Lessons for addressing noncommunicable diseases within a primary health-care system from the Ballabgarh project, India

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ABSTRACT

Background: Most patients with noncommunicable diseases (NCDs) can be managed appropriately at the primary care level, using a simplified standard protocol supported by low-cost drugs. The primary care response to common NCDs is often unstructured and inadequate in low- and middle-income countries. This study assessed the feasibility of integration of NCD prevention and control within the primary health-care system of India.

Methods: This study was done among 12 subcentres, 2 primary health centres (PHCs) and one subdistrict hospital in a block in north India. All 28 multipurpose health workers of these subcentres underwent 3-day training for delivering the package of NCD interventions as a part of their routine functioning. A time–motion study was conducted before and after this, to assess the workload on a sample of the workers with and without the NCD work. Screening for risk assessment was done at domiciliary level as well as at health-facility level (opportunistic screening), and the cost was estimated based on standard costing procedures. Individuals who screened positive were investigated with electrocardiography and fasting blood sugar. PHCs were strengthened with provision of essential medicines and technologies.

Results: After training, 6% of the time of workers (n = 7) was spent in the NCD-related activities, and introduction of NCD activities did not impact the coverage of other major national health programmes. Loss during referral of “at-risk” subjects (37.5% from home to subcentre and 33% from subcentre to PHC) resulted in screening efficiency being lowest at domiciliary level (1.3 cases of NCDs identified per 1000 screened). In comparison to domiciliary screening (₹21 830.6; US$ 363.8 per case identified), opportunistic screening at subdistrict level (₹794.6; US$ 13.2) was 27.5 times and opportunistic screening at PHC (₹1457.5; US$ 24.3) was 15.0 times lower. There was significant utilization of NCD services provided at PHCs, including counselling.

Conclusion: Opportunistic screening appears to be feasible and a cost-effective strategy for risk screening. It is possible to integrate NCD prevention and control into primary health care in India.

Key words: cost, health workers, noncommunicable disease, primary health care, risk assessment

BACKGROUND

Noncommunicable diseases (NCDs), which were once considered “diseases of affluence”, have now invaded low- and middle-income countries as well. In 2008, roughly four out of five NCD deaths occurred in low- and middle-income countries, up sharply from just under 40% in 1990.¹ Adding urgency to the NCD challenge is the fact that the number of people living with NCDs will increase substantially in the coming decades. The cost of an acute event or chronic care has been shown to place a heavy burden on individual households, which may result in catastrophic expenditures. A high proportion of

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patients do not purchase prescribed medicines because they cannot afford them. NCDs can change the spending patterns of households dramatically and result in significant reduction in spending on food and education.\(^2\)\(^3\) Low- and middle-income countries are characterized by health-care costs being borne by patients themselves and by limited coverage of health insurance schemes, in terms of population as well as services covered.

Primary health care offers a way to improve fairness in access to health care, and efficiency in the way resources are used.\(^4\) It is now well recognized that the increasing burden of NCDs in India and the world is best addressed by a primary health-care approach.\(^5\) Primary-health-care facilities are patients’ first point of contact with health services and hence the most appropriate places for patient screening and early disease detection, continuous care provision for uncomplicated patients, and referral of patients to specialists. Most patients with NCDs do not require specialized care and can be managed appropriately at the primary care level, using simplified standard protocols supported by low-cost drugs and with links to higher levels of care for people who need them. Managing NCDs (as is true for other diseases as well) at primary care level has several advantages: it provides a technically equivalent level of care; it is provided in a setting that is closer to the patient both physically and socioculturally; it imposes lower cost to both the patient and health system; and follow-up for monitoring compliance and control can be more effectively done.

The primary care response to common NCDs in most low- and middle-income countries is unstructured and inadequate.\(^6\) There is an urgent need for a framework for use and adaptation by countries to improve the delivery of interventions for patients with chronic NCDs by primary care providers.\(^7\) This calls for operational research into integrating NCDs into the primary health-care system of low- and middle-income countries.\(^8\) One of the objectives of the WHO Global Action Plan for the Prevention and Control of NCDs 2013–2020 is to use people-centred primary health care and universal health coverage to strengthen and orient health systems to address the prevention and control of NCDs and their underlying social determinants.\(^9\)

An operational research study was undertaken to define and validate packages of services and tools for the prevention and management of NCDs within the primary health-care system of India. As a part of the Indian Council of Medical Research Task Force study, the following questions were identified for answering, based on the need for inputs into the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases including Stroke (NPCDCS).\(^9\)

1. Does the current workload of multipurpose health workers (MPHWs) allow the additional introduction of NCD programme-related work or will it affect the performance of other programmes?
2. Which strategy should be chosen for screening for high-risk individuals – domiciliary or opportunistic screening at primary and secondary health facilities?
3. What would be the likely utilization of different facilities like counselling, blood glucose, electrocardiography (ECG) and medicines at the primary health-care level?

