Non-communicable diseases (NCDs), which include diabetes, cardiovascular disease (heart disease and stroke), cancers and chronic respiratory diseases and mental illness, are increasing dramatically in India. This underscores the need for more clinical research training and institutional capacity building in the prevention and control of NCDs. With this in view the current programme on “Strengthening Indian NCDs clinical research and training capacity” was taken up by the Madras Diabetes Research Foundation (MDRF) along with Dr. Mohan’s Diabetes Specialities Centre (DMDSC), for the thirteenth successive year. MDRF is supported by the Florida International University (FIU), USA, the University of Alabama at Birmingham (UAB), Birmingham, USA, and University of Minnesota, Minnesota, USA. The Principal Investigator from the US is Dr. O. Dale Williams, Professor and Chair, Department of Biostatistics, Robert Stempel College of Public Health and Social Work, Florida International University, Miami, Florida and he is assisted by Dr. Cora Lewis, Professor and Associate Director for Research, Division of Preventive Medicine, University of Alabama at Birmingham, Birmingham and Dr. Myron Gross, Professor, Department of Laboratory Medicine and Pathology, University of Minnesota, USA. Dr. V. Mohan, President of MDRF
is the Principal Investigator for India and assisted by Dr. R. Guha Pradeepa and other colleagues from MDRF. This programme is supported by the National Institutes of Health (NIH) U.S.A. under the Fogarty International Center (FIC) NCD LifeSpan Programme.

Over 2900 young researchers, epidemiologists and community health specialists from all over India and neighbouring countries have been trained through our Seminars. The primary objective of the programme is to encourage capacity building in India and to develop strategies for prevention of NCDs in general and diabetes and cardiovascular diseases in particular. In order to plan strategies for prevention at the national and international level, the 13th International Seminar on 'Prevention and Control of Non-Communicable Diseases (NCDs)' and 11th Intensive training program was conducted at MDRF from 21st - 25th January 2015.

The intensive interactive training programme on ‘Clinical Research Methods’ was conducted at MDRF from 21st to 23rd January, 2015. The two-day Intensive training programme on clinical research methods included in-depth training on designing studies and risk factor analysis. Over 50 students from all over the country participated in this programme.
The Thirteenth International Seminar on ‘Prevention and Control of Non-Communicable Diseases (NCDs)’ conducted at MDRF from 23rd to 25th January, 2015. Over 110 delegates from 20 institutes and Medical colleges all over the country were trained in preventive and control aspects of NCD’s at the seminar this year.

The Seminar was inaugurated by Mr. Philip A. Min, Consul General, U.S. Consulate, Chennai. Prof. K. Vijay Raghavan, Secretary, Department of Biotechnology (DBT), Government of India, New Delhi was the ‘Guest of Honour’.

During the occasion, Prof. K. Vijay Raghavan was conferred the ‘Tenth MDRF-UAB-FIU Gold Medal Oration Award’ for his significant contribution in the field of Science.
Hearty Congratulations

To
Our Chairman Dr. V. Mohan

For being conferred with Honorary Doctor of Science (D.Sc) by Sri Devaraj Urs Academy of Higher Education and Research, Kolar. He has also been conferred with the following awards recently

1. Kuwait Medical Association (KMA) - IDF Oration Award,
2. 2014 Sci Genom Research Foundation (SGRF) Excellence in Science Award,
3. Dr. Jivraj Mehta Award by the Association of Physicians of India,
4. Ranbaxy Science Foundation Award for Medical Research.
What is Type 1 diabetes?

Type 1 diabetes mellitus or insulin-dependent diabetes is an autoimmune disease in which the immune system destroys the insulin-producing beta cells of the pancreas – the organ that produces insulin.

Features of Type 1 diabetes

Type 1 diabetes mostly has an acute (sudden) onset in children, adolescents or young adults. It can strike at any age varying from less than a year of birth, up to 40 years of age. The diagnosis of type 1 diabetes in children is usually straightforward and requires little or no specialized testing.

