

# Diabetes Self-Management Education Programs: Current Scenario and Relevance in India

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## Abstract

Diabetes mellitus is an important public health problem in India. With a prevalence of 8.6%, more than 66 million people are suffering from diabetes mellitus in our country. Many comorbid conditions and complications are associated with diabetes. Self-care in diabetes is a key element in the overall management of diabetes. *Diabetes self-care* is defined as the daily regimen tasks that the individual performs to manage diabetes. Poor self-care practices among diabetic patients are largely due to lack of information and support, and can result in poor control of the disease and its complications. In many countries, diabetes self-management education programs are integrated with diabetes care.

In the present article, studies examining the effectiveness of self-care management education programs in various countries have been reviewed. The current scenario in India is discussed, as well as the challenges in integrating such programs.

It has been concluded that such interventions should be culturally relevant, and should be provided in a continuous, on-going manner, so that the results in terms of metabolic control and positive behaviors are sustainable.

**Keywords:** Diabetes mellitus, Self-management, Self-care, Glycemic control, Behavior change

## Introduction

Diabetes mellitus is a major public health problem in India. The International Diabetes Federation (IDF) reported that the total number of diabetic subjects in India was more than 66 million in 2014 and that this would rise to 70 million by the year 2025. The national prevalence of diabetes was reported to be 8.6% in 2014.<sup>1</sup> Although there is scarcity of data from rural areas where nearly 70% of the population lives, recent studies suggest that rural India may soon experience the same epidemic of diabetes as urban areas. A study done in rural south India has reported a prevalence of 13.2% (95% CI 12.1-14.3)<sup>2</sup> while another study from rural Haryana reported a prevalence of 18.5%.<sup>3</sup>

In addition to high numbers, many comorbid conditions and complications are associated with diabetes including renal disease, nervous system disorders, ophthalmic problems, heart disease and stroke. Diabetes mellitus requires lifelong behavioral modifications for effective treatment, such as regular exercise, dietary changes, blood glucose monitoring and medication adherence.

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**How to cite this article:** Kaur R, Madasu S. Diabetes Self-Management Education Programs: Current Scenario and Relevance in India. *Epidem Int* 2017; 2(2): 4-8.

**Digital Object Identifier (DOI):** <https://doi.org/10.24321/2455.7048.201709>

**ISSN:** 2455-7048

## Importance of Self-Care in Management of Diabetes

Self-care in diabetes is a key element in the overall management of diabetes. *Diabetes self-care* is defined as the daily regimen tasks that the individual performs to manage diabetes. It includes a range of activities, viz., self-monitoring of blood glucose, doing regular physical activity, eating a sugar-free and low-saturated-fat diet, adherence to medications and foot care. Relationship between diabetes mellitus self-care and glycaemic control has been extensively examined in the literature.<sup>4-6</sup>

Poor self-care practices among diabetic patients are some of the important variables influencing the progression of diabetes and its complications, which are largely preventable. It has also been observed that the primary barrier to diabetes self-care management resulted from lack of knowledge of target blood glucose and blood pressure.<sup>6</sup>

Globally, self-management education is recognized as an important component for the management of type 2 diabetes. In most of the developed countries, diabetes self-management education (DSME) is provided through diabetes educators, who are an integral part of diabetes care programs. In India, diabetes self-management education is not an integral component of diabetes care clinics in majority of settings, particularly in resource-constrained public health facilities.

## Effectiveness of Diabetes Self-Management Education Programs - Evidence from Other Countries

In recent years, several studies have highlighted that education on self-management may play a pivotal role in illness cognition and hence, may improve metabolic control, adherence to drugs and adoption of a healthy lifestyle.<sup>7,8</sup>

