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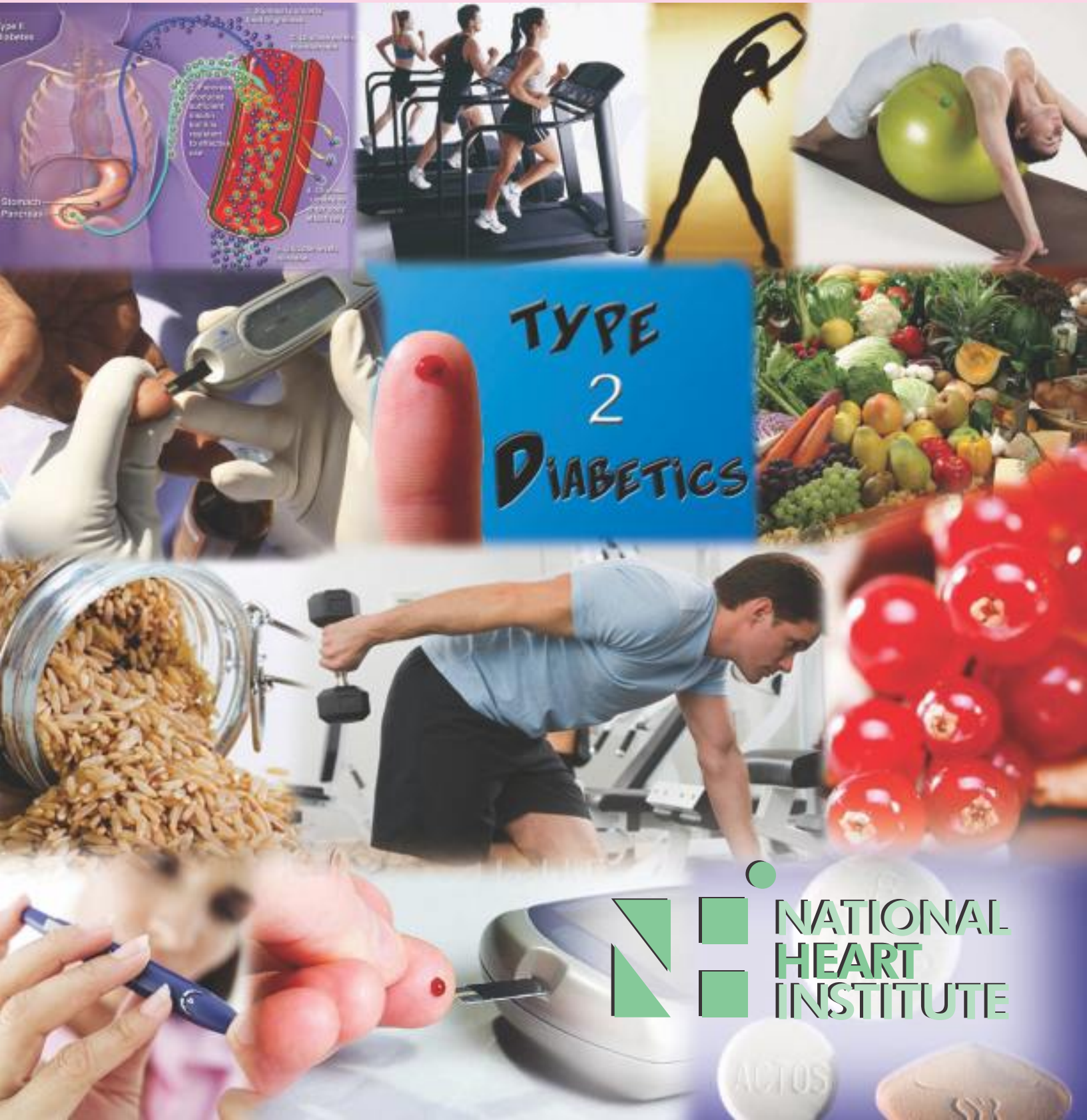
# NHI Dialogue

