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## Original Research Article

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# Development and Evaluation of a Training Programme on Primary Prevention of Diabetes for Primary Care Physicians

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## Abstract

**PURPOSE:** To strengthen the capacity of primary care physicians in prevention and control of diabetes in Tamilnadu State in India.

**METHODS:** A 2-day workshop focusing on diabetes, its prevention and control was carried out. The impart of the training programme was evaluated in two parts – (i) knowledge assessment done by administering a tool to the doctors before the start and towards the end of the sessions and (ii) clinical practice assessment - interviewing the doctors to assess diabetes service delivery, after six months.

**RESULTS:** A significant improvement in identification of risk factors and high risk groups, primary prevention methods, screening and diagnostic procedures and treatment of diabetes by the physicians were observed. After 6 months, considerable improvement in diabetic care delivery to patients at community level was observed and some physicians had started organizing screening and awareness campaigns in their communities.

**CONCLUSION:** Diabetic health care at primary health care level can be considerably improved through sensitization and effective educational programmes.

**Keywords:** Diabetes; Training programme; Primary care physicians.

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## Introduction

It is projected that diabetes may affect 366 million people by 2030 [1]. Among these, India alone may contribute to 79.4 million, which is equivalent to 21.7 % of the world population with diabetes. Hence it has been reported that India is the diabetes capital of the world [2]. Being a metabolic and vascular disorder, it is also associated with other complications [3-5]. The global epidemic of diabetes has created enormous burden both on people with diabetes as well as on the healthcare providers. It is reported that, diabetes exerts a huge burden on treatment expenditure and the presence of a co-morbid condition or a complication further increases the cost significantly [6]. The healthcare delivery system in India has to be enhanced to cope with the disease burden. The doctor population ratio in India is a record low of 1:3500 as against 1:500 for developed countries [7]. Institutions imparting post graduate programmes in diabetology are very few in India which reflect upon the lack of qualified diabetologists in India.

Evidence from research suggests that education and adoption of healthy lifestyle delays the conversion of high risk cases from pre-diabetes to diabetes [8,9]. There are many studies demonstrating the effectiveness of patient based education programmes [10,11]. All these studies provide evidence on the positive impact of education either on prevention or successful control of diabetes. Training the doctors in translating the available knowledge and evidence on primary prevention of diabetes to the community was the unique goal of our study. Thus our main aim was to test the efficacy of the education programme on the knowledge, attitude and practices and level of motivation of the doctors during diabetes service delivery and thereby try to evolve a model training programme for doctors on primary prevention of diabetes.

With this background, there was an urgent need to train the primary care physicians in diabetes and its prevention. Hence the

training programme on primary prevention of diabetes was launched in 2008 in collaboration with the Government. This paper discusses the methodology and the effectiveness of the training programme.

