Perspective

Capacity-building of the allied health workforce to prevent and control diabetes: lessons learnt from the National Initiative to Reinforce and Organize General Diabetes Care in Sri Lanka (NIROGI Lanka) project

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ABSTRACT

In 2008, to tackle the exponential rise in the clinical burden of diabetes that was challenging the health systems in Sri Lanka, a shift in focus towards patient-centred care linked with community health promotion was initiated by the National Initiative to Reinforce and Organize General Diabetes Care in Sri Lanka (NIROGI Lanka) project of the Sri Lanka Medical Association. Specific training of “diabetes educator nursing officers” (DENOs), field staff in maternal and child health, footwear technicians, and health promoters from the community, was instituted to improve knowledge, skills and attitudes in the area of control and prevention of diabetes. This article highlights some of the activities carried out to date with the allied health workforce and volunteer community. Specifically, it describes experiences with the DENO programme: the educational and administrative processes adopted, challenges faced and lessons learnt. It also highlights an approach to prevention and management of complications of chronic diabetic foot through training a cohort of prosthetics and orthotics technicians, in the absence of podiatrists, and an initiative to provide low-cost protective footwear. Harnessing the enthusiasm of volunteers – adults and schoolchildren – to address behavioural risk factors in a culturally appropriate fashion has also been a key part of the NIROGI Lanka strategy.

Key words: allied health workers, capacity-building, diabetes education, health promotion, primary care, Sri Lanka

BACKGROUND

As in other lower-middle-income countries of South-East Asia, the Sri Lankan health service has been severely challenged in recent decades by a rapid rise in the clinical burden of chronic noncommunicable diseases (NCDs), chiefly diabetes and cardiovascular disease (CVD). Chronic NCDs require a continuum of clinical care, with a holistic outlook that must focus on a patient-centred approach with emphasis on strategies for behavioural modification and self-care at primary level. The total-care approach translates into empowering the patient and family to tackle chronic disease, with the primary goal of reducing life- and limb-threatening complications and securing quality of life. This approach also aims at effective prevention and control of chronic NCDs in the community. Appropriate strengthening of the health system towards achieving these goals must target existing systems operating at differing levels of clinical care. At the same time, population-wide health promotion is required, to minimize the risk factors.

More than a decade ago, the Sri Lankan system for healthcare delivery was poorly structured to accommodate the demands from the rising numbers of individuals with diabetes, particularly the requirement for appropriately trained healthcare providers. The National Initiative to Reinforce and Organize General Diabetes Care in Sri Lanka (NIROGI Lanka)
project was initiated in 2008, by a volunteer group of dedicated medical doctors who formed the Diabetes Prevention Task Force of the Sri Lanka Medical Association.4 With financial support from the World Diabetes Foundation, the project aimed to streamline diabetes care in Sri Lanka, with a focus on the lower socioeconomic groups. Although these groups are eligible for free state-sector health care, high “out-of-pocket” expenditures are incurred by individuals and families with diabetes and CVD.5 Many people with chronic illnesses such as diabetes were not receiving support for self-management, resulting in unacceptably high rates of inadequate disease control and preventable complications – the vast majority of the health workforce focused on curative care and only a minority were involved in preventive activities.6 The mismatch between the needs of patients with chronic problems and the traditional health systems caring for them, induced researchers to compile the evidence for appropriately redesigned clinical health-care support systems for managing chronic diseases, using a chronic care model.6

The challenges faced in ensuring health-care professionals are trained in supporting patients with chronic incurable diseases requires recognition of the health and long-term care needs for individuals, simple rules for health care, and making the patient perspective a priority in policy and planning. Health systems have been confronted with the challenges of such goals, particularly when they remain conventional in nature. Patient-centred care requires greater empowerment and activation of patients and consumers.7 The use of evidence-based care planning, reorganizing practice systems and provider roles, improving support for patient self-management, and increasing access to expertise and clinical information are recognized challenges of reorganizing existing health systems to suit the needs of patients with chronic disease such as diabetes, through primary care or through specialized care settings.8 Recognizing the exponential rise in trends and future projections for diabetes,9 and taking into account the authors’ opinion that the response of the Sri Lankan state-run health-care system in tertiary care was suboptimal, voluntary support was used for a project that targeted capacity-building of allied health-care professionals and made use of published approaches that were pragmatic and achievable in the local setting.

