted network connections, especially in resource-limited areas. It is

important to note that this should not be an issue in the current context of technology development.

Overall, our study found out that human resource availability and their capacity building pertaining to NCD were satisfactorily achieved in this tribal region, however, attention is needed for improving the infrastructure, regular medicines availability and internet connectivity for teleconsultation for better NCD related service provision in this tribal district.

Strengths and limitations

This study was conducted in a tribal district of Western India, assessing its primary healthcare system through baseline assessment of HWCs, covering all the facets of NCD related health services. Hence, it limits the generalizability of the study findings to populations other than those with similar resource-limited settings. The cross-sectional situational analysis of the health system limits the longitudinal documentation of changes made in the system after dissemination of findings to the district health officials.

Conclusions & Recommendations

Although the human resource availability and training was not an issue, improvement is needed regarding infrastructure, logistics, review and feedback for timely interventions of NCD service provision in the resource limited tribal district. Uniform checklists can be developed for infrastructure related issues and circulated from the district to all the HWCs for periodic gap analysis and upgradation of infrastructure accordingly. Regular audits need to be conducted regarding medicine and equipment availability and their functioning status. Uniform counselling material in local language can be distributed to all HWCs to improve patient compliance. Multisectoral coordination is needed to address the issue with telephonic network availability for telemedicine.

Public Health Implications

- NCDs are reportedly increasing across the populations including tribal populations, requiring prompt actions to mitigate.
- Preparedness of the primary healthcare system (trained staff, infrastructure, regular medicines supply) is essential in resource-limited remote tribal regions to address the NCD burden, with regular feedback and support to the field-level health functionaries to streamline and maintain regular NCD related services.
- This study thereby provides baseline evidence on the NCD service provision and their gaps in a tribal district, allowing policy makers to plan and implement relevant activities to combat NCDs in such population.

Author Declarations

Competing interests: None

Ethical approval and consent to participate: Ethical approval for conducting the study was obtained from the Institutional Human Ethics Committee (IHEC) (Approval letter No. MCV/ IHEC/ 08/ 22, dated 28/02/2022). Written informed consent was taken from study participants before enrolling them in the study. Participants were made aware that they can withdraw at any point from the study voluntarily. Confidentiality of the data collected from the study participants has been maintained.

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