Quarterly Health Magazine of Cardio Diabetes Research Society

CDRS

Editor in Chief : V. K. Gujral

www.diabetesheartcare.com



# Editorial Voice

*Dear Readers !*

*Greetings of the season !!*

*The New year issue is here. This is also the 6th year of your own NHI DIALOGUE. Our circulation and the reach has grown considerably. We will be printing the guidelines for various diabetes & cardiac management now onwards for the benefit of our medical practioners & patients. This issue carries guidelines for exercise in Type 2 Diabetes.*

*My heart felt thanks to the sponsors for continuous support !*
*Hope it continues to make a useful reading for all ....*

*Yours*

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# SUDDEN CARDIAC DEATH

*A. Kundu,**O.P.Yadava
*Consultant Cardiac Surgeon, **C.E.O. & Chief Cardiac Surgeon
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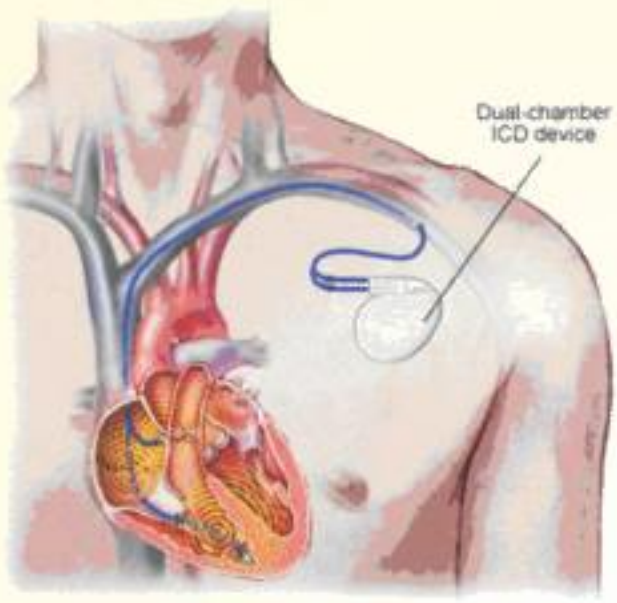



This rather ominous-sounding disorder is actually a well-defined clinical entity, with its definition, presentation, causes and hopefully, prevention! Sudden Cardiac Death (SCD) is defined as sudden cardiac (heart) arrest with complete cessation of heart activity, regardless of whether or not spontaneous reversion or resuscitation occurs. Patients who survive such an episode are said to have undergone an aborted SCD. According to the World Health Organization, SCD is defined as a sudden collapse of cardiac function occurring within an hour of symptom onset. The commonest symptoms are :

- ☞ CHEST PAIN
- ☞ SHORTNESS OF BREATH
- ☞ FATIGUE
- ☞ PALPITATION AND
- ☞ FAINTING SPELLS

It is important to remember that these symptoms may predate the actual event of SCD by days to even months, insidiously wreaking havoc at the molecular level, only to give rise to tragic consequences later.

But what are the causes of SCD ? These may be conveniently subdivided into the following subgroups :

### A. ISCHAEMIC HEART DISEASE :

Coronary Artery Disease (CAD) with angina or myocardial infarction (MI – Heart Attack)

Coronary artery embolism

Coronary artery spasm

Non-atherogenic CAD (arteritis, dissection, etc.)