Symptoms become apparent only after pancreatic beta-cells are completely destroyed and include excessive thirst and urination, constant hunger, weight loss, and blurred vision. Children may also feel very tired and weak and sometimes exhibit irritable behaviour.

However now-a-days, the incidence of type 2 (non insulin dependent) diabetes is also increasing among children and adolescents. Hence one should not classify all juvenile diabetic children as having type 1 diabetes and a careful clinical examination will help to distinguish the two conditions as shown in the Table below.

<table>
<thead>
<tr>
<th></th>
<th>Type 1 DM</th>
<th>Type 2 DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at presentation</td>
<td>May occur at any age and commonly below 10 years of age</td>
<td>Usually after puberty</td>
</tr>
<tr>
<td>Family history of type 2 diabetes in parents</td>
<td>Rare (2-4%)</td>
<td>Usually present in one or both parents</td>
</tr>
<tr>
<td>Obesity and signs of insulin resistance</td>
<td>Usually absent</td>
<td>+++</td>
</tr>
<tr>
<td>C- Peptide at diagnosis</td>
<td>Absent</td>
<td>Good</td>
</tr>
<tr>
<td>Treatment</td>
<td>Always needs insulin</td>
<td>Response to OHA</td>
</tr>
<tr>
<td>Presence of ketoacidosis &amp; coma</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Some patients, particularly children and adolescents, may present with ketoacidosis or coma as the first manifestation of the disease. As insulin deficiency worsens, ketoacids (formed from the breakdown of fat) build up in the blood and are excreted in the urine and
breath. They cause shortness of breath and abdominal pain, lethargy, muscular cramps, disturbed consciousness, vomiting and severe dehydration. High blood sugar, acidosis and dehydration together cause a condition known as diabetic ketoacidosis or DKA. If diabetes is not diagnosed and treated promptly with insulin and sufficient intravenous fluids at this stage, the individual can lapse into a life-threatening diabetic coma. Often children with DKA are mistakenly diagnosed as having gastroenteritis due to the vomiting. Sudden-onset diabetes can be differentiated from gastroenteritis by the excessive urination along with vomiting, as opposed to decreased urination due to dehydration if the vomiting is caused by a gastrointestinal infection.

Management:

In juvenile onset type 1 diabetes, since the pancreas can no longer produce insulin, these children have to take insulin injection daily on a lifelong basis, in order to maintain life and to control their blood sugar levels. These four important rules in the management have to be followed.

1. Regular insulin therapy
2. Eating a healthy diet and following a meal plan
3. Checkups at regular intervals
4. Regular physical activity

What are the latest advances in treatment?

Several new insulin-delivery systems are under development that may eliminate the need for needle-based introduction. Insulin pens, which are compact, self-contained devices resembling a writing instrument, are convenient, more accurate and less painful. They allow patients to inject more discreetly without using bottles and painful syringes.

INSULIN PEN

Another breakthrough is the insulin pump, a small pager or mobile sized electronic device which delivers insulin from a reservoir inside the pump, through a thin plastic tube (called an infusion set), to the body. Insulin pump delivers insulin like a healthy pancreas, provides more effective, safe and predictable insulin absorption for many patients, making it easier for patients to keep their blood glucose levels within a near-normal range, offering both short and long-term health benefits. Pump therapy can replace insulin shots for many patients, allowing them to live a more flexible lifestyle. Moreover the insulin pump is so comfortable that people adapt easily to life with a pump. Ideally all type 1 diabetic patients should be treated with a pump. However, pumps are presently quite expensive and this limits their usage to those who can afford.

Can children with juvenile diabetes have a normal life like anyone else?

Yes, certainly. One of our patients currently aged 33 years, was diagnosed with type 1 diabetes when she was 2 years old. With her parents support and with regular self monitoring of blood glucose, insulin
In summary, the family and diabetes care team consisting of the diabetologist, an educator and a dietician should work together to ensure that all children with type 1 diabetes can have a long and healthy life despite diabetes.

