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Case Study on  
Dr.Mohan's Diabetes Specialties Centre-  
Diabetic care under one roof

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November-2010

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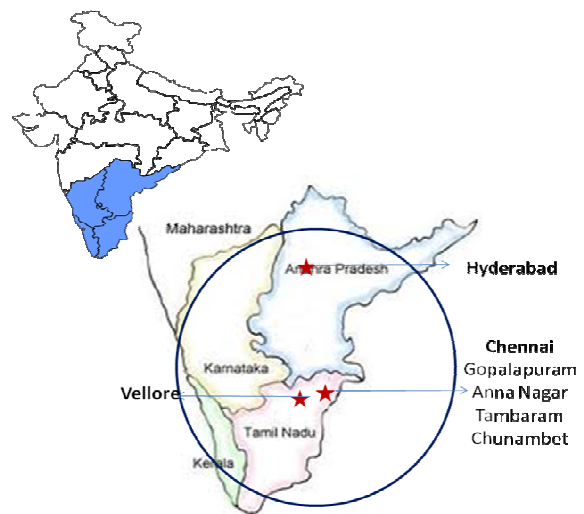
## Dr.Mohan's Diabetes Specialities Centre

### Introduction

Dr.Mohan's Diabetes Specialities Centre (DMDSC) is one of India's leading diabetes care providers offering comprehensive diabetic services. The unique selling point of DMDSC is "Total diabetes care under one roof" which treats all the problems related to diabetes that result in blindness, kidney disease, heart attacks and amputations. DMDSC was started with the purpose of providing state of the art, efficient and comprehensive care at affordable costs. The number of people with diabetes is increasing due to population growth, aging, urbanization, and increasing prevalence of obesity and physical inactivity. DMDSC is now treating around 100,000 patients a year in seven facilities in Southern India.

Dr. Mohan's DSC (DMDSC) was conceived by Dr. V. Mohan and his wife Dr. M. Rema. Dr. V. Mohan started working in the field of diabetology right from his undergraduate days. He earlier assisted his father late, Prof. M. Viswanathan, considered as one of the doyens in the field of diabetology in India and helped in setting up the M.V. Hospital for Diabetes at Royapuram, Chennai. Later, in order to serve the growing numbers of people with diabetes, Dr. V. Mohan and Dr. M. Rema set up the Dr. Mohan's Diabetes Specialities Centre. On Sep 1<sup>st</sup> 1991, the hospital was set up in a rented building. In Sep 1997, the centre moved into its new building which has both outpatient and inpatient facilities with 69 beds.

Over the years the hospital has been attracting patients from different parts of the country and even from other countries like Singapore, Malaysia, Sri Lanka, Bangladesh, Nepal and the Gulf countries. DMDSC has shown growth of 15-20 percent every year as per the hospital sources. Since the base hospital was overflowing with patients and to cater to the increased number of people with diabetes in Chennai, the first branch of the centre was started in Anna Nagar, Chennai in Sep 2003. Subsequently, other branches were started at Hyderabad, Tambaram and Vellore in 2005, 2006 and 2008 respectively.



Pic 1: DMDSC Branches

The Madras Diabetes Research Foundation (MDRF), the research wing of DMDSC, was established in May 1996, with the aim of providing a world class environment for research in diabetes and its complications. Within the short span of its existence, MDRF has built up strengths in basic, clinical and epidemiological research.

DMDSC is recognised as one of the WHO Collaborating Centres for Non-communicable Disease Prevention & Control and IDF Centre of Education.

**Type 1 diabetes** results from the body's failure to produce insulin, and requires the person to inject insulin lifelong. This is usually first diagnosed in children, teenagers, or young adults

**Type 2 diabetes** results from insulin resistance, (a condition in which fat, muscle, and liver cells do not use insulin properly) sometimes combined with insulin deficiency. Being overweight and inactive increases the chances of developing type 2 diabetes.