### Overview of the primary health-care system in India

The lowermost tier of the publicly funded formal primary health-care system comprises MPHWs. One team of male and female MPHWs caters to a population of about 5000–7000 distributed over 2–4 villages, which together form the population under a subcentre. Six subcentres come under a primary health centre (PHC), which serves a population of 30 000–40 000. One male and one female health assistant supervise the work of MPHWs at PHC level. At the PHC, there is usually one medical officer who provides clinical care, as well as administering and supervising the community-level work. There are additional nurses who look after the ward, primarily for childbirth. At the next higher level is the community health centre, which is usually 30 bedded and provides specialist service in medicine, paediatrics, obstetrics, surgery and anaesthesia. It serves as the first referral unit and has an operating theatre for routine and emergency services. These are generally for a population of 120 000–150 000. Above this is usually the district hospital, which has around 200 beds and has other specialists like orthopaedics, ophthalmology, etc. In many places, there are also subdistrict hospitals, which fall somewhere in between these two levels. NPCDCS currently focuses mainly in strengthening district hospitals.

### METHODS

#### Study setting

This study was done in the health facilities under the Centre for Community Medicine of the All India Institute of Medical Sciences, New Delhi. This is located in Ballabgarh Block of Haryana State, about 30 km from the institute. It consists of 12 subcentres, two PHCs covering a population of about 88 000 in 28 villages in 2007, and one civil hospital (subdistrict hospital). The study site has been described in detail elsewhere.\(^10\) The fieldwork for this study was carried out from August 2007 to December 2009.

#### Ethics

The study was approved by the All India Institute of Medical Sciences Ethics Committee. The study was implemented as a strengthening of existing services of the PHCs.

#### Training

All MPHWs and their supervisors (\(n = 28\)) underwent a 3-day orientation/training programme held during February 2008. They were made aware of NCDs, their link to changing lifestyles and the need to tackle their increasing burden. They were trained for NCD risk assessment (techniques for asking questions, as well as skills for anthropometry) and other activities (health education/advising for tobacco cessation, dietary modification and physical activity). Each didactic session was followed by hands-on exercises on themselves and their co-trainees. In addition to MPHWs, six research staff were also trained.
Risk-assessment procedure

A NCD risk-assessment tool was designed, based on data from the previous Indian Council of Medical Research multicentre risk-factor survey. In keeping with the requirement for use by MPHWs, it was a three-stage tool. At the first stage (domiciliary), there was a 10-item questionnaire covering age, tobacco use, alcohol use, physical activity, diet, waist circumference and family history of NCDs. The total score possible was 20 and individuals with a score of more than 8 were asked to report to the subcentre for the second stage, where blood pressure, height and weight (for body mass index [BMI]) were measured. If the score was then greater than 12, the subject was referred to the PHC for ECG and testing of fasting blood sugar. If, at the PHC, any of these test results were abnormal, the patient was registered in the NCD clinic at the PHC and started on treatment by a doctor, based on standard treatment protocols developed for these diseases. They were additionally referred to the Civil Hospital Ballabgarh for serum cholesterol measurement and a physician consultation, if needed.

Work schedule

After the training, up to the end of the project, the health workers were expected to conduct NCD risk assessments during their routine schedule; identify and refer individual with symptoms suggestive of NCDs; provide advice for lifestyle modification; and follow up patients with disease, for compliance and monitoring. Individual risk-assessment cards with health messages were developed, to be retained by the individuals. The monthly reporting forms were modified to add a section for NCDs, which would list the activities conducted by the health worker in a given month, such as the number of risk assessments done and individuals identified with an assessed risk score of more than 8.

Comparison of screening strategies

Two approaches for screening for NCDs were tested in the study. These are summarized in Figure 1.

