Early detection of chronic diseases and their risk factors: a women empowerment model from Kerala, India

Safraj Shahul Hameed

Identification of risk factors through screening is an important tool in the fight against chronic diseases. We have used a unique model, named Saantwanam (to console) in Malayalam language, for health screening in Kerala, India.

Under the Saantwanam programme, government selects suitable women care-givers who are trained and equipped by a nongovernmental organization through loans from a public sector bank. After training, care-givers deliver screening services by measuring the weight and height, and blood pressure, glucose and cholesterol levels of people concerned in their local communities at a reasonable fee-for-service that provides a source of income to them. All care-givers are trained to counsel on healthy living, i.e. appropriate diet, exercise and unhealthy habits such as tobacco consumption. When cases are detected they are referred to local physicians and later on followed up by care-givers at their residence.

In the last five years, the Saantwanam programme has screened more than 300 000 people for various diseases and risk factors. They have been counselled to avail of health-care services. The Saantwanam model does not cause additional expenditure to the government for early detection of chronic diseases and their risk factors. Moreover, it ensures that the care-givers are rewarded for their effort. However, before large-scale implementation of this model, measurement of baseline risk factors in a sample population should be done so that their impact can be measured at a later date. The cost-effectiveness of the model also needs to be determined.

Key words: Health, screening, chronic diseases, empowerment, women, India.

Introduction

Recent studies report that chronic diseases have displaced communicable diseases as the leading cause of death and disability in India.1, 2 Chronic diseases are estimated to have caused a cumulative loss of 16.68 billion rupees to the Indian Gross Domestic Product (GDP) between 2005 and 2016.3 Large financial costs pose significant difficulties for assessment of the prevalence, and provision of treatment services for chronic diseases in a large developing country like India. Identification of risk factors through screening is an important tool in the fight against chronic diseases.

a Health Action by People, 7/1724, Temple Road, Kochulloor, Trivandrum, Kerala 695011, India.
Correspondence to Safraj Shahul Hameed (email: Safraj@gmail.com)
Among the Indian states, Kerala is at the most advanced stage of an epidemiologic transition that has brought about a dramatic change in the disease profile. Kerala, with a population of over 31 million in 2000 has the longest life expectancy and the lowest infant mortality rate in India. The Kerala model of development, characterized by a high level of human development and a low level of economic growth, has been much discussed in academic circles, most notably by Amartya Sen.

Now lifestyle diseases are the major cause of death in Kerala. The burden of deaths from cardiovascular diseases now exceeds that of industrialized countries. However, necessary reorientation of a public health strategy that focuses on chronic diseases has not yet taken place. This has resulted in high prevalence of many chronic diseases and risk factors in Kerala. Therefore, a unique public-private partnership model of health screening, which relies on entrepreneurship, has been developed in Kerala.

**Saantwanam, a home-based health screening programme**

Saantwanam means “console” in Malayalam, the local language in Kerala. Saantwanam was conceived by Health Action by People (HAP), a nongovernmental organization (NGO) based in Kerala, which is devoted to public health research. The Saantwanam programme is run in partnership with the State Bank of India, the largest public sector bank in India, and Kudumbashree, the poverty alleviation wing of Kerala government.

The aims of the Saantwanam programme are to: (1) identify adults with one or more risk factors for chronic diseases and refer them to physicians for advice; (2) help patients with risk factors or disease to monitor their condition regularly, and help reduce complications; and (3) provide health education to people. These aims are achieved through creation of a network of “home care-givers” – young educated women, who are trained in the science of health screening. Trained “home care-givers” reach out to every home in their locality where individuals are screened for the presence of major risk factors and diseases. Those who have risk factors or are already suffering from diseases and are under treatment are monitored regularly to assess the progress of treatment. These services are provided for a fee at an affordable cost. Thus a member of the Saantwanam programme or “care-givers” involved in household screening and monitoring earns a decent income by providing the envisaged services.

Kudumbashree, a government of Kerala enterprise, is entrusted with the task of identifying and selecting deserving candidates from among the eligible population using the following eligibility criteria. The “care-giver” candidate shall (i) ideally belong to a below-poverty line family; (ii) be nominated by the “local self government” and Kudumbashree; (iii) have a minimum of high school education; (iv) have a valid two-wheeler driving licence or would obtain one after completing the training; and (v) undergo a one-week residential training in health-screening methods.