## Diabetes in India

Diabetes has reached epidemic proportions worldwide. The World Health Organization (WHO) has commented there is 'an apparent epidemic of diabetes which is strongly related to lifestyle and economic change'. India has the largest number of people with diabetes in the world (Annexure 1 contains figures on global prevalence of diabetes) , most of it being Type 2 diabetes, with an estimated 51 million in 2010 and projected to rise to 87 million in 2030. The prevalence of type 2 diabetes in urban Indian adults has been reported to have increased from less than 2.5% in 1970 to about 18.6% in 2008. On the basis of recent surveys, the ICMR estimates the prevalence of diabetes in adults to be 3-8% in rural areas and 11-8% in urban areas<sup>1</sup>. Diabetes is rightly labelled as a lifestyle disease, but it doesn't imply that the poor and underserved communities are not at risk of diabetes. A recent

study done at southern parts of the country, diabetes were found to be at par in rural and urban areas, dispelling the misconception that diabetes is only affecting the rich living in urban areas

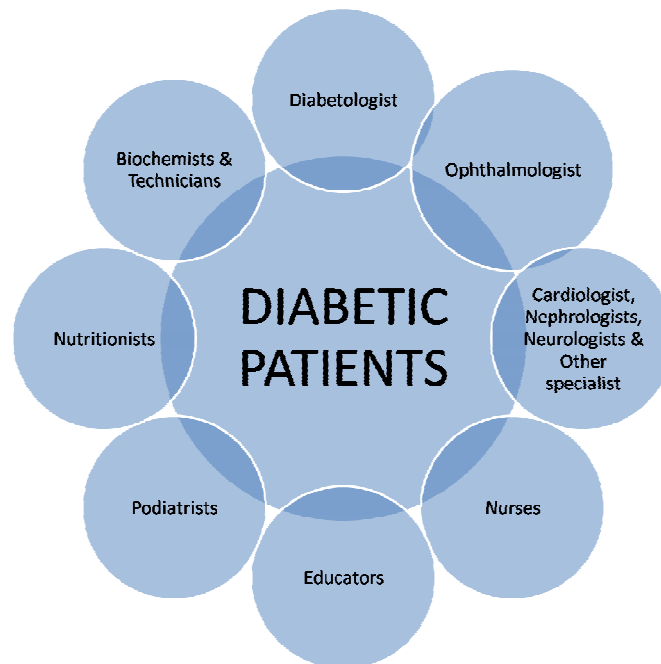
Apart from the disease burden, Diabetes exerts a life-long financial burden for treatment. It is not only the cost of medicines but the recurring costs of ongoing home monitoring, laboratory investigations and hospitalizations also add to the financial burden the personal. The social and economic costs of diabetes are huge and are likely to adversely affect India's economic development over the next couple of decades. Unless urgent steps are taken to prevent this burgeoning epidemic, more and more young and middle-aged Indians will fall prey to diabetes in the prime of their lives.

Diabetes causes severe morbidity. Complications of diabetes can be divided into three categories:

- Metabolic complications of high blood glucose levels (hyperglycaemia) and of low blood glucose levels (hypoglycaemia),
- Damage to small blood vessels (microvascular complications) leading in turn to damage to the retina of the eye (retinopathy), kidney (nephropathy) and nerves (neuropathy);
- Damage to the larger arteries supplying the brain (leading to stroke) or the heart (leading to coronary heart disease) or the legs and feet (leading to peripheral vascular disease) (macrovascular complications).

### **DMDSC- Diabetic care under one roof**

Diabetes affects many part of human body and DMDSC is equipped to diagnose and treat all diseases caused by diabetes like heart attacks, kidney diseases, Neuro and diabetic retinopathy under one roof. The treatment of diabetes at DMDSC follows well-established protocols with ample scope for individualisation depending on the type of diabetes, whether the patient has other active medical problems, whether the patient has complications of diabetes, and age and general health of the patient at time of diagnosis. Care is delivered by a diabetes management team comprising different cadres of staff (as shown in Pic: 2)



*Pic 2: Diabetes management team*

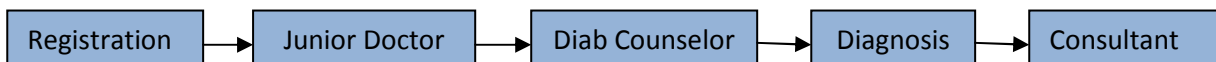
### **Service Delivery:-**

Comprehensive care is provided at three levels- primary, secondary and tertiary. At primary level, people with family history of diabetes and anyone with symptoms of diabetes are offered preliminary screening with blood tests. At the secondary level people with known diabetes are offered blood tests, urine tests, eye examination, X-ray, scan, Doppler, ECG, Biothesiometry, dental and foot examination at regular intervals. The types of tests to be undergone at different intervals are presented to patients in a chart which is very informative (Shown in Pic 3). At the tertiary level patients with high sugar, or with one or several of the serious complications of diabetes, are admitted in the hospital for evaluation and further management. Laser procedures and amputation surgeries are performed for diabetic retinopathy patients and patients with foot ulcer respectively. A team of diabetic educators take the complete diet history of patients and depending upon the Diabetologist's prescription, individualised diet advice is given to the patients.