Domiciliary screening

NCD risk assessment of all individuals aged over 20 years available at the time of home visit was carried out by two trained research workers in two villages and was completed between January and March 2009. It was a three-stage process as described above. The cut-off age of 20 years was decided by the advisory committee, as a good trade-off between workload and the need to catch risks early.

Opportunistic screening

In this approach, four of the remaining trained research staff conducted NCD risk assessment of all patients older than 20 years attending the outpatient services of the two PHCs and the Civil Hospital Ballabgarh (where this was restricted to those older than 40 years, owing to the heavy workload of patients). In this approach, the first two stages were combined and individuals were referred to ECG or fasting blood sugar testing if they were above the cut-off value of 12. This screening continued at the health facilities, for at least 6 months, between May 2008 and April 2009. Subjects referred from PHCs or the field were not subjected to this screening.

Health-facility strengthening

The primary care facilities were strengthened by training of medical officers on the use of a standard simplified protocol for common NCDs (hypertension, diabetes and coronary artery disease). This started after training in February 2008 and continued until the end of the project in December 2009. Provision of diagnostic facilities (ECG, blood sugar and cholesterol measurement using strips) and drugs (glibenclamide, metformin, enalapril, simvastatin, chlorothiazide and low-dose aspirin) were also part of the strengthening. The Civil Hospital Ballabgarh had a weekly NCD clinic running under the supervision of a physician, and new NCD clinics were started in the PHCs. A tobacco-cessation and diet-counselling clinic was started for three days a week at Ballabgarh hospital, wherein trained medical social workers provided individual as well as group counselling. The same counsellors provided counselling facilities at the PHCs on the respective days of the NCD clinics. The model adopted for health-facilities strengthening, along with individual NCD screening and lifestyle advice by health workers, is summarized in Table 1. The patients were asked to return every week for follow-up for counselling for the first one month, and monthly thereafter.

Measurement of outcomes

The study compared the usefulness of the two approaches of risk assessment, in terms of their yield (number of new NCD patients found) and the cost incurred. The costs included in calculations were workers’ time (based on proportionate allocation of salaries), the cost of new equipment (tension tapes, body meters, ECG machine and glucometer) and consumables (risk-assessment forms, ECG jelly, glucometer strips, batteries). The equipment and consumables were valued at their procurement price. The annual equivalent costs of equipment were estimated using a discount rate of 5%, assuming a useful life of 3 years, for the year 2009. The cost of training was not included, as it would be the same in both approaches. Cost estimates excluded capital costs of health facilities and equipment already available (weighing machine and blood pressure apparatus).
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Figure 1: Diagrammatic representation of the two modes of screening
BMI: body mass index; BP: blood pressure; ECG: electrocardiography; PHC: primary health centre.

Table 1: Model for strengthening the primary health-care system for provision of NCD services

<table>
<thead>
<tr>
<th>Level</th>
<th>Diagnosis/testing</th>
<th>Management</th>
<th>Strengthening elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household level</td>
<td>Risk assessment; suspect disease and refer</td>
<td>Health education and interpersonal communication, ensuring drug compliance</td>
<td>Training</td>
</tr>
<tr>
<td>Subcentre</td>
<td>BMI and blood pressure measurement</td>
<td>Preliminary counselling by health workers and referral of high-risk cases; follow-up during weekly clinics, drug provision</td>
<td>Equipments for risk assessment; digital blood pressure measuring device; drugs</td>
</tr>
<tr>
<td>Primary health centre</td>
<td>Blood sugar; ECG; serum cholesterol (trial)</td>
<td>Weekly counselling, assessment and treatment by medical officer</td>
<td>Glucometer, ECG machine, serum cholesterol analyser, first-line drugs</td>
</tr>
<tr>
<td>Secondary-level hospital, Ballabgarh</td>
<td>Serum cholesterol; review of case by physician</td>
<td>Management by physician; individual counselling</td>
<td>Necessary equipment (already available); counsellor; second-line drugs</td>
</tr>
</tbody>
</table>

BMI: body mass index; ECG: electrocardiography.
Assessment of workload and performance of workers