THE NIROGI LANKA PROJECT

The NIROGI Lanka project started in 2008. The project has several components that have developed in parallel and that share a focus on empowering existing allied health workers and the volunteer community. The first phase of the project provided capacity-building to establish a cohort of “diabetes educator nursing officers” (DENOs) – the first such programme in Sri Lanka. The NIROGI Maatha component enabled field-based public health nursing sisters and midwives to initiate national-level universal screening for diabetes in pregnancy and to support pregnant women with diabetes and their families to adopt healthy lifestyles. In the NIROGI Paadha component, a pioneer cohort of prosthetists and orthotics technicians were trained to provide patient support in the care of diabetic foot, and a shoe manufacturer developed diabetes-specific protective footwear. In the NIROGI Diviya component, health-promotion volunteers were trained to empower communities from work, school and community settings. This article describes these components, together with the processes adopted and challenges faced in addressing this hitherto relatively neglected area.

### CAPACITY-BUILDING OF DIABETES EDUCATOR NURSING OFFICERS

Starting in September 2009, a programme was developed to train a cohort of DENOs to serve throughout all nine provinces of Sri Lanka. The goal was to train 300 nurses. The hospitals from which the nurses were selected for training were required to have at least one specialist doctor (physician, general surgeon, obstetrician or paediatrician) who could supervise the work of the DENOs. Potential DENOs were selected by the hospital administrator and chief nursing officer, according to predetermined selection criteria. The training programme was structured as per International Diabetes Federation modules, with an in-house module developed on gestational diabetes. Each module specified the required behavioural change communication skills required for an educator on diabetes and was reviewed by subject experts. For each module, a grid of competencies to be achieved, which served as the curriculum blueprint, was developed. Lesson plans were then developed by senior experienced nursing tutors. Training was conducted in batches of 50 during a 2-week residential course at the Post Basic Nursing School in Colombo; this was followed by a 3-day refresher course 6–8 months later. Knowledge retention was assessed by pre- and post-training tests. Clear job descriptions were developed, with an outline for monitoring on-the-job functions of trainees by their hospital nursing and physician supervisors. Further recommendations for patient education were developed, based on feedback from clinical supervisors and trainees following their first 6 months of functioning as DENOs. This entailed rational time allocations and feasible numbers of patients to be provided formal diabetes education on an individual basis, for the newly diagnosed patients and for groups of follow-up patients. Data collection and provision of reports to the project office was also encouraged.

Upon project completion in September 2012, 279 nurses from government institutions were trained, representing 131 hospitals based islandwide. In addition, 64 diabetes educator nurses from the private sector (35 hospitals) and 74 health educator nursing officers in state hospitals were trained, in response to the demand. This gave a total of 417 trained nurses, well beyond the original goal.

### Teaching aids and methods

A comprehensive training manual and guide with information, education and communication materials were developed. Training was by lectures, group work, role-play and visits to hospital wards and clinics supervised by subject specialists in diabetes, internal medicine, surgery, clinical pharmacology, public health, child health and women’s health. The DENOs
were trained to take a lead role in outpatient clinics, in patient registration, anthropometric measurements and education on healthy lifestyle, smoking cessation, adherence to treatment, complying with follow-up appointments, insulin self-injection, and self-monitoring of blood glucose for those with access to glucometers. A tool kit of teaching aids (leaflets, patient record books, DVDs, flash cards, posters and food tables) was given to each trainee, along with PowerPoint teaching slides and simple screening tools. Certified DENOs were also encouraged to provide on-the-job training to ward-liaison nurses, to ensure expansion of a diabetes-specific nursing service. In parallel, 20 senior nurse tutors were trained, to ensure the sustainability of training that is specific to diabetes education. The final two batches of training were led by these trained tutors.

Further expansion of the activities of diabetes educator nursing officers

The NIROGI Lanka project has continued to arrange an annual 1-day session for all DENOs from 2012 to date. Timed to take place a month before World Diabetes Day, this provides a forum to review DENOs’ progress, in the presence of their supervisors, maintain the momentum of their commitment, identify gaps and encourage sharing of achievements, and provide updates on initiatives for gestational diabetes and diabetic foot. Group presentations made from the provinces demonstrate a tremendous level of dedication and work. Common challenges faced are inadequate educational material for teaching to match the demand, lack of separate space, and logistics for providing comprehensive diabetes education for inpatients.

Opportunistic screening has been integrated to the DENO duties. Thus, apart from diabetes clinic days, DENOs perform screening on a regular basis, using a simplified questionnaire. Beyond this, staff screening and outreach programmes arranged by the local health authorities are also undertaken by DENOs, under the supervision of their consultants. Six targeted primary health facilities in the city of Colombo that piloted a model of primary care for diabetes in phase 1 also used DENOs who were specially trained for primary care. Useful actions, such as rewarding the best controlled patients, were introduced by these DENOs, with greater integration of preventive and curative care at community level. Foot care was included in the nurse training module (complementary to the guidelines for management of diabetic foot care developed in phase 2 by NIROGI Paadha), which has enabled improvements in early recognition of the high-risk foot.