A five-day training programme for selected candidates is organized by HAP. The training provided by epidemiologists and physicians consists of theory and practice sessions. Screening methods and common disease conditions in Kerala are taught during the theory sessions. Practical training on measurement techniques and safe handling and disposal of waste are also provided. A certificate of successful completion of training is provided along with an instruction booklet.
After completing the training the care-givers who possess a two-wheeler driving licence are provided assistance by Kudumbashree to obtain bank loans and other financial subsidies. On receipt of application, the State Bank of India provides collateral-free loans up to Indian rupees 50 000 (US$1250). Once the necessary financial assistance is secured the amount is used for obtaining the necessary equipment (see Box 1).

The success of the programme depends on access to the services. Mobility and outreach are ensured through the provision of a motor bike/scooter and a mobile telephone. All equipment used in the Saantwanam programme conforms to the standards recommended by the World Health Organization.

Methods
The care-givers of the Saantwanam programme, at the household level, measure and take readings for height, weight, body mass index (BMI), body fat, blood pressure, blood glucose, cholesterol, triglycerides, urine sugar and albumin. All measurements are carried out using standardized methods for which care-givers are trained. The equipment is also standardized and calibrated periodically.

Height is measured using a custom-built anthropometric rod that can be easily carried by the care-giver. The subjects are asked to stand close to the wall and their height measured using the adjustable anthropometric rod. The BMI is calculated from the height and the weight measurements using a calibrated electronic weighing machine. The blood pressure is measured after making the subject sit down, and the procedure is carried out in a standardized manner that is explained to care-givers during their initial training. Random capillary-blood-glucose level is measured using the standardized glucometer and a repeat test is advised for those showing high values. All subjects with higher-than-normal values are advised to consult physicians of their choice in public or private sector. All initial tests including lipid measurements are done at random; subsequent tests, if required, are carried out after fasting. Sterilized, disposable needles and swabs are used for finger-prick blood collection. Care-givers provide the test results in a standardized form with indicated healthy ranges.

Care-givers are required to visit the households in their area at least once a month. All data collected by care-givers are transferred

---

**Box 1: Equipment used by Saantwanam care-givers in Kerala, India**
- Abbott optium sensor glucometer
- Omron digital blood pressure monitor
- Roche Accutrend GCT machines for cholesterol and triglycerides
- Omron body fat monitor
- Tanita weighing balance
- Anthropometric rod
- Electronic calculator
- Nokia mobile telephone
- Glucose strips, swabs and lancets
- Two-wheeler (motorcycle or scooter)
Early detection of chronic diseases and their risk factors

Safraj Shahul Hameed

Table 1: Fees charged by Saantwanam care-givers for their services in Kerala, India

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Fee (US currency)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood glucose</td>
<td>62 cents</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>25 cents</td>
</tr>
<tr>
<td>Body mass index</td>
<td>25 cents</td>
</tr>
<tr>
<td>Serum cholesterol</td>
<td>1.5 dollars</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>1.5 dollar</td>
</tr>
<tr>
<td>Urine sugar and albumin</td>
<td>13 cents</td>
</tr>
</tbody>
</table>

*One US$ = 40 Indian rupees

...to HAP where they are stored and analysed. Care-givers also have telephonic access to physicians involved with the programme. Any doubts and concerns that the subjects might have during the screening are addressed by connecting the patient to the physician over the mobile phone. As mobile phones are part of a corporate user group, the care-givers do not incur any expenses for calls within the network.

The cost of equipment and training material is estimated at US$ 1250 per care-giver. The equipment is purchased and distributed by HAP directly from the manufacturers. The equipment is also warranted by the manufacturer. The breakdown time is limited to one working day since HAP provides replacements. All consumables are bought by HAP directly from the manufacturers. These are provided to care-givers at prices significantly lower than the prevailing market price. The consumables are couriered to care-givers within a day of receiving the order. After completing six months the care-givers are required to pay a fee of US$ 12.50 per month to HAP for covering the administrative costs. Caregivers charge a reasonable fee for service, which is a source of some revenue for them. At the same time, this model makes the services affordable to the public. The fees charged for services by care-givers is presented in Table 1.