## Methods

### Collaboration with government

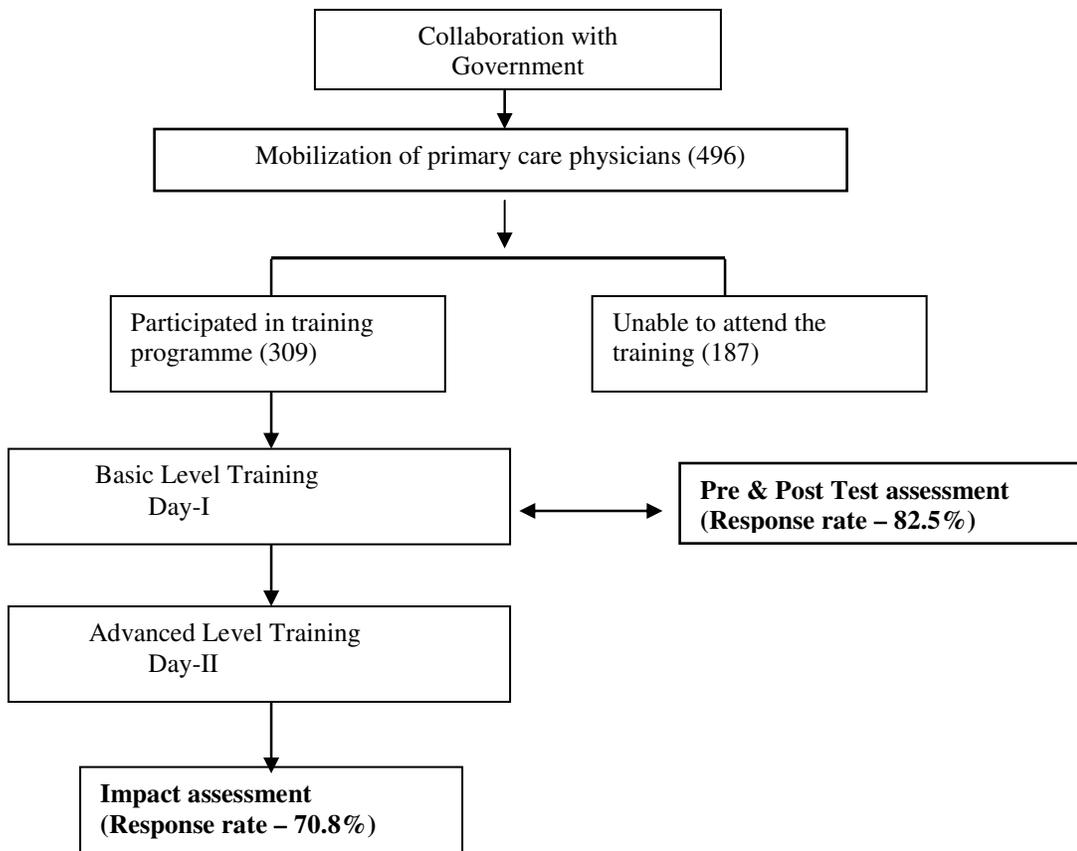
A proposal to train the Medical Officers serving in the government sector in the rural and urban parts was submitted to the government and approval was obtained by the appropriate Officer in Chief (Health Secretary) of the Department of Health and Family Welfare. Three districts were allotted by the government for implementation of the training programme. One joint director and two deputy directors of each of the three districts were responsible for mobilizing the doctors for participating in the training programme.

### Programme details

The name list of the primary care physicians serving in the government sector of all the three districts was obtained and a letter of communication to attend the workshop was sent to all the doctors undersigned by the Health Secretary. There were 496 primary care physicians serving in the three allotted districts, out of which 309 were able to attend the programme.

The training was imparted in a biphasic manner. Phase I training consisted of lectures on diabetes and its prevention at primary care level and Phase II focussed on prevention of diabetes at community level. A two days workshop was conducted for imparting the training. The course content was covered by a multi-disciplinary team consisting of a diabetologist, epidemiologist, senior biochemist and a nutritionist, who had sound knowledge in their respective discipline and experience, of up to 15 years.

Evaluation was done in two parts - Knowledge assessment and Clinical Practice



**Figure 1:** The framework showing the steps involved in the training programme for primary prevention of diabetes

assessment - both by administration of questionnaires. The schematic sketch of the programme is represented in figure 1.

### Course Curriculum

The curriculum was designed by a team of experts focussing on primary prevention of diabetes consisting of officials from the government, diabetologists and consultant epidemiologists. Their suggestions and recommendations were incorporated and approval was later obtained for the course curriculum. The details of the phase I and II course content are shown in Table 1. The phase II curriculum was unique in design by inclusion of the topic research methodology, as it was suggested by World Health

Organization during a meet on “Prevention and control of non communicable diseases” at Geneva in August 2008, that the practicing clinicians of low middle income countries should receive training in research or investigative medicine to prevent and control the epidemic of non communicable diseases.

Each topic was covered by highly educated, experienced and senior faculty members. Since primary prevention of Diabetes requires significant lifestyle changes, the teaching and motivation skills to enhance behavioral change were incorporated and imparted. The two day workshop was made interesting and lively by electronic display of education materials, active interaction and panel discussion.