To date, the DENOs remain an important human resource in providing quality care to individuals with diabetes, under the supervision of consultants, predominantly in the outpatient department, and supplementing diabetes-specific care for inpatients, along with community education and empowerment. There is still a need to establish a focal point for DENOs to communicate with and obtain support to resolve technical and administrative issues, outside the NIROGI project. The Ministry of Health has accepted this responsibility in principle, and the draft National Action Plan for NCD Control and Prevention includes a commitment to sustain diabetes education. Currently, the follow-up system for diabetes education operates mostly in an ad hoc manner. There is no formal information system on the DENO work output. Hence, the authors recommend establishment of a proper system of information on the DENO service. As a step towards sustainability, inclusion of diabetes education in the core nursing curriculum is recommended.

NIROGI MAATHA: FIELD-BASED MATERNAL AND CHILD HEALTH

In the NIROGI Maathä component, the Family Health Bureau, the focal point in the Ministry of Health for training and supervision of the field-based maternal and child health personnel in Sri Lanka, collaborated with the NIROGI project.
in developing a training module on screening and management of diabetes complicating pregnancy. Emphasis was put on preconception assessment and universal screening, using field-based glucometers; lifestyle modification through diet and physical activity during pregnancy to supplement tertiary care management of diabetes in pregnancy; and highlighting the need for annual screening well beyond the traditional postpartum period of 6 weeks for these high-risk mothers. Supplementary information, education and communication materials and teaching aids were developed and reviewed by experts. A national-level 1-day training of trainers from throughout the country was conducted for provincial consultant community physicians and district-level medical officers for maternal and child health \( (n = 150) \), and their feedback on issues of feasibility, implementation of universal screening and collection of data on pregnancy morbidity was obtained. Field-based training was decentralized, where medical officers of health were then trained at district level \( (n = 325) \), with distribution of information, education and communication material and data-collection formats. At health-divisional level, the medical officers of health, in turn, trained 45 public health nursing sisters, 231 supervisor public health midwives and 5757 public health midwives, giving a total of 6033 field-based primary care health personnel being targeted with pregnancy diabetes-specific training.

At the time of reporting, an evaluation of this intervention led by the Family Health Bureau is being formulated to assess the amount and distribution of field-based activities and challenges faced in relation to gestational diabetes and its management at grassroots level throughout Sri Lanka.

**NIROGI PAADHA: PROSTHETICS AND ORTHOTICS OFFICERS**

The NIROGI Paadha component started in 2013. A group of 10 allied health workers with a diploma in prosthetics and orthotics awarded by the Sri Lanka School of Prosthetics and Orthotics were selected for further diabetes-specific training for 2 weeks, in two centres of excellence in south India – CMC Vellore and Jain Institute Bangalore – as a training of trainers opportunity. Two senior technicians from a shoe manufacturer (the largest local manufacturer with 220 sales outlets and committed to a corporate social responsibility project with the Sri Lanka Medical Association) were also included in this group.

The 10 trained prosthetics and orthotics officers and technicians from the industry, in conjunction with the Sri Lanka School of Prosthetics and Orthotics, conducted a national-level training programme for 50 other prosthetics and orthotics officers at Ragama Rehabilitation Hospital, targeting the government and private sector. The training was a 7-day full-time in-service programme that included practical inputs on general diabetes care, complications of diabetic foot, and the basis of surgical management, diabetes education, and the need for shoe modification and manufacture. Competency gained was assessed by pre- and post-test evaluations. From among these trainees, 34 are now placed in prosthetics and orthotics workshops of state hospitals throughout the country. It is too early to assess the impact of this training on delivery of patient care, although the authors believe that the inclusion of this group of allied health professionals has encouraged institutionalization of a concept of total foot care within the Sri Lankan health system. It is noteworthy that, at the time of reporting, 10 prosthetics and orthotics workshops are functioning at teaching and provincial hospitals in Sri Lanka where the trained officers are employed by the government, with a view to developing the services of shoe modifications for individuals with diabetes, while the supply of prosthetic and orthotic devices for amputees still accounts for the bulk of the workload. The Sri Lanka School of Prosthetics and Orthotics has also included a teaching component on the care of diabetic foot in its revised curriculum.