For being conferred the Dr. Coelho Memorial Lectureship in Experimental Medicine at the annual conference of 'Association Physicians of India' (API) conference held in Gurgaon, February 2015.

For being awarded the E. Merck Award at the annual conference of 'Association Physicians of India' (API) conference held in Gurgaon, February 2015.

Vice Chairman Dr. Ranjit Unnikrishnan
Joint Managing Director Dr. R. M. Anjana
What is the Insulin resistance?

Insulin resistance (IR) is a condition characterized by a decreased ability to respond to the effects of insulin, a hormone that is produced by the beta cells of the pancreas. Insulin has many actions within the body including those involved in metabolism of carbohydrates (sugars and starches), fat ad proteins. Since cells must have glucose to survive, the body compensates for insulin resistance by producing additional amounts of insulin. This results in higher levels of insulin [hyperinsulinemia] in the blood, which is one of the signs of insulin resistance.

Causes of Insulin Resistance.

Both genetic factors and environmental factors such as excessive caloric intake, physical inactivity and obesity can contribute to the development of insulin resistance. In most individuals, the body is able to keep pace with the need for extra insulin production, and hence insulin resistance does not lead to too many adverse effects. However, in some cases, the body's insulin production fails to keep up with demand and hyperglycemia (high blood sugar) occurs which can progress to type 2 diabetes over time. Insulin resistance usually has no specific symptoms, but if you have one or more of these conditions, you are advised to consult a physician.

- Obesity especially around the abdomen
- Patches of dark and thickened skin, with velvety feel around the neck or on the back [Acanthosis nigricans] other possible sites for acanthosis nigricans include elbows, knees, knuckles, and armpits.
- Gestational diabetes mellitus [Diabetes occurring during pregnancy]
- Polycystic Ovarian Disease (PCOD) a condition due to hormonal imbalance that causes irregular periods, abnormal hair growth and acne in women.
- High blood pressure, high blood triglycerides, low HDL (good cholesterol)

Associated conditions:

Insulin resistance is not a disease or a specific diagnosis by itself but it is associated with conditions such as type 2 diabetes, cardiovascular disease, hypertension, polycystic ovarian syndrome, abdominal obesity [having excess weight around the waist], and nonalcoholic fatty liver disease. Additionally, Insulin resistance is associated with increased levels of serum triglycerides, small dense LDL cholesterol and decreased levels of HDL (good) cholesterol. Clustering of these metabolic risk factors is called 'Metabolic syndrome' or 'Insulin Resistance Syndrome', formerly called 'Syndrome X'. Presence of metabolic syndrome increases an individuals risk of developing cardiovascular disease.
Management of insulin resistance.

Early recognition is important and interventions such as diet modification, physical activity and weight reduction are the cornerstones in managing insulin resistance. One should have a diet low in carbohydrate and fat and high in fibre. Foods with high glycaemic index (GI) which indicates the glucose-raising effect of a food should be restricted as they increase blood glucose levels more rapidly and require the secretion of more insulin to control the level of glucose in the blood. Regular exercise helps to lower blood glucose level, strengthen muscles, helps body cells to use insulin better and help lower blood pressure. It has been shown that weight loss increases the rate at which glucose in the blood is utilized by muscle cells as a result of improved insulin sensitivity. Medical treatment can be used as an adjunct to lifestyle modification but should only be prescribed by a physician. Metformin helps to regulate the amount of sugar in the blood. It prevents the liver from releasing glucose into the blood, and it increases the sensitivity of muscle and fat cells to insulin. In summary, a healthy lifestyle (proper diet and regular exercise) can help prevent insulin resistance. These measures need to be adopted right from childhood and adolescence, particular if there is a history of diabetes in the family. Reducing or preventing insulin resistance can help to prevent not only diabetes, but also heart disease.

**CONGRATULATIONS AND BEST WISHES TO**

**Mr. C. Sathish Kumar,**

Senior Research Fellow, Cell and Molecular Biology, MDRF

For being awarded the prestigious “Indian Science Congress Association (ISCA) Young Scientist Award” at the Indian Science Congress-2015 held at Mumbai (3rd to 7th January) for the work entitled: “Augmentation of histone deacetylase 3 (HDAC3) links inflammation and insulin resistance in Type 2 Diabetes: Therapeutic implications”.