Recommended test schedule for diabetes				
Weekly/Daily	Monthly	Quarterly	Half yearly	Yearly
Self monitoring of blood sugar using glucosemeter (at home)	Blood sugars Urine routine	Blood sugars HbA1c Urea Creatinine P/C Ratio	Blood sugars HbA1c Urea Creatinine P/C Ratio Total cholesterol Triglyceride HDL Microalbuminuria	Half yearly test + Liver function test Electrolytes Eye test ECG X-ray Doppler Biothesiometry Foot examination Foot pressure study Dental screening

Pic 3: Recommended test schedule for diabetic patients

The whole process (as shown in Pic 4) is standardised and a team of people is responsible for each area. Once the patient registers, he/she will be seen by the junior doctors for preliminary screening, followed by diabetic counsellor who takes patient history and sends them to diagnostic area where the blood samples are collected. Based on the condition, necessary examinations are done before they see the senior consultants. Following the consultants' advice the counsellors explains the diet procedures and follow up details to the patient. Since the work load is divided among many cadres of staff, and diabetic counsellor shares the major work of communicating to the patient, on any given day a consultant may see 20 to 30 patients.



Pic 4: Process flow at DMDSC

Since diabetic retinopathy is considered one of the leading causes of blindness after cataract, DMDSC has developed special expertise in the treatment of diabetic retinopathy under the banner of Indira Eye Institute for Diabetes. The institute has set of unique protocols for screening diabetic retinopathy patients. Every patient who visits DMDSC is advised to undergo routine eye screening. If a patient found to have diabetic retinopathy, they will be evaluated for further intervention using Fundus Fluorescein Angiography and Ocular Coherent Tomography. Based on the results of these tests, laser procedure is done for the retina.

DMDSC has state of the art laboratory facilities for diagnosis. It does routine bio-chemistry investigations and performs special tests such as thyroid, insulin and C-peptide using Roche Diagnostic Elecsys analyser. The laboratory is equipped with three auto analysers and provides round the clock service. Since **kidney** disease is a well known complication of diabetes, DMDSC does Microalbuminuria test to diagnose this. A foot pressure measurement system is used to detect areas of high pressure under the foot which is major cause for diabetic ulcer.

DMDSC has a specialised clinic to look after diabetic **heart** problems. This clinic has facilities for computerised ECG, cardiac stress testing with a computerised treadmill and Echocardiography. This is used for early diagnosis of coronary heart diseases. The diabetic **neuropathy** clinic treats the painfulcrippler ‘neuropathy’. The clinic is equipped with EMG and Nerve conduction study which is used to identify the stages of neuropathy. In keeping with the holistic approach, DMDSC has also introduced psychological counselling and yoga tailored to suit each individual.

### **Human Resources:-**

DMDSC is described as an employee friendly organisation by its staff and the entire organisation works as an enlarged family. The human resource department takes care of recruitment, selection and training of staff. It maintains the defined job responsibility for different cadres and their performance is measured against that. Every staff in the organisation is given training at the time of joining and regular updation once they are on the job.

*Diabetic counsellor* is a unique cadre that is developed at DMDSC. Those who have completed their bachelor's degree in nutrition and diet are recruited for this. They are given three months' training on diabetic related diet procedures. Their role is history taking and educating the patient on the life style changes they need to make. They explain to the patient about insulin administration, diet guidelines, self monitoring of glucose and physical exercises. Since they do part of the consultant's job, it saves the patient's time and makes them efficient.