**NIROGI DIVIYA: HEALTH-PROMOTION FACILITATORS**

The NIROGI Diviya project was initiated in 2009 to establish volunteer-led low-cost health promotion that is applicable in highly urban and semi-urban areas in Sri Lanka. A group of health-promotion facilitators (HPFs) were selected, based on their willingness to work as volunteers with no provision of incentives. They were hand-picked by the medical officers of health of the selected areas, based on the commitment and enthusiasm they displayed during public-health-related work they had previously carried out. HPFs were based in schools, workplaces and the community and showed wide variation in age, sex and educational level – housewives and bank managers were trained alike.

Training was carried out by a central team of experts with experience in health promotion at grassroots levels. Inaugural training included development of soft skills in negotiation, team-building and leadership. Each HPF had to recruit 10–15 persons interested in changing their own behaviour. The health-promotion process was initiated: measuring risk behaviour related to unhealthy diet, physical inactivity, alcohol use and tobacco smoking, and mental well-being; identifying the factors underlying these behaviours; and addressing these factors using culturally appropriate activity-based strategies developed in the local context. The HPF-led groups met regularly. Interventions were all activity based, with social participation. Knowledge, and development of positive attitudes and skills were emphasized, with the HPFs playing only a facilitator role. HPFs also empowered group members to initiate their own settings with 10–15 participants, which led to a rippling effect. Schoolchildren have been trained as “health messengers”; to engage their peer groups and families using a life-cycle approach to prevention of NCD. The health-promotion process has been expanded through organizations like societies for women and children. Table 1 depicts the numbers and settings of the groups initiated each year to date. With regard to sustainability, of the 236 groups that had been started by 2012, 172 (73%) were still functioning in 2015.
Tools developed and additional activities

Tools developed include health-education material (leaflets and posters), interactive exhibition kits (quiz programme, flip charts, buffet table, food pyramid), a health-promotion book, an annual calendar with health messages based on community art competitions for children, an interactive DVD on physical activity for adolescents and adults, and a calendar (2015) for self-appraisal of health-promotion activities throughout the year. The HPF programme has also been embedded within a wide range of regional and national advocacy activities, including outreach programmes in rural settings and a mobile screening facility for all settings.

The application of this low-cost health-promotion model has been successful in highly urban and semi-urban settings in Sri Lanka in empowering community members, workforces and schoolchildren to engage in healthy lifestyles (see Table 2). Interventions were tailored to address the underlying determinants of behaviour of participants, with an emphasis on the process of changing behaviour rather than conducting one-off activities.

**CONCLUSION**

NIROGI Lanka has shown that it is feasible, in a south Asian country, to empower allied health staff, consisting of diabetes nurse educators, field-based maternal and child health staff, and prosthetics and orthotics technicians, along with community leaders and the general public, on the multiple actions required for the control and prevention of diabetes and cardiovascular risks, through the existing health-care system. However, such an approach requires multidisciplinary inputs and advocacy towards a holistic patient-centred approach to managing chronic disease and requires long-term evaluation and monitoring.

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**Table 1. Numbers of health-promotion groups initiated by year (2009–2015)**

<table>
<thead>
<tr>
<th>Health-promotion groups by type</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools in highly urban settings</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>8</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Workplaces in highly urban settings</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Schools in semi-urban settings</td>
<td>8</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Workplaces in semi-urban settings</td>
<td>6</td>
<td>7</td>
<td>11</td>
<td>16</td>
<td>14</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Community settings in both highly urban and semi-urban settings</td>
<td>17</td>
<td>37</td>
<td>46</td>
<td>62</td>
<td>54</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>54</td>
<td>66</td>
<td>85</td>
<td>87</td>
<td>64</td>
<td>63</td>
</tr>
</tbody>
</table>

**Table 2. Health-promotion activities: cumulative numbers for project indicators (2012–2015)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Targeted population</th>
<th>Cumulative number to date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provided training in primary prevention</td>
<td>Teachers</td>
<td>413</td>
</tr>
<tr>
<td></td>
<td>Primary and secondary schoolchildren</td>
<td>2135</td>
</tr>
<tr>
<td></td>
<td>Parents (via schools)</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provided training of trainers</td>
<td>Health-promotion facilitators</td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>Employees in work settings</td>
<td>1810</td>
</tr>
<tr>
<td></td>
<td>Schoolchildren (as “health messengers”)</td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>Community group participants</td>
<td>1052</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitized to diabetes control and prevention</td>
<td>Schoolchildren and their families</td>
<td>3948</td>
</tr>
<tr>
<td></td>
<td>Members of the general public</td>
<td>9398</td>
</tr>
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</table>
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REFERENCES


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