### B. NON-ISCHAEMIC HEART DISEASE :

Hypertrophic cardiomyopathy

Dilated cardiomyopathy

Valvular heart disease

Congenital heart disease

### C. RHYTHM DISORDERS :

### D. NON CARDIAC DISORDERS :

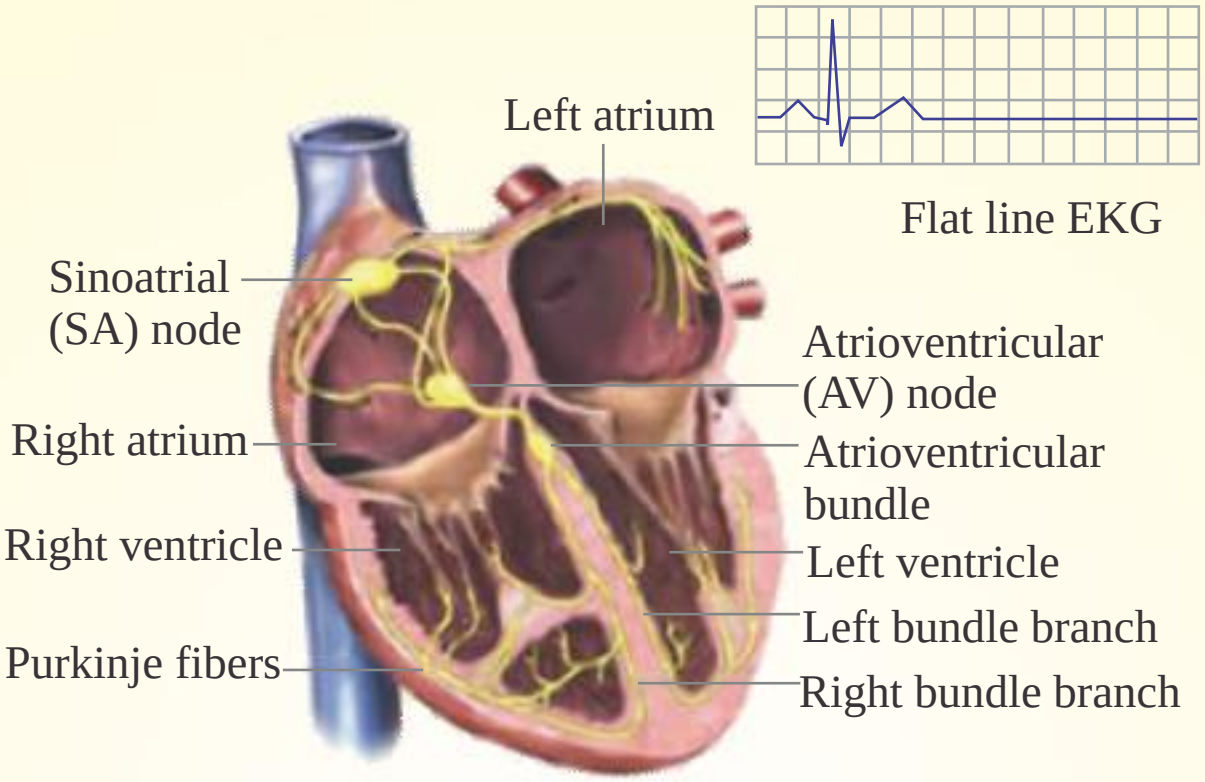
Pulmonary embolism

Intracranial haemorrhage

Drowning, etc

The overwhelming majority (80%) of cases are caused by ventricular fibrillation (VF) or tachycardia (VT) in the setting of underlying CAD. The resulting damage to the heart muscle knocks the electrolyte mechanism operating at the molecular level off balance, causing a totally chaotic, uncoordinated rhythm (VT/VF) that leads to a gross reduction of cardiac output to the vital organ systems, and death. SCD accounts for a staggering 30-50% of all coronary-related deaths. Peak incidence of these life-threatening rhythm disturbances (VT/VF) has been found to occur within the first 48 hours following a heart attack.

In a younger age-group (</=35 years), SCD is most commonly caused by hypertrophic cardiomyopathy, an inherited disease. Here, too the




fatal end-point is VT/VF, the actual mechanism of which, in this setting, is still unclear. There is an underlying genetic mutation in the molecular structure of the heart-muscle forming protein in this disease. Other causes in this age group are valvular heart disease, especially aortic stenosis, or narrowing of the orifice of the aortic valve; congenital disorders of the rhythm; congenital heart defects, commotio cordis. The latter term refers to SCD in young athletic individuals following a striking of the chest or precordium with an object like a ball, or hockey stick, leading to, again, VT/VF. Hence, it is clear that the frequency of CAD is much lower in SCDs occurring in the age group 30-40 years. In a post-mortem study of 193 cases of SCD occurring in young Australians, 22% occurred during exercise, 38% during minimal exertion or at rest and the remainder 40% were not witnessed. Another peculiar finding was that unlike the United States and Europe, primary rhythm disorders were found to be the leading cause of SCD in young Australians. Indeed, concern has been expressed regarding the underestimation of primary rhythm disorders as a cause of SCDs.