**Table 1:** Details of curriculum of the training programme

Topic	Type of Faculty
<b>Phase I (9.00 am – 5.00 pm)</b>	
Epidemiology and Burden of illness of Diabetes	Epidemiologist
Lab Diagnosis and monitoring of diabetes	Biochemist
Overview of Diabetes and its management	Diabetologist
Lifestyle modification in diabetes prevention	Educator
Dietary guidelines for diabetes prevention	Dietician
<b>Phase II (9.00 am – 5.00 pm)</b>	
Evidence from literature from studies on primary prevention of diabetes and implementation of prevention strategies in the community	Epidemiologist
Research methodology	Epidemiologist
Latest trends in diabetes management	Diabetologist
Panel discussion on prevention of diabetes by lifestyle modification	Diabetologist/Dietician/Educator

### Development of education materials

A concise pocket sized manual measuring 15.2 x 10.3 cm consisting of 32 pages focusing on diabetes burden and its primary prevention was prepared, by the above faculty members. The manual was written in simple English avoiding certain complicated medical terminologies so that the doctors can use it as a tool while teaching their patients. The manual was translated into the local regional language for the benefit of those who cannot follow English. The main contents of the manual were stages in evolution of diabetes, definition of high risk groups, strategies and approach to primary prevention of diabetes, diagnostic tests, recommendations for optimum biochemical and anthropometric measurements, dietary and physical activity guidelines and methods of creating awareness.

A multi color poster measuring 55.5 x 42.7 cms was also printed focusing on the ten golden rules for primary prevention of diabetes which was meant to be displayed at all the government health centres at all levels. The poster was made attractive and depicted the message in short points as well as by pictographic representation for easy comprehension of those who cannot read.

These education materials were later released by the Minister of the Public Health department at a function in order to create awareness and emphasize on prevention of diabetes.

### Evaluation tools

Two instruments were developed for evaluating the training programme. An expert opinion was obtained for development and approval of both the instruments. The first tool was developed to assess the effect of training on the knowledge levels of the doctors on diabetes. The questionnaire consisted of 25 items in multiple choice formats. It contained questions on risk factors of diabetes, diagnosis of diabetes and methods of primary prevention of diabetes. The questionnaire was pre-tested on a different sample of doctors who had come for a certificate course in diabetology and certain modifications were done. The final version was then administered to the doctors before the start and at the end of the sessions during the phase - I of the training programme.

The second instrument was developed to evaluate the impact of the programme on behavioural and self care attitude, changes

in clinical practice, methods of improving diabetes care and the efforts made by the doctors in organizing community level programmes. It was broadly classified into four sections - personal profile, self realization and self care, capacity building and improving the general practice. This proforma was sent to all the participants and self administered after 6 months of training programme. The data was entered into excel and analyzed by SPSS version 10.0.

## Results

### Knowledge assessment

A total of 309 primary care physicians participated in the training programme. The mean age of the participants was  $36 \pm 8.4$  years. Majority of the participants who attended the programme were serving in rural part of the districts (urban: rural was 38 %: 62%). Around 255 (82.5%) respondents

**Table 2:** Selected responses in the pre- and post-training evaluation

Question	% correct answers	
	before session [N (%)]	after session [N (%)]
What is the prevalence of diabetes in urban India?	135(60)	115(45.0)
What is target HbA1c?	150(58.8)	211(83)*
What is the criteria for overweight?	134(52.5)	215(84.3)*
What is fasting blood sample value for diagnosis of diabetes?	113(44.3)	168(66)*
How can pre-diabetes to diabetes be delayed or prevented?	38(14.9)	119(46.6)*
Which countries bear the most diabetes burden?	204(80)	241(94.5)*
Can diabetes be prevented?	213(83.5)	240(94.1)*
When should screening for gestational diabetes be done?	179(70.1)	237(93)*
Which is healthy diet among Meat /Chicken /Fish?	244(95.6)	253(99.2) #
Overall Score (maximum = 25)	14±2.0	20±2.5

(Nine questions out of total twenty five are listed here)

\* denotes  $p < 0.0001$

# denotes  $p < 0.05$

completed the first questionnaire. The average score obtained from the pre-training evaluation was  $14 \pm 2.0$  (an aggregate of 56 % and 80%) which improved to  $20 \pm 2.5$  after the training. The difference was statistically significant ( $p < 0.0001$ ). Most of the participants had undergone screening for diabetes and even got their family members screened after the training programme as a result of motivation during training. Adoption of health promotion measures like diet control and exercise were also evident. The doctors had improved knowledge on community level prevention programmes and individual counseling on diabetes, screening and diagnostic procedures under different settings and treatment of diabetes – minimal

care and standard care. Table 2 illustrates some of the sample questions and percentage of correct answers obtained before and after the sessions.