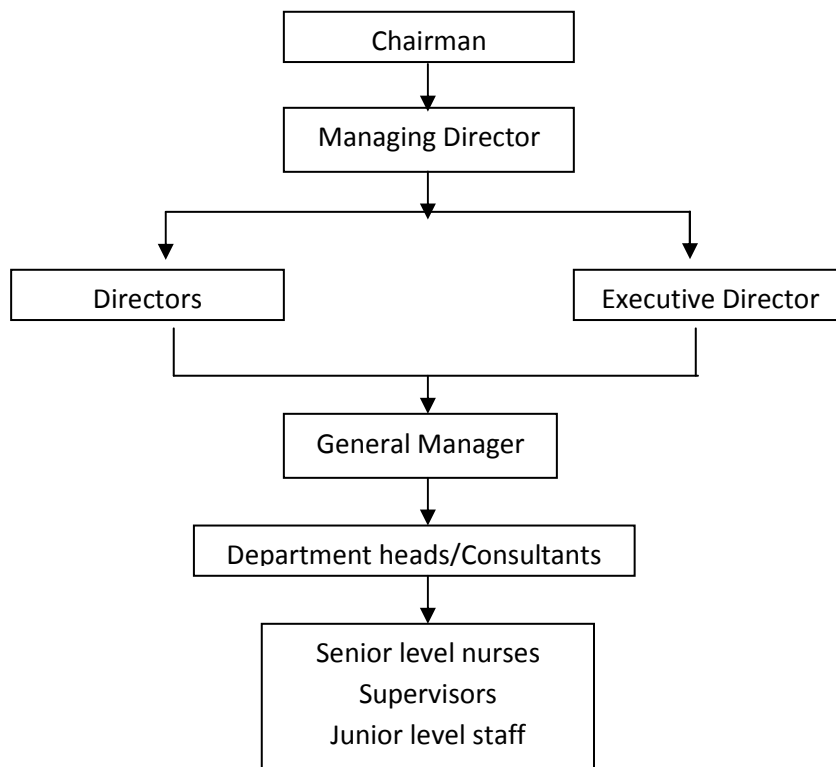
Developing doctors and aligning them into the hospital systems is one of the key task which helps DMDSC in providing quality care. To maintain the continuous supply of the consultants and to produce well qualified Diabetologists, DMDSC has started a two year fellowship in diabetology for post MBBS candidates. During these two years, they are given hands on training on comprehensive evaluation and treatment of diabetic patients. They are also exposed to the organisation culture and quality policy prevailing at the institution. After completing the fellowship, based on their interest and performance, they are absorbed into the organisation. This ensures the regular supply of Diabetologists. More than 100 people have undergone this fellowship programme till now. Likewise DMDSC offers fellowship in eye disorders for Ophthalmologists and certified courses for diabetes educators.

Performance measurement for all staff is done by their department head and based on that, they will be appointed as seniors. For example a nurse working for four years may become the floor in charge after showing good performance.

Being in the metropolitan city, the challenge of retaining the staff is admittedly huge. Offering salaries equal to the market rate and giving operational freedom to the staff to show their talents and grow are some of the strategies employed at DMDSC to minimize attrition. Due to these policies, DMDSC has

an attrition rate less than 10 percent and most of the staff has been with the institution for more than five years.

The management at DMDSC is open to innovation and easily approachable by all staff. Hence there is a high degree of ownership among the staff working at the hospital which leads to many operational level innovations. The organisation structure (Shown in Pic 5) of DMDSC is flat and people who have been working for more than ten years are occupying the position like general manager and department head today. It shows the organisations openness towards their staff.



Pic 5: Organisation structure

**Quality:-**

Quality control is given great importance at DMDSC, as it is handling 300 outpatients a day and has to provide quality care to all. To prove its quality management processes, DMDSC has gone in for ISO certification in 1998. The lab facilities have been accredited by NABL (National Accreditation Board for Testing and Calibration Laboratories). As a part of this accreditation, 19 standard protocol manuals have been developed for different departments. Processes across the hospital are standardised

**Q**  
Quality policy  
We dedicate ourselves 'Towards Excellence in Diabetes Care' by continuously improving our people, processes and technology

as per these manuals and the quality manual is updated once in three months. A dedicated quality control department with four staff and fifty internal quality auditors is responsible for monitoring the quality across the system. They conduct internal quality audit once in four months where the audit team checks the compliance in accordance to standards. If any non conformity is found, report is given to both the respective department and quality department. The respective department has to give the explanation for the non conformity and rectify it. All these non conformity reports are discussed in the management review meeting for further follow up and action.