Results

The project was launched on 8 October 2005. Out of the 561 participants who attended a series of 13 training programmes conducted till May 2008, 239 were inducted as Saantwanam care-givers. Fifty-nine care-givers have since discontinued. The Saantwanam programme currently covers both urban and rural areas in all districts of Kerala. More than 300 000 people have been screened so far for diabetes, hypertension and hypercholesterolemia as part of the programme. If family members are also included more than one million adults have been exposed to individual-level health education provided by the care-givers since the start of the programme. The number of tests done and the revenue generated as...
part of the programme is shown in Table 2. About 50,000 new cases of diabetes were detected and referred to local physicians. It is important that the quality of diagnosis and care provided by care-givers is monitored regularly. Five supervisors conduct spot checks and households are also contacted to provide feedback on programmes. Moreover, regular re-training programmes are conducted to ensure that care-givers’ knowledge and skills remain current and relevant.

**Discussion**

Community participation is the hallmark of the Saantwanam programme right from the selection of care-givers. The training component is supported by the government of Kerala. Care-givers are then deployed in their own communities. All care-givers are trained to provide counselling on healthy living that includes appropriate diet and exercise as well as unhealthy habits including tobacco consumption. When cases are detected they are referred to local physicians. Patients diagnosed with hypertension/diabetes are followed up in the community by care-givers and their routine blood tests are carried out at their residence. The care-givers being part of local women’s self-help groups regularly meet with the local government officials to discuss health-related issues in the community. As a result of these discussions, screenings of people in marginalized communities undertaken by care-givers, are now subsidized by the panchayat - an elected body of local self-governance. The project is now considered by local governments as part of the health system, thus, ensuring long-term sustainability.

Community-based health programmes have been shown to increase awareness, help identify patients at high risk, as well as community-based interventions, and increase adherence to chronic disease screening. A large-scale multipronged diabetes awareness programme provided through community involvement as part of the Prevention Awareness Counselling and Evaluation (PACE) project in Chennai, reported that such programmes are effective in heightening the

### Table 2: Number of tests performed and sales revenue generated by Saantwanam care-givers from 2005-2011 in Kerala, India

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Number of tests*</th>
<th>Sales revenue (US dollars)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood glucose</td>
<td>332400</td>
<td>207750</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>30500</td>
<td>45750</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>500000</td>
<td>125000</td>
</tr>
<tr>
<td>Body mass index (BMI)</td>
<td>300000</td>
<td>50000</td>
</tr>
</tbody>
</table>

*Blood glucose and cholesterol measurements calculated from the number of glucose and cholesterol strips bought by care-givers and blood pressure and BMI based on the data provided by care-givers

** Sale revenue refers to the fee-for-service received by care-givers.
Early detection of chronic diseases and their risk factors

Safrajul Hameed

awareness among many different segments of the population. A study from the United States of America reported that community-based screening can be used as a method for identifying the high percentage of patients at risk for diabetes or with undiagnosed diabetes in an inner-city immigrant/mixed-ethnic population. The Bootheel Heart Health Project reported that even with modest resources, community-based interventions show promise in reducing self-reported risk for cardiovascular disease within a relatively brief period. A qualitative study done on why community health workers called “promotoras” increased adherence to chronic disease screening among women along the United States-Mexico border, reported that community health workers can play a crucial role in the health care team, and that both clients and clinicians recommended working with them to increase adherence to chronic disease screening.

The Saantwanam programme holds opportunity for scaling up and there is scope for further improvement. Health education using books, pamphlets, posters and video are planned for the coming year. However, before any large-scale implementation, the baseline risk factors in the population should be measured so that their impact can be assessed at a later date. One of the limitations of this project is that we did not have the baseline data on risk factors. The selection of suitable candidates is important for the success of the programme. Most caregivers who discontinued working, reported on subsequent interviews that they were not clear about the type of work involved. The nature of the work involved should be explained clearly at the time of selection. The use of portable electronic equipment instead of paper forms could facilitate the capture and storage of patient data by making the process easier and safer.

There is a definite potential to include more diagnostic tests and services like first aid, wound dressing and cancer screening, etc. Incorporation of WHO Package of essential noncommunicable disease interventions (WHO-PEN) protocols in the training programmes can help assess the risk of death from cardiovascular diseases in 10 years. These protocols have been developed taking into consideration limitations in low-resource settings where even referrals can be very difficult and delayed due to lack of transport and accessibility. Suitably trained caregivers might be able to prevent or manage noncommunicable NCDs locally and at the first-contact point with the patient.

Organizations and individuals in other parts of the world can use this model with suitable variations to provide health-screening services and to generate employment for women. This model involves no additional expenditure to the government while at the same time ensuring that the individuals involved are rewarded for their effort.

References

Safraj Shahul Hameed

Early detection of chronic diseases and their risk factors