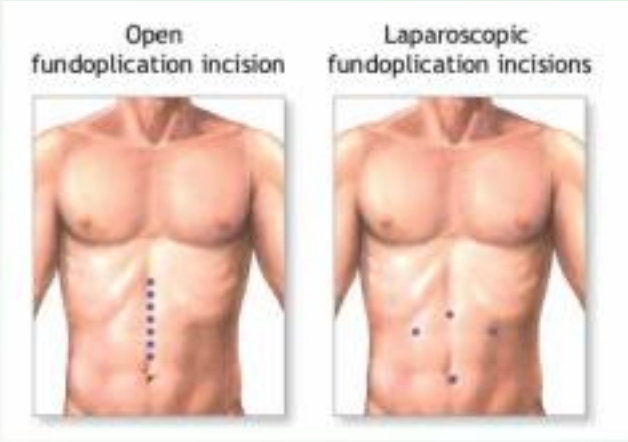
So what can be done to avoid this dreaded condition ? While a blanket screening of all individuals in a population for risk factors for SCD would not be cost-effective, certain measures can be considered :

A. Correct genetic screening to detect congenital cardiac disease,

B. Appropriate family screening of at-risk family members, e.g., offspring of past victims of SCD

C. Initiation of strategies, such as Implantable Cardioverter-Defibrillator therapy (ICD); this an implantable device, that detects any sudden rhythm disturbance, like VT/VF and automatically delivers a pre-set electric shock to revert it to a normal, regular rhythm; although an expensive proposition, this is the most effective preventive therapy for individuals at clear risk for SCD.

# 7 Steps to Effective Medications




If you're not used to taking several different meds, it can be a little daunting at first. Here are some tips to make the medicine go down more smoothly.

## 1. Know your stuff :

Don't leave your doctor's office without knowing exactly what medicine you are supposed to take, what it's for, how much to take, when, and how often. Write down the information for future reference (Organize your medications with printable chart.)

## 2. Make a schedule :

If you're taking lots of different meds, injections, or both, you may need to actually write out a schedule to figure out how they all fit together—and to make sure you remember to take them.

## 3. Avoid bad interactions :

Some drugs should not be taken together, and some vitamins, dietary supplements, and even fruits or juices (grapefruit, in particular) may change how certain medications work. Inform all healthcare providers about any supplements or nonprescription meds you take. Go over the list at every office visit.

## 4. Watch yourself :

Note any common side effects associated with your medications and the symptoms you should watch for. If you suspect you're having a side effect, call your health care provider's office immediately. But never stop taking a medication without consulting your doctor.

## 5. Think about the money :

Don't be shy about talking to your doc and pharmacist about your ability to afford medications and co-pays. Meds can differ significantly in price, particularly when there is a generic version. If cost is a concern, explore your drug-buying options. You might save yourself a trip to the pharmacy—and some cash—by ordering some prescriptions through the mail or on the Internet.

## 6. Never skip a dose :

It is crucial that you always take your medicine exactly as your doctor instructs. Never double up on meds to catch up on a missed dose unless a provider tells you to. You can make it easier to keep track of what to take when by using a weekly pill organizer. Some are divided not only by days of the week but also by times of day—and some of the new ones are downright fashion-forward.

## 7. Be prepared for change :

Oral meds may fail to control your blood glucose and often become less effective over time. It's not unusual to find that you need to use additional medications or add insulin to your regimen as the months and years go by.

# Diabetes & teeth

*Dr. Seema Saini*

***Did you know that people who have diabetes have a greater risk of developing gum disease, tooth decay, fungal disease, and other problems with oral (mouth) health? Starting and maintaining a regular dental care routine is part of a comprehensive diabetes care plan. You can make sure your mouth stays healthy and pain-free with these simple steps:***

## CONTROL BLOOD GLUCOSE (SUGAR):

Patients who don't properly control their blood glucose levels are more likely to develop periodontal (gum) disease and can lose more teeth than someone whose diabetes is well-controlled. Talk with your endocrinologist about what the right target is for you.

## BRUSH AND FLOSS REGULARLY:

Use a soft bristled toothbrush and replace it every 3 months.

Brush for at least 3 minutes with fluoride toothpaste.

Brush at least 2 times a day, after each meal if you can.

Floss at least once a day.

## SEE A DENTAL PROFESSIONAL:

Have your teeth cleaned by the dentist at least two times a year.