The quality department also ensures that each department sets their “smart objectives” and it is evaluated once in six months against the performance. Each department is evaluated against external customer feedback, internal customer feedback, training assessments and documentation error. Clinical quality is monitored through assessing mortality rates and surgical complication rates. DMDSC understands that quality standards continue to evolve, influenced by technological innovation and changing patient expectations. To monitor that evolution, regular feedback is collected from patients and analysed. A good customer feedback management system is in place to respond to all the customer complaints regularly.

#### **Reaching out:-**

Many people in India suffer from diabetes but are unaware of how to keep it under control. According to Dr. Mohan, “Over 18 percent of adults in Chennai have diabetes but only 6 percent of them have the disorder under control! Public education is the urgent need of the hour”. So the hospital reaches to the patient through various methods like outreach camps, rural centre and mobile van. The outreach camps are conducted every month where it targets the specific communities in the society like the auto drivers, and makes them undergo the initial screening and refer them to the hospital for further intervention if needed. As diabetes is considered as a life style disease and mostly affects the modern working class people, DMDSC has specially designed programs for corporate employees. A team from DMDSC visits these organisations, does screening and creates awareness.

#### **Sai Rural Diabetes Centre:**

DMDSC has started Sai Rural Diabetes Centre in 2006 at Chunampet which is situated 100 km away from Chennai. This project was conceived because the studies have proved that diabetes has reached a pandemic stage, not only in urban India, but also in rural areas where its prevalence is increasing rapidly. It is estimated that more than 20 million people with diabetes live in rural areas in India. The rural centre was started in collaboration with World Diabetes Foundation (WDF), National Agro Foundation and Indian Space Research Organisation (ISRO).

The highlight of the project is the use of a fully equipped Tele-medicine Van as a novel tool to make diabetes health care, including treatment, accessible to the rural population. With its help, 23,449 people (above 20 years of age) from 42 villages have been screened for diabetes and its related complications, especially eye and foot complications. Thus 87.7 percent of the total population of

these villages has been screened. Out of this 970 people had known diabetes and 1,114 persons were diagnosed for the first time. 1,061 retinal examinations have been done in the telemedicine van. Those identified to have sight threatening diabetic retinopathy are treated free of cost at the main centre. With the support from WDF, tests and specialized treatments are done free. Thus effective strategies for community based diabetic screening in a rural setting have been evolved.

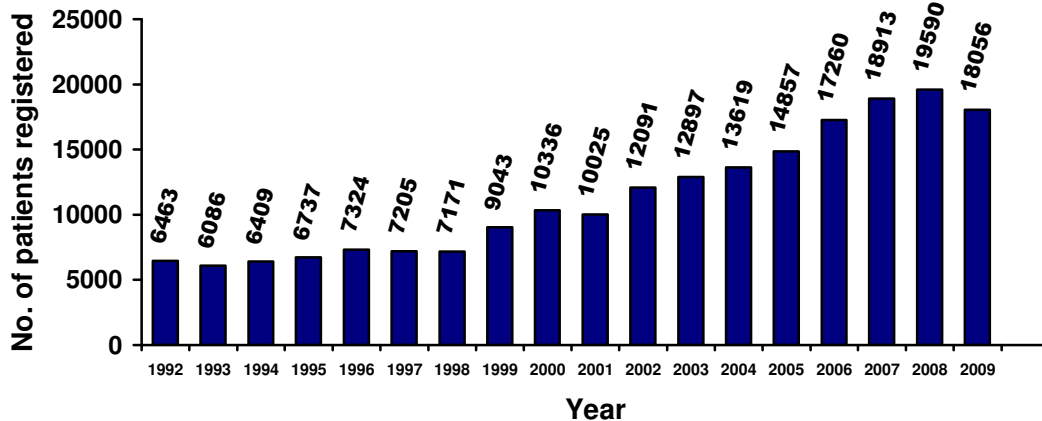
In addition to providing services, DMDSC gives great emphasis on educating the patients. It has a separate department called corporate communication which is dedicated to creating awareness among the public. It educates patients through awareness camps, mass exhibitions and organises events during World Diabetes Day and World Health Day. Apart from this, it also educates general physicians about the checkups that diabetic patients need to undergo. This will enable them to educate their patients.