Overall, the doctors had improved knowledge on burden of diabetes at global, national and regional levels, risk factors of diabetes, simple identification measures of the high risk groups and strategies for primary prevention of diabetes at community level.

### Clinical Practice assessment

A response rate of 70.8% was obtained. Table 3 shows the details of the effect of the

training programme. Most of the participants showed evidence of positive changes and developments as a result of the training programme. Considerable changes were noticed in self care behaviour and improved diabetes delivery methods. Capacity building of the clinic staff and counseling those at high risk for screening and prevention of diabetes were initiated. Moreover, it was interesting to find that the physicians had started to screen and even identified new cases of diabetes in their health centres. Some of the participants had organized screening and awareness camps for the population at community level.

## Discussion

Our training programme was a very simple and yet an effective model which is suitable for being implemented in developing

countries. The programme resulted in significant improvement in the knowledge levels, and better and improved clinical practice methods of the primary care physicians. The training programme yielded a positive impact on self care and realization which can be considered as a positive sign of improvement. Efforts made at individual level and at community level in creating awareness on diabetes mellitus such as display of the given education materials in the clinics, advising patients at high risk for screening for diabetes, promotion of healthy lifestyle habits and identification of new cases of diabetes are some of the salient points that can be highlighted as an impact of the training programme.

With a high prevalence of diabetes in India and improper National Diabetes Control Programmes, our training programme may

**Table 3:** Measures taken by the doctors after the training

	No (%)
<b>Self care</b>	
Undergone blood test after training	126 (57.5)
Started lifestyle modification	
Combination of Diet and Physical Activity	46 (21.1)
Only Exercise and physical activity	24 (12.0)
Only Dietary Modification	7 (3.2)
Motivated family members for check up	200 (91.3)
<b>Capacity building</b>	
Added more team members for diabetes service delivery	64 (29.2)
Trained the existing staff	106 (48.4)
<b>Improving diabetes service delivery</b>	
Education materials displayed in clinic	156 (71.2)
Started Advising those at high risk for screening	175 (80)
Maintenance of patient file / record	108 (49.3)
Started identifying new cases due to screening	23 (10.5)
Advised LSM and importance of nutrition and weight reduction	204 (93.2)
Advised for regular glucose self monitoring	201 (92)
<b>Efforts at community level</b>	
Organized screening camps	50 (22.8)
Conducted health education and awareness programmes	18 (8.3)

*Changes that are evident among the physicians at various levels – self and family at health centre and at community level as a result of the training programme on primary prevention of diabetes.*

be adopted at the national level for successful training of the doctors on primary prevention of diabetes. This programme may also be extended to include the training of allied health professional like nurses who play a major role in health service delivery in the rural areas. Educating the patients and spreading awareness on diabetes prevention by the physicians will exert a great impact on them, which in turn might help in reducing the burden of diabetes epidemic in the community. In related studies, the influence on intervention practices have been demonstrated in community programmes in Canada [12,13], America [14], Middle East [15].

Despite the present success being reported, long term follow up of these participants is essential to assess the sustainability of the education programme. However, other studies have shown that the impact of an education programme may decline after one year [16]. If this is true, then it is recommended that to have a long term impact, regular training programmes be organized and conducted or low cost strategies need to be designed to maintain sustainability.

The self reported evaluation tool for health professionals sometimes tend to over-estimate the extent of their behavior change. This might be a limitation. Even though there is a significant improvement in knowledge and changes in clinical practice, these may not be sufficient to evaluate the efficacy of an education programme and more reliable indicators like field based comparative studies before and after the training could have been done. But due to several logistic constraints and barriers in conducting the comparative study, it could not be carried out.

## Conclusion

Even though we have adopted a simple evaluation method, our results can still draw conclusions that this programme was a success and that it can be replicated as a

model training programme in developing countries for capacity building among health care personnel in primary prevention of diabetes. At present this programme has been amended, such that the trained physicians in turn train the allied health care staff of the primary health care centers in future.

It is recommended that particular attention should be focused on planning and documentation of the quality of any such programmes. Capacity building and networking among health care and allied professionals are essential to both health and promotion activities in reducing the current epidemic of type 2 diabetes.

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