**Mr. Sathish Kumar receiving ISCA Young Scientist Award from honourable Governor of Uttar Pradesh Mr. Ram Naik, in the presence of Mr. Suresh Prabhakar Prabhu, Union Minister for Railways and Mr. Vinod Tawde, Maharashtra Education Minister.**
Diabetes is a chronic disease, which can damage a whole range of body tissues and organs leading to increased morbidity. People with diabetes are prone to foot problems leading to formation of ulcers and amputations. Foot ulcers and amputations, are the most common reasons for hospitalization, disability, as well as emotional and physical costs among diabetic subjects. While diabetic subjects take adequate care to protect eyes, kidneys and heart from the vulnerable effects of abnormal sugar levels, the foot is often neglected. Estimates suggest that more than 15% of the diabetic subjects develop foot problems. The Chennai Urban Population Study (CUPS) conducted by us at the Madras Diabetes Research Foundation and Dr. Mohan's Diabetes Specialities Centre at Chennai revealed that nearly 25% of the amputations were among subjects with diabetes. In fact 50% of the hospital admissions at our Centre are due to diabetes related foot problems.

**RISK FACTORS FOR FOOT PROBLEMS:**

Children or young adults with Type 1 diabetes are not at great risk of diabetes related foot problems in the early years as their nerves and blood vessels will not have been severely affected by diabetes. They should be encouraged to play sports or undertake the activities they normally do. The risk of ulcers or amputations in diabetic individuals is increased in male diabetic individuals, in those with poorly regulated diabetes or in those who have eye, kidney or heart complications. In addition, as the duration of diabetes becomes longer (eg. greater than 10-15 years) and the person becomes older (eg older than 40-50 years), progressively more care is required. People with Type 2 diabetes can get foot problems even soon after diagnosis because they might have diabetes for a long time without knowing.

**COMMON PROBLEMS IN DIABETIC FOOT:**

- Neuropathy (nerve damage)
- Peripheral vascular disease (Poor blood circulation)
- Infections

**Neuropathy**

Neuropathy (nerve damage) is a common complication of diabetes, reducing the ability to detect sensations and predisposes an individual to injuries and trauma. Any weight bearing area without adequate protection tends to open and form a wound called as "ulcer". Neuropathy predisposes to ulceration mainly by reducing the perception of pain and trauma inflicted by foreign bodies, walking or tightly fitting shoes. In order to protect the leg, nature offers a
mechanism by which it thickens the skin to avoid forming a wound. This protective mechanism will lead to problems such as callus and corns in later stages due to irritation of tissue beneath. These can break down and lead to ulcers.

Neuropathy may also affect the muscles of the foot causing clawing of the foot. Charcot foot is one of the deformities that result from trauma to the insensitive foot, due to which the arch of the foot collapses. Deformities make the feet more vulnerable to infection. The symptoms of diabetic neuropathy are numbness, loss of sensation in the feet. The patient may feel that he is walking on cotton wool or on a mattress. Often the legs may feel like a "log of wood". There are instances where the chappals fall off and yet the patient is unaware of this. Some have even had their toes nibbled off by rats while sleeping on the ground at night and they were unaware of it! Other patients complain of pins and needles, pricking sensation, burning of feet or even severe pain in both feet. These symptoms often begin gradually. In some cases the skin may become so sensitive that the slightest touch is painful.

Peripheral vascular disease:
Diabetes can also affect blood circulation, which can affect the ability of the body to heal when damage occurs. Reduction in blood circulation to the feet restricts delivery of oxygen and nutrients that are required for normal maintenance and repair, which would result in slow healing of foot injuries, infection or ulcerations. Sometimes, poor circulation can result in ischemic foot and gangrene (cell death) and ulcers may be painful. It has been demonstrated that smoking decreases blood flow to feet.