### **Performance & Monitoring:-**

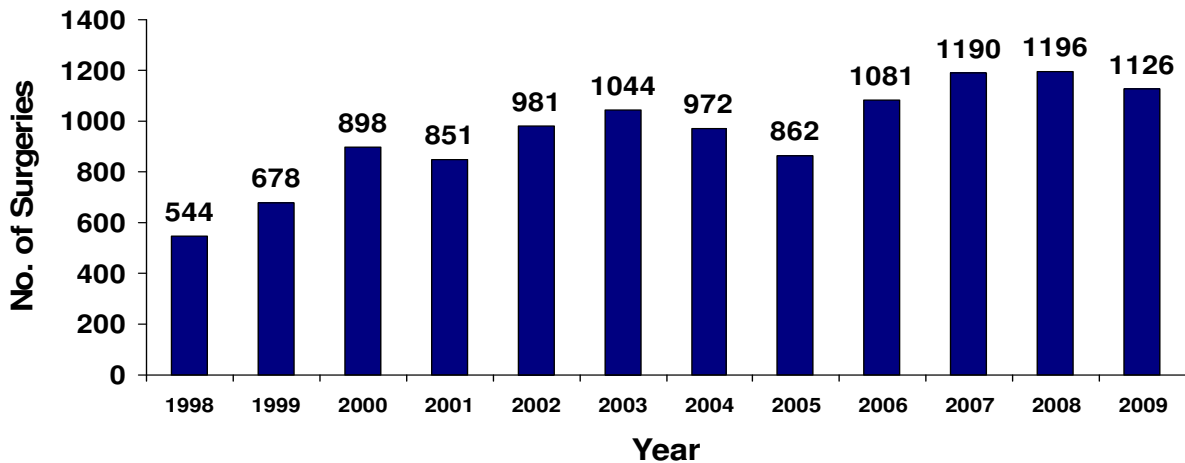
The growth of DMDSC over the years has been remarkable. From 20 patients per day during inception, today it sees 350 – 600 patients per day depending on the day of the week at all branches combined. Monitoring each department's performance was made easy with the advent of Information Technology. DMDSC has fully computerised medical records which help to capture and store all the diagnosis and treatment information of each patient. This facilitates quick clinical decision making and medical intervention. With the introduction of electronic medical records, standardisation was made possible in various clinical examinations. This software is integrated right from patient appointment and registration to prescription of medicines. Each patient is given unique ID while registering and the complete patient history is stored in that. Since the data is made available online internally, the consultant/staff sitting in any clinic can view the patient history and treat them accordingly. Mrs. Rekha Thankappan, Executive Director who has been instrumental in managing the IT systems at DMDSC says "Initially we had resistance from the staff while introducing electronic medical records, but once they started seeing the benefit they started appreciating how it is helpful in improving their productivity". Apart from clinical areas, the IT systems have been introduced in other areas like patient complaints management, internal complaints management, maintenance and accounting.

Management Information System is made available to each department where they can see the number of patients treated, bed occupancy, monthly performance etc. Each department has monthly meetings to discuss their performance and issues to be addressed. Once in three months, management review meeting is held where all the directors and senior managers participate to discuss the quality compliance report, mortality report, patient complaints report and any other issues.

**TOTAL NUMBER OF NEW PATIENTS REGISTERED AT DMDSC FROM 1992 TO 2009**



**TOTAL NUMBER OF SURGERIES FROM 1998 TO 2009**



Pic 6: Patient statistics

**Diabetes International Research, Education and Charitable Trust (DIRECT)**

DIRECT is the non-profit charitable wing of DMDSC which was started to support the poor and needy diabetic patients, to support the educational activities on diabetes both for health care personnel and for the public and to organise large scale free screening for diabetic patients. Under DIRECT a unique Juvenile Diabetes Sponsorship Scheme was introduced to provide free treatment and lifelong free insulin for children with Type 1 diabetes. DIRECT attracts donations from philanthropists and socially minded organisations to support these children with type 1 diabetes who need to be under medication throughout life.

DMDSC conducts free diabetes camps under DIRECT once a month in Chennai at Raja Annamalai Puram and Tirumangalam. Yearly around 3,200 patients receive free consultation, check up, blood test and free medicine at these centres. Apart from this, DIRECT conducts free diabetes detection

campus at various parts of Chennai and surrounding areas. Around 800-1,000 patients are screened free of cost every year along with the support from a philanthropic organisation, the Satya Sai Organisation, Tamil Nadu. Those who are detected with diabetes are referred to DMDSC for free investigations and treatment.