A cluster randomized controlled trial was conducted by Khunti et al. in 13 primary care sites in the United Kingdom, among diabetic patients within 12 weeks of diagnosis. A structured group education program was delivered in the community by trained healthcare professional educators, among patients of diabetes mellitus diagnosed within 12 weeks. The results of this diabetes education and self-management for ongoing and newly diagnosed (DESMOND) program showed that after the intervention, glycaemic control and self-care practices improved considerably in the intervention group. HbA1c levels at 12 months had decreased by 1.49% in the intervention group as compared to 1.21%

in the control group (95% confidence interval -0.22 to 0.17). Although the decrease in mean HbA1C was not significant, there was significant change in self-care practices, depression and diabetes awareness scores. The awareness about the disease and self-care practices was found to be consistent after three years; however, it was found that biochemical control could not be sustained. The study thus recommended that diabetes self-management education programs should be ongoing and integrated with diabetes care.<sup>8</sup>

A meta-analysis of 31 studies showed that diabetes self-management education intervention decreased HbA1c by 0.76% (95% CI 0.34–1.18) more than the control group at immediate follow-up; by 0.26% (0.21% increase–0.73% decrease) at 1-3 months of follow-up; and by 0.26% (0.05-0.48) at 4 months of follow-up. It was concluded that self-management education improves HbA1c levels at immediate follow up, and increased contact time increases the effect. The meta-analysis suggested that further research is needed to develop interventions that are effective in maintaining long-term glycaemic control.<sup>9</sup>

It has also been realized that if diabetes care programs are designed after understanding cultural aspects and knowledge regarding illness of the patients, these may prove to be more effective as compared to a generalized approach. A systematic review of 23 studies done in both developing and developed countries suggested that diabetes self-management education programs are effective in the developing countries but must be tailored to the cultural aspects of the target population.<sup>10</sup>

Ricci-Cabello et al.<sup>11</sup> did a systematic review, meta-analysis and meta-regression to assess the effectiveness of educational programs to promote the self-management of racial/ethnic minority groups with type 2 diabetes, and to identify programs' characteristics associated with greater success. The systematic review and meta-analysis included studies in which at least 90% of the participants pertained to a racial/ethnic minority group considered to be at a higher risk for diabetes complications than the majority population group. The outcomes considered were assessed under three categories diabetes knowledge, diabetes self-management behavior, and clinical outcomes.

The meta-analysis of pooled difference measured immediately after the intervention found that there was a significant reduction in overall HbA1c of -0.31% (95% CI -0.48% to -0.14%). However, only three studies have measured HbA1c at six months post-intervention, meta-

analysis of which resulted in a reduction of  $-0.47\%$ , with no statistical significance ( $P=0.13$ ).

The study found that the interventions delivered face to face  $[-0.37 (-0.62; -0.12)]$  were better than those interventions that used telecommunication. The interventions delivered in individual format  $[-0.45 (-0.75; -0.14)]$  obtained better results than those that followed group format. Interventions which included at least one peer educator  $[-0.54 (-0.93; -0.15)]$  produced significantly better results than those where peer educator was not included. The interventions which included a single teaching method  $[-0.30 (-0.55; -0.04)]$  were found to be better than using multiple study methods.

Content of teaching included diet (most common)  $[-0.35 (-0.54; -0.15)]$ , exercise  $[-0.33 (-0.54; -0.12)]$ , blood glucose self-monitoring  $[-0.26 (-0.48; -0.03)]$ , basic diabetes knowledge  $[-0.28 (-0.53; -0.02)]$ , and medication adherence  $[-0.25 (-0.49; -0.05)]$ , all of which showed better outcomes. However, these outcomes showed better results only when they were measured immediately after the intervention. The meta-analysis of three studies which showed six months post-intervention results was not statistically significant.

Thus for planning any diabetes educational program, one should consider the fact that diabetes is a chronic disease, interventions should include reinforcing the information and efforts should be on improving the long-term outcomes of intervention.

In recent times, mobile phone technology has been proving to be effective in delivering diabetes self-management education. Several studies and systematic reviews have reported that mobile phone interventions are effective in sustaining favorable health behavior and disease management practices.<sup>12,13</sup>

### Diabetes Self-Management Education-Evidence from India

Several research studies have been conducted to assess the self-care activities among diabetic patients.