In order to estimate the time spent by workers in different health domains/work categories, time–motion analyses were carried out at baseline (November to December 2007) and at the end of the study (June 2009), after one full year of implementation. Six subcentres were randomly selected and both the male and female health workers were studied. At the end of the study, again, six subcentres were selected randomly but only seven health workers were available on the days of visit. During the assessment, workers selected for the day were accompanied from their starting point in the village until they returned to their subcentres after completing their household visits. All the activities that were carried out in each household were noted in a structured observation sheet. Additionally, each activity was timed using a stop-watch and the time spent was noted in the structured sheet. Fixed immunization days and “pulse polio” days were excluded from the study. The impact of NCD activities at macro level was assessed by looking at coverage or performance indicators of major national programmes in the field practice area for a 5-year period starting 2 years before the project, up to the end of the project. The data for these are reported annually and were sourced from annual reports of the All India Institute of Medical Science. At the end of the study in December 2009, MPHWs were asked to fill in a feedback form on their perspectives on introduction of NCD activities in their workplan.

**RESULTS**

**Workload on multipurpose health workers (see Table 2)**

At both baseline and the end of the study, the time–motion study showed that the workers were spending an average of 3–3.5 h in the field, covering about 45–50 houses, of which an average of 32 had potential recipients of services at home. Workers then spent about 2 h in the afternoon in the subcentre in record keeping and planning the next day’s work. Almost 40% of the time was spent in travelling and general enquiries. Reproductive and child health activities together accounted for 18.2% of the time and malaria surveillance 12% of the total field time. Ill-defined work categories like health education or others (like meeting members of the village health and sanitation committee) accounted for 25% of the time and showed the maximum decline at the end of the study. About 6% of workers’ time was spent in NCD-related activities at the end of the study, which translated to about 12 min of work, or 1–2 risk assessments, in a day. There was an increase in maternal care and tuberculosis work, probably reflecting the increased emphasis on these at national level. Coverage with major immunizing agents and antental registration were sustained above 95% after the introduction of the NCD activities. The number of cases of tuberculosis detected annually, and the annual blood examination rate for malaria, also remained unchanged during this period.

### Table 2: Result of time–motion analysis at baseline and the end of the study

<table>
<thead>
<tr>
<th>Work category</th>
<th>Proportion (%) of time spent in the work category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline (Nov–Dec 2007)</td>
</tr>
<tr>
<td>Number of MPHWs covered (households visited)</td>
<td>12 (384)</td>
</tr>
<tr>
<td>Travelling between houses and waiting at homes</td>
<td>23.3</td>
</tr>
<tr>
<td>Rapport building and general enquiry</td>
<td>17.1</td>
</tr>
<tr>
<td>Child care</td>
<td>5.4</td>
</tr>
<tr>
<td>Maternal care</td>
<td>6.5</td>
</tr>
<tr>
<td>Contraception advice</td>
<td>6.3</td>
</tr>
<tr>
<td>Collection of vital statistics</td>
<td>3.8</td>
</tr>
<tr>
<td>Health education</td>
<td>9.2</td>
</tr>
<tr>
<td>Tuberculosis case-finding and treatment</td>
<td>0.8</td>
</tr>
<tr>
<td>Malaria surveillance</td>
<td>12.0</td>
</tr>
<tr>
<td>Others</td>
<td>15.5</td>
</tr>
<tr>
<td>Noncommunicable disease prevention and control</td>
<td>0.0</td>
</tr>
</tbody>
</table>

MPHW: multipurpose health worker.
therefore, felt that, rather than adding more workload on them, there should be a rationalization of their workload. They suggested either a reduction in the number of houses to be visited daily, or lower targets for other programmes, especially blood smears for all cases of fever.

**Comparison of screening strategies (see Table 3)**

**Domiciliary approach**

In three months, two research workers screened 6068 subjects aged over 20 years at their homes in the two villages. Of these, 1687 (27.8%) were found to have a score of more than 8 and asked to come to the subcentre. Only 633 (37.5%) of those asked came to the subcentre and of these 633 subjects, 82 (12.9%) scored more than 12 and had to be referred to a PHC. Of these 82, only 27 (32.9%) complied with the referral and among them, 8 patients were diagnosed with NCDs, giving a rate of detection of 1.3 cases of NCDs for each 1000 screened at domiciliary level.