### **Madras Diabetes Research Foundation**

Madras Diabetes Research Foundation (MDRF) which is the research wing of DMDSC was started in 1996 with the objective of carrying out research of international standards in the diagnosis and treatment of diabetes and its complications. MDRF conducts research in the area of diabetology, diabetic eye disease, epidemiology, translational research, molecular genetics, cell & molecular biology, clinical trials and clinical nutrition. MDRF started in a single room in 1996 and moved into a separate building in 2001 with the support from the Jhunjhunwala family and expanded into the second research building in Sep 2007 with the generous support of Dr. K.Anji Reddy, Founder and Chairman of Dr. Reddy's Laboratories. It also has collaboration with various international research institutions like University of Alabama at Birmingham, Mayo Clinic, Rochester, U.S.A and University of Minnesota, USA

MDRF is recognized by the Tamil Nadu Dr. MGR Medical University and the University of Madras for conducting courses leading to the award of Ph.D. degree. Till date, MDRF has published 143 research articles in international journals, 150 in national journals and contributed to 49 chapters in text books. 16 students have completed their PhD under the guidance of MDRF faculty.

### **Finance**

DMDSC is registered as private limited company under which all the clinical activities are performed. It is owned and managed by Dr. Mohan and his family members. MDRF is registered under the Societies Act and DIRECT is registered as a Charitable Trust. Patient revenue is the major source of income for DMDSC. Medical consumption and salary are the major sources of expenditure. Doctors and other staff receive a fixed salary linked to overall performance, not to patient load. DMDSC believes in maximum use of all hospital resources- human resources, equipment and buildings to ensure reduction in cost. This was achieved through standard protocols and quality systems in place. The organisation has developed a cost conscious culture among its staff. The price of services is fixed based on the market condition and affordability of patients. 80 -90 percent of patients pay for their services either through out of pocket expenditure or through private insurance. The remaining 10 percent who are not able to afford will get support from Dr.Mohan's foundation. The purchases are handled centrally which results in better price bargaining and maintaining the same quality across the hospital.

DMDSC generates a sizable surplus with which it has been able to finance most of its growth--building new hospitals, investing in new equipment and the research activities. In the core area of patient care, DMDSC is entirely self sufficient both in meeting operating and capital costs.

### **Expansion/Replication**

DMDSC has five branches now apart from its main centre at Gopalapuram. The first expansion idea was conceived in 2003. The first branch facility was started in Anna Nagar at Chennai. Since DMDSC used to get more patients from this part of the city, it was decided to start a centre at this location. According to one of the senior Administrative Managers “while starting the centre at Anna Nagar, we spent heavily on the set up cost, as it was the first such experiment for us”. The existing staff from that locality was given preference to work there and additional new staff were recruited from that area. Having learnt from the experience with the first centre, the second one was started at Hyderabad in 2005. Hyderabad was the first experiment outside Tamilnadu for DMDSC which exposed them to a new work culture. It took some time for the staff from Hyderabad to adapt to the organisational culture of DMDSC. The main differences in work culture between the two states were perceived to be.....The new staff recruited in Hyderabad was brought to the main centre for training and a senior consultant belonging to Andhra Pradesh was given charge of leading the centre. Due to these efforts, the branch has been running successfully for the last five years.