See a periodontist (gum doctor) at least once a year.

Tell both the dentist and periodontist that you have diabetes, if your blood glucose levels are controlled, and any medications you are taking.

**Call your dentist if you notice any of the following:**

- Bleeding, red, or sore gums.
- Gums that are pulling away from teeth.
- Bad breath for a long period of time.
- Loose or separating adult teeth.
- A change in the way you bite.

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Free : Blood Sugar, ECG, Nerve Test, Eye & Dental Check up along with FREE Consultation by Consultant Diabetes & Heart

# SELF CARE AT HOME : SECRET TO HEALTH IN DIABETES MELLITUS

Ravinder Singh Sambi, Aashna Treohan Kapoor
*Senior Registrars, National Heart Institute*

## INTRODUCTION :

India has as many as 50.8 million people suffering from diabetes, according to the data stated at the 20th Annual World Diabetes Congress of the International Diabetic Federation in Montreal on 21st October, 2009. According to this data, most of the people suffering from diabetes fall in the age group of 40 to 64 years.

If you or someone you know has diabetes, they would be wise to follow and make healthful lifestyle choices in diet, exercise and other health habits. These will help to improve glycemic control and will prevent or minimize the complications of diabetes.

## DIET :

A healthy diet is the key to controlling blood sugar levels and preventing diabetes complications.

- If the patient is obese and has difficulty losing weight on their own, talk to a healthcare provider who can help recommend a dietician or a weight modification programme to help the patient reach a goal.
- Eat a consistent, well-balanced diet that is high in fibre, low in saturated fat (less than 10% of the total calorie intake) and low in concentrated sweets.
- A consistent diet that includes roughly the same number of calories per day helps the healthcare provider prescribe the correct dose of medication or insulin.
- It will also help to keep blood sugar at relatively even level and avoid excessively low or high levels, which can be dangerous and even life threatening.

## EXERCISE :

Regular exercise, in any form can help reduce the risk of developing diabetes. Activity can also reduce the risk of developing complications of diabetes such as heart disease, stroke, kidney failure, blindness and leg ulcers.

- As little as 20 minutes of walking three times a week has a proven beneficial effect. Any exercise is beneficial; no matter how light or how long, some exercise is better than no exercise.
- If the patient has complications of diabetes (eye, kidney or nerve problems), they may be limited both in type of exercise and the amount of exercise they can safely do without worsening their condition. Consult with your healthcare provider before starting any exercise programme.

## SMOKING :

If the patient has diabetes and he smokes cigarettes or uses tobacco in any other form, then he or she raises the risk markedly for developing nearly all complications of diabetes. Smoking damages blood vessels and contributes to heart disease, stroke and poor circulation of blood to the limbs. If someone needs help quitting, talk to your healthcare provider.

## ALCOHOL USE :

Moderate or eliminate the consumption of alcohol. Try to have no more than seven alcoholic drinks in a week and never more than two or three drinks in an evening. One drink is considered 1.5 ounces of liquor, 6 ounces of wine or 12 ounces of beer. Excessive alcohol use is a known risk factor for type II diabetes. Alcohol consumption can cause low or high blood sugar levels, nerve pain called neuritis and increase in triglycerides which is a type of fat in our blood.

## SELF MONITORED BLOOD GLUCOSE :

Check blood sugar levels frequently, at least before meals and at bedtime and record the results in a logbook.

- The logbook should also include
  - Insulin or oral medication doses.
  - Times when and what the patient ate.
  - When and for how long they exercised.

- Any significant events of the day such as high or low blood sugar levels and how they treated the problem.

- Better equipment now available makes testing blood sugar levels less painful and less complicated than ever. A daily blood sugar diary is invaluable to the healthcare provider in seeing how the patient is responding to medications, diet and exercise in the treatment of diabetes.

- Medicare and medical insurances now provide for diabetic testing and supplies.

## GLYCOSYLATED HEMOGLOBIN OR HEMOGLOBIN A1C :

This test is a measurement of how high blood sugar levels have been over about the last 120 days (i.e. the average life span of a normal red blood cell on which the test is based).

- Excess blood sugar hooks on to the hemoglobin in the red blood cells and stays there for the life of the red blood cell.