**Opportunistic screening**

In the opportunistic screening occurring at PHCs, a total of 4454 subjects aged over 20 years were screened and 820 (18.4%) were found to be at “high-risk”, i.e. with a score of more than 12. Among these, 138 cases of NCDs were identified (16.8%), giving a case-detection rate of 31.0 per 1000 screened. At the Civil Hospital Ballabgarh, 5380 of the outpatient attendees above 40 years of age were screened; 24.3% were identified as “at risk” and further investigated; and 323 cases were detected, giving a case-detection rate of 60.0 per 1000.

**Cost of screening (see Table 3)**

The cost per screening increased as the level of screening increased, with the lowest cost being at domiciliary level (₹28.8; US$ 0.48 @ US$ 1 = ₹60), and the highest at subdistrict hospital level (₹47.71; US$ 0.80). However, the cost–effectiveness ratio decreased as the level of health facility increased. In comparison to domiciliary screening, opportunistic screening at subdistrict level was 27.5 times and opportunistic screening at PHC was 15.0 times more cost-effective.

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| **Table 3: Cost-effectiveness of the two approaches of screening at Ballabgarh** |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| **Description of screening strategy** | **Domiciliary, by research worker at homes (two-level); individuals aged >20 years** | **Opportunistic, by research worker (single level)** | |
| Indicator | Definition of indicator | | |
| Sample size | Individuals whose risk assessment was done | 6068 | 4454 | 5380 |
| Proportion with risk at first-stage assessment, n (%) | Above cut-off score of 8 | 1687 (27.8%) | Not applicable | Not applicable |
| Compliance with reporting to subcentre, n (%) | Proportion who attended among those called | 633 (37.5%) | Not applicable | Not applicable |
| Proportion with risk with full assessment, n (%) | Total score over 12 | 82 (13%) | 820 (18.4%) | 1329 (24.7%) |
| Compliance with referral to PHC, n (%) | Proportion who attended among those referred | 27 (33%) | Not applicable | Not applicable |
| NCD cases identified, n (%) | Individuals with abnormal ECG or blood sugar | 8 (29.6%) | 138 (16.8%) | 323 (24.3%) |
| Case-detection rate, per 1000 screened | Case detected per 1000 screened | 1.3 | 31.0 | 60.0 |
| Screening cost, ₹ (US$) | Total cost incurred | 174 645 (2910.7) | 201 135 (3352.2) | 256 656 (4277.6) |
| Cost per screening, ₹ (US$) | Cost per person screened | 28.78 (0.48) | 45.16 (0.75) | 47.71 (0.80) |
| Cost–effectiveness ratio, ₹ (US$) | Cost per NCD case identified | 21 830.6 (363.8) | 1457.5 (24.3) | 794.6 (13.2) |

ECG: electrocardiography; NCD: noncommunicable disease; PHC: primary health centre.
Health-facility utilization

During the period 2008–2009, 146 newly diagnosed patients and other previously known patients with diabetes and hypertension were treated at the two PHCs. A total of 960 subjects were counselled for tobacco cessation and modifications to diet and physical activity, and the holding rate and the mean number of counselling sessions per subject was about two (see Table 4). In addition to diagnostic facilities, free drugs were distributed to all patients.

DISCUSSION

This study illustrates the feasibility of integrating NCD prevention and control into primary health care. It shows that there is scope in the health workers’ schedule for introduction of work related to NCDs. The workers understood the need for taking up NCD work but resisted it as additional work. Resistance to work seen as “additional” is a known factor for difficulties in implementing changes.\(^{14}\) Though additional monetary incentive for this could address such resistance, it would be more appropriate to restructure and rationalize the workers’ schedules to accommodate NCD-related work. However, the study also found the actual time spent on NCD work was quite low, perhaps reflecting the current priority levels. In order to better utilize workers’ time, one could conceivably look at village-based community health workers to do part of the work related to risk assessment, interpersonal communication and follow-up of patients. This was attempted in the second phase of the study and results will be presented in due course.