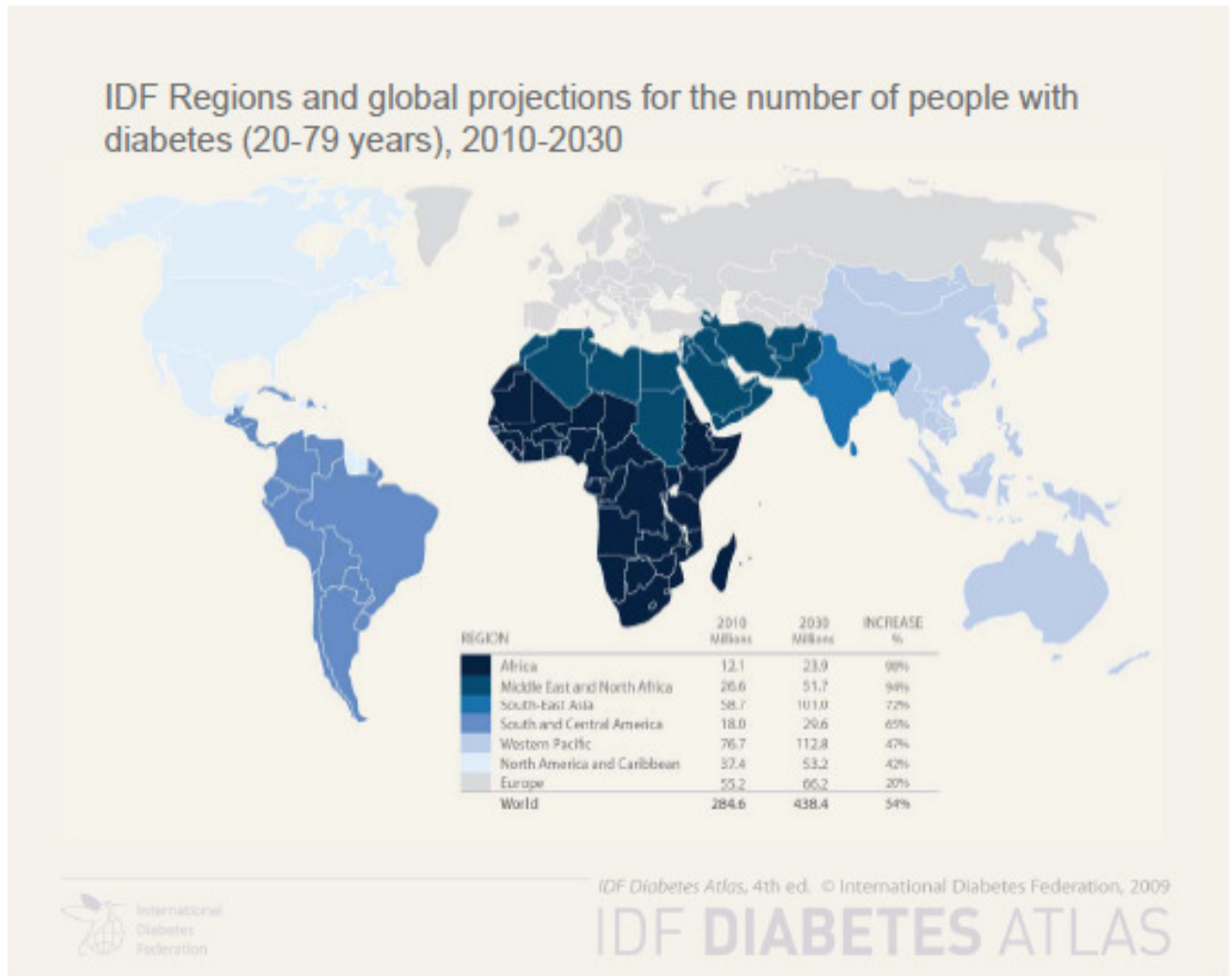
From the experience gained over the years, DMDSC has developed standard protocols for service delivery which makes replication possible without compromising on quality. Training is another area where DMDSC is capable now due to experienced staff and protocols. Having built the base, DMDSC further added centres in Tambaram and Vellore in 2006 and 2008 respectively. Mrs. Rekha Thankappan, Executive Director mentioned about expansion “we don't want to dilute the image of Dr.Mohan's diabetes which is known for its quality of care. So the deciding factor for the new centre would be having the dedicated team of people who would be willing to move to new location and continue giving the same quality”. As per Dr.Mohan “Finance is also one of the limitations for expansion today and hence we would like to take it one step at a time”.

### **Conclusion**

DMDSC as a model now stands for diabetic care under one roof and reaching out all community. A country like India where the incidence of diabetes is increasing and the need for prevention is a priority, DMDSC model is an appropriate method of addressing this issue. DMDSC's evolution over the years has proved to be a strong foundation for its growth in the coming days. It has gained all the expertise to replicate the same model across the country. Since India has a huge diabetes burden, it requires many diabetic hospitals like Dr.Mohan's Diabetes Specialities Centre. But the challenge that rests with the management is how to take forward the replication process and customise it to local needs.

**Annexure 1**

**Prevalence of diabetes**



The top 10 countries, in numbers of people with diabetes in 2010, are:

- China**
- India**
- USA**
- Russia**
- Brazil**
- Germany**
- Pakistan**
- Japan**
- Indonesia**
- Mexico**

Year <i>Ranking</i>	Country	2010 <i>People with diabetes (millions)</i>
1	China	92.4
2	India	50.8
3	United States of America	26.8

Source : IDF Diabetes Atlas, 2009