The symptoms include:
- Cramping or pain at rest
- Absence of foot pulses
- Skin may become thin and shiny
- Loss of hair on the foot and ankle
- Colour and temperature (cold) changes
- Non healing ulcers and
- Foot infection that is hard to heal
Infection:

Diabetes also alters the immune system, thus decreasing the body’s ability to fight infection. The body's processes that normally fight infection respond slower and often have trouble getting to infections due to the poor circulation. Due to loss of sensation, infections often worsen and may go undetected. Infection to diabetic foot ulcers may be either superficial or deep and sometimes life threatening. Common symptoms of infection are fever, redness, swelling or pain. Pus may also be seen in the lesions.

Prevention of diabetic foot problems

To prevent diabetic foot problems, routine integrated examination of the feet is mandatory. Biothesiometry studies for detecting neuropathy, a new diagnostic technique which is quick, simple to perform and noninvasive and helps to detect and quantify early sensory loss in diabetics patients, Peripheral Doppler for assessing circulatory disorders and Foot Pressure Distribution Measurement to measure the pressures in regions that are prone to get calluses and corns in the foot can be done.

<table>
<thead>
<tr>
<th>✔ DO’s FOR FOOT CARE</th>
<th>✗ DONT’S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examine your feet daily for blisters, bleeding, and lesions between your toes, use a mirror if it is difficult to see the entire foot</td>
<td>Do not walk barefoot</td>
</tr>
<tr>
<td>Keep the feet clean by daily washing with lukewarm water and soap</td>
<td>Do not sit cross legged for long time</td>
</tr>
<tr>
<td>Avoid extreme temperature</td>
<td>Do not cut corns / calluses with blade or knife. Home surgery is dangerous</td>
</tr>
<tr>
<td>Dry the feet carefully and pay special attention to the spaces between the toes to prevent athletes foot</td>
<td>Do not smoke</td>
</tr>
<tr>
<td>Nails should be trimmed straight across with nail clippers or nail scissors</td>
<td>Don’t use hot water bottles or heating pads, one can burn the feet without realizing it</td>
</tr>
<tr>
<td>Use correct footwear</td>
<td>Don’t soak the feet since this dries out natural oils</td>
</tr>
<tr>
<td>Have regular foot examinations</td>
<td></td>
</tr>
</tbody>
</table>

In summary, although foot problems in diabetes cannot be eradicated completely, the opportunity exists to diagnose and manage effectively by a multidisciplinary approach that focus on prevention, education, regular foot examinations, aggressive intervention, and optimal use of therapeutic footwear to reduce the incidence of morbidity associated with foot complications.
1. How can diabetes affect digestion?

**Ans:** Diabetes can cause indigestion, diarrhea or constipation especially at night and interferes with sleep, thus affecting the nutritional status. Nerve damage can cause the stomach to empty too slowly, a disorder called gastroparesis, which literally means "paralysis of the stomach". The individual can have heartburn, persistent nausea and vomiting, bloating, an early feeling of fullness when eating and loss of appetite which often lead to weight loss. The symptoms of gastroparesis can be improved by eating smaller, more frequent meals. Individuals with gastroparesis may be advised to eat well-cooked fruits and vegetables, fish, chicken, yogurt, liquid foods, and to avoid fat and high fibre foods.

2. Does diabetes lead to hearing impairment?

**Ans:** Hearing depends on small blood vessels and nerves in the inner ear. Scientist report that, over time, high blood glucose levels can damage these vessels and nerves, diminishing the ability to hear. Hearing loss due to diabetes is typically a high frequency sensorineural (nerve) hearing loss which can be treated successfully with hearing aids. The earlier a hearing loss is diagnosed the earlier it can be treated. It is recommended that those with diabetes should have an annual hearing test done in addition to screening for other complications related to diabetes.

3. If I take a sweet, can I take an extra tablet on that particular day?

**Ans:** Taking extra tablet is not advised. In unavoidable situations where you are going to take sweet on that particular day, you can try for restriction of calories in other meals, so that total calorie consumption maintained at constant level. You can exercise longer on that day.