These studies have highlighted poor self-care practices among the Indian population and have recommended that education on diabetes care is much needed in Indian settings.<sup>14,15</sup>

However, research studies examining the impact of education interventions on metabolic control are lacking in Indian settings. In the National Diabetes Educator Program conducted by the IDF center for education in

India, nearly 1000 diabetes educators were trained across 78 cities in India. However, the authors have mentioned that it was a limitation of this project that impact of the program in terms of patient compliance and measurement of HbA1C and lipid profile was not evaluated.<sup>16</sup>

Studies done in India have reported that mobile phone messaging is effective in lifestyle modification and improvement in behavior for prevention of diabetes. In a randomized controlled trial conducted among patients suffering from impaired glucose tolerance, it was reported that 18% of the participants in the intervention group that received mobile phone messaging intervention developed diabetes, as compared to 27% in the control group.<sup>17,18</sup>

Self-management accompanied with pharmacotherapy is the corner stone for management of diabetes. There is no universal educational program that can be standardized and effective for all patients. This urges the need for research in building evidence for framing the national guidelines for diabetes self-management, which are relevant and feasible.

Despite the fact that India is known to be diabetes capital of the world, there is limited research available in India, which focusses on diabetes self-management. Nachman et al.<sup>19</sup> have studied a mobile-based self-management system named Jog Falls in India. This wearable sensor tracks the individuals' diet and physical activity and provides information to both physician and patient. Selvaraj et al.<sup>20</sup> explored self-care practices among diabetes patients. These included diet, physical activity, adherence to medication, blood glucose monitoring and foot care. A key research was done by Murugesan et al.<sup>21</sup> which included training the primary care physicians on various aspects of diabetes management, which addressed the issue of capacity building and training of the healthcare professionals in management of diabetes. It also emphasizes on building the communication skills of doctors to facilitate efficient exchange of information between patient and doctor.

In India, diabetes is recognized as an important cause of premature death and disability. Diabetes has become one of the leading healthcare problems in India with an estimated 69.1 million people suffering from diabetes.<sup>22</sup> Despite the higher burden of diabetes in India, awareness regarding the disease is low. Nearly half of the people with diabetes remain undetected, accounting for complications at the time of diagnosis.<sup>23</sup> The rising burden of diabetes has affected the healthcare sector and economy of India. There is a need to strengthen diabetes health educational program

which is an essential component of management of diabetes. The main components of the educational programs should be modest changes in diet, weight loss and physical activity, which have showed effectiveness not only in controlling the disease, but in preventing it as well. Such interventions have shown reduction in incidence of type 2 diabetes by >50% for people with impaired glucose regulation.<sup>24-26</sup>

Patient-empowering techniques develop an individual's confidence in their own abilities. These techniques provide patients with knowledge, skills and responsibility to make changes in their behavior. Empowerment includes four components: give power to patients (authority and responsibility), to motivate patients continuously, to provide patients with means and tools (education), to guide the patients (leadership). Using such techniques will help in maintaining the outcomes for longer duration of time after the end of intervention.<sup>27</sup>

### Diabetes Self-Management Education in India – Challenges

Self-management is a complex concept, which needs multi-sectoral involvement including patient, physician, family, friends, community, public health system and policymakers. Many of the patients depend on the physician for reliable convincing information. This may be challenging to the physician who has more patient load, compromising the quality of medical care provided to each patient. In India, with a 1:1800 physician-to-patient ratio expecting physician to be sole provider of diabetes education would be unrealistic.<sup>28</sup>

There should be alternative reliable sources of information on diabetes self-management for patients with diabetes mellitus. In community, frontline workers can be trained and used as a valuable resource for providing sustainable education and support.

In view of the rising burden of diabetes in India, steps must be taken to encourage more research and generating evidence on standard diabetes educational programs, suitable for Indian population.

### Conclusion

The educational component is an important part of diabetes management. Its effectiveness will depend on many factors that include commitment of the patient, willingness to learn, family support, cultural influences, and commitment of the health education provider.

**Conflict of Interest:** Nil

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Date of Submission: 31<sup>th</sup> Jul. 2017

Date of Acceptance: 04<sup>th</sup> Aug. 2017