The NPCDCS focus is largely on health-facility-based interventions at district level and it advocates opportunistic screening at health facilities and a camp approach for risk screening at population level.\(^{15}\) As of 31 March 2014, as per the data received from individual states, a total of 5,539,571 persons have been screened for diabetes and hypertension under various health facilities, schools, workplaces and urban slums. An average of 6.15% were suspected to have diabetes (random blood sugar above 140 mg/dL) and an average of 5.12% were found to be either pre-hypertensive or hypertensive.\(^{16}\) A qualitative study conducted at a subcentre in Ambala found that there was no focus on health-promotion activities. The subjects were not sure as to why the camp was being held and some had anxiety related to a positive test result.\(^{17}\)

This paper found that the opportunistic screening was more cost-effective than domiciliary screening. The main problem with domiciliary screening was poor compliance with referral. Roughly, only one third complied with advice for referral at both the stages (home to subcentre and subcentre to PHC). This was also the reason why there was a lower unit cost of screening at domiciliary level, as lower costs were incurred at higher levels of the health system, because only a few subjects reached this level. Similar compliance rates for diabetes screening have been reported by others in India and other countries.\(^{18,19}\) The reason for poor compliance is poor perception of risk, combined with the inconvenience of complying with referral. Increasing awareness and motivation by accredited social health activists could overcome this problem. While the results of this study provide support for the opportunistic screening being carried out under NPCDCS, the choice between opportunistic, domiciliary or camp approaches can vary by context or situation. The higher efficiency at the Civil Hospital Ballabgarh was partly due to the fact that only individuals aged over 40 years were screened and the proportion of people at risk usually increases with age. However, it should be noted that the best period for counselling for many of these behaviours is early adulthood.

The World Health Organization (WHO) has developed a package of essential non-communicable (PEN) disease interventions for primary health care in low-resource settings.\(^{20}\) PEN identifies core technologies, medicines and risk-prediction tools, and provides technical and operational outlines for integration of essential NCD interventions into primary care. The experience

<table>
<thead>
<tr>
<th>Services</th>
<th>PHCs</th>
<th>Civil Hospital Ballabgarh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated adult attendance at outpatient department in one year</td>
<td>15,000</td>
<td>54,686</td>
</tr>
<tr>
<td>Opportunistic screening, (n) (% of outpatient attendance)</td>
<td>4,454 (29.7%)</td>
<td>5,380 (9.8%)</td>
</tr>
<tr>
<td>Blood sugar (n)</td>
<td>998</td>
<td>Tests routinely done and therefore not reported separately as done</td>
</tr>
<tr>
<td>Electrocardiography, (n)</td>
<td>518</td>
<td></td>
</tr>
<tr>
<td>New cases put on treatment, (n)</td>
<td>146</td>
<td>323</td>
</tr>
<tr>
<td>People started on counselling, (n)</td>
<td>960</td>
<td>1,280</td>
</tr>
<tr>
<td>Counselling sessions held, (n)</td>
<td>1,629</td>
<td>2,347</td>
</tr>
<tr>
<td>Mean number of counselling sessions per subject</td>
<td>1.70</td>
<td>1.83</td>
</tr>
</tbody>
</table>

PHC: primary health centre.
of its pilot testing in Bhutan shows that integration of NCDs into primary health care is feasible, though the study also reported a significant loss to follow-up of patients with NCDs, with up to 50% not coming for follow-up after three visits. While not exactly following the PEN guidelines (as they were introduced after this study), this study has used similar components.

Another key research issue on integrating NCDs into a primary health-care system, identified by Harries et al., was validating standard diagnostic protocols for NCD case-finding and assessing staff performance in the use of protocols. While the risk-assessment tool used in the present study could be different from that used by others, most of the risk-assessment tools would require similar knowledge and skills as the one used in this study. This study covered many critical operational issues for integration of NCD prevention and control into the primary health-care set-up in India. However, it did not focus on the effectiveness of this intervention in control of NCDs, as the blood pressure and blood sugar levels of patients were not monitored. The small number of health workers and facilities is also a limitation.

This study has shown that, with sufficient strengthening by provision of basic technologies and medicines, PHCs can be a nodal agency for provision of NCD services. The availability of essential medicines and basic technologies at primary care facilities is one of the nine indicators with targets under the national and global NCD monitoring frameworks. Currently, the NPCDCS has no identified role for PHCs. This needs to be corrected. The role of counselling is critical for changing the behaviours of those at risk. However, counselling services are not available. This study used weekly visits by a counsellor based in the district hospital, to provide part-time counselling for NCDs. Another approach would be to use the integrated counselling and treatment centres (ICTCs) for HIV counselling, to also provide NCD counselling.

CONCLUSION

It is possible to integrate NCD prevention and control into primary health care in India. Opportunistic screening appears to be feasible and a cost-effective strategy for risk screening. A strengthened PHC can serve as a focal point for NCD prevention and control.

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