4. What are common sleep disorders among diabetic individuals?

**Ans:** Sleep plays a vital role in good health and well-being throughout one's life. Getting enough quality sleep at the right times can help protect one's mental and physical health, quality of life, and safety. Sleep difficulties are more common in people who have diabetes than in those without the disorder. Having diabetes increases the risk for certain sleep disorders, which include sleep apnea, restless legs syndrome (RLS) and insomnia. Sleep apnea is a condition that occurs when your breathing stops while you are asleep. The most common kind of sleep apnea is obstructive sleep apnea (OSA), which occurs when the throat closes off when one tries to breathe while asleep. This happens because the muscles that usually keep the
throat open are relaxed during sleep. Diabetic individuals who are overweight are at risk for OSA. RLS is a condition manifested by an uncontrollable urge to move the legs, often with an uncomfortable feeling in the legs that occurs around bedtime. It can feel like something is creeping or crawling on the skin, an electrical sensation, or a need to stretch. Insomnia generally refers to difficulty in falling asleep, staying asleep, or poor quality sleep. Stress and worry are also frequent causes of insomnia.

5. I am planning to go on a long holiday. Should I take any special precautions?

**Ans:** Diabetic individuals can enjoy travel as much as anyone else by just planning a little ahead. Prior to travelling, work out how much travelling is involved and the destination (urban or remote) as access to medical supplies and services may not always be available. The special precautions one should take is carry extra supplies of medications, syringes, needles etc, follow prescribed meal plan as much as possible when eating out, carry a snack in case blood sugar drops too low, to avoiding dehydration in tropics consume sufficient amount of fluids, wear comfortable footwear and take care of the feet and most important is carry a card which states that you have diabetes.

### Bajra Kitchidi

**Ingredients**

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Bajra</td>
<td>100g</td>
</tr>
<tr>
<td>Onion</td>
<td>50g</td>
</tr>
<tr>
<td>Tomato</td>
<td>25  g</td>
</tr>
<tr>
<td>Green peas</td>
<td>50g</td>
</tr>
<tr>
<td>Green Chillies</td>
<td>2</td>
</tr>
<tr>
<td>Oil</td>
<td>1 tsp</td>
</tr>
<tr>
<td>Ginger</td>
<td>1 piece</td>
</tr>
<tr>
<td>Turmeric powder</td>
<td>1/2 tsp</td>
</tr>
<tr>
<td>Mustard</td>
<td>1 tsp</td>
</tr>
<tr>
<td>Coriander</td>
<td>a few</td>
</tr>
<tr>
<td>Curry leaves</td>
<td>a few</td>
</tr>
<tr>
<td>Salt</td>
<td>to taste</td>
</tr>
</tbody>
</table>

**Method**

Dry roast broken bajra in a tawa. Add hot water and keep aside. Cut onion and tomato into small pieces. Heat oil in a pan. Add mustard seeds. When mustard seeds crackle, add curry leaves, green chili, chopped onion, tomato and chopped ginger, green peas, turmeric powder. Saute for a minute and add water. Cook and add salt. Add bajra and cook stirring in between. Remove from fire. Garnish with coriander leaves and serve hot with chutney.

### Nutritive Value

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Energy</td>
<td>197 Kcal</td>
</tr>
<tr>
<td>Protein</td>
<td>5.6 g</td>
</tr>
<tr>
<td>Fat</td>
<td>6.7 g</td>
</tr>
<tr>
<td>Fibre</td>
<td>1.4 g</td>
</tr>
<tr>
<td>Portion size</td>
<td>1 bowl</td>
</tr>
<tr>
<td>No. of servings</td>
<td>3</td>
</tr>
</tbody>
</table>
Dear Readers, we invite your contributions to ‘Diabetes Monitor’ in the form of Diabetes related queries, anecdotes or personal experiences. Please send / email:

Dr. R. Guha Pradeepa, M.Sc., Ph.D.,
Editor, Diabetes Monitor
Email : guhapradeepa@gmail.com
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