- The percentage of the hemoglobin that has excess blood sugar attached to it can be measured in the blood.

- The hemoglobin A1C is the best measurement of blood sugar control in patients of diabetes. Hemoglobin A1C of less than 7% indicates good control. A result greater than 7% corresponds to poor control of blood sugar.

- Hemoglobin A1C of more than 6.1% is suggestive of impaired fasting glucose and indicates the need to investigate further for diabetes mellitus.

- Hemoglobin A1C test is generally measured at intervals of about three months for patients with diabetes mellitus.

## DIABETES FOLLOW-UP TREATMENT :

- Follow the healthcare provider's treatment recommendations. Keep records of blood sugar levels as often as recommended by the healthcare provider including

  - The times the levels were checked.

  - When and how much insulin or medication was taken.

  - When and what was eaten and.

  - When and for how long the patient exercised.

- Call the healthcare provider if the patient has any problems with their treatment or symptoms that suggest poor blood sugar control.

## EDUCATION :

- Attend diabetes education classes at the local hospital. The more educated the patient and their families are about the disease, the better they are likely to do.

- Regular visits to the primary healthcare provider.

- If the patient takes insulin, they should see the healthcare provider about every three months or more often. For those taking oral medications, every three to six months is generally adequate, unless they are having problems.

- The patient and their families should be taught how to recognize the signs and symptoms of low blood sugar levels.

- Mild symptoms include confusion, uneasiness, vomiting and/or sweating. They can progress to lethargy, agitation (sometimes with violent jerky movements or seizures) or even complete unresponsiveness (coma).

- The healthcare provider should lay a clear and simple plan for treating low blood sugar levels.

## DIABETES PREVENTION :

As healthcare providers, we have yet to discover a way to prevent type I diabetes mellitus. But type II diabetes, is however preventable in some cases.

- Control weight to normal or near normal levels by eating a healthy low fat, high fibre diet.

- Regular exercise is crucial to the prevention of type II diabetes. Increase physical activity levels and aim for moderately vigorous physical activity for at least 30 minutes every day.

- Drink an adequate amount of water and avoid taking too much of salt.

- Quit smoking.

- Keep alcohol consumption low.
- If you have high blood fat/cholesterol levels or even high blood pressure, consult your healthcare provider and take your medications as directed.
- Life-style modifications and certain medications can be used in people with pre-diabetes to prevent the progression to diabetes. Pre-diabetes can be diagnosed by checking fasting blood sugar and after two hours of ingestion of 75 grams of glucose.
- If you or someone you know already has diabetes, focus should be on preventing the complications, which can cause serious disabilities such as heart attack, stroke, blindness, kidney failure requiring dialysis, limb amputation or even death.
- Tight blood sugar control: the single best thing the patient can do is to keep their blood sugar level within the suggested range every day. The only way to do this is through a combination of regular blood sugar checks, a balanced diet low in simple sugars and fat; and high in complex carbohydrates and fiber and appropriate medical treatment. Please consult a nutritionist or check with the healthcare provider with questions in regard to your diet.
- The skin should be taken care of; keep it supple and well hydrated to avoid sores and cracks that can become severely infected.
- Brush and floss the teeth every day. See a dentist regularly to prevent gum disease.
- The feet should be washed and examined daily looking for small cuts, sores or blisters that may cause problems later. The toe nails should be filed rather than cut to avoid damaging the surrounding skin. A specialist in foot care may be necessary to help care for the feet.

## Conclusion

People with diabetes must deliver 95% of their own care, so it is of paramount importance that they receive ongoing, high quality diabetes education that is tailored to their needs and delivered by skilled healthcare professionals. The International Diabetic Federation states that diabetes can be prevented by helping and encouraging those at risk to maintain a healthy weight and take regular exercises.

# The New Year Resolutions

On January 1st, millions of people resolved to lose weight. I hope you weren't one of them.

You may be thinking, "What?!!! Of course I resolved to lose weight—it's a tradition—I do it every year!"

The reason is that losing weight is not a resolution, it is a result. It is the result of making specific small changes in the way you eat, move, and live. For the changes to stick, they must be in alignment with your core values, not just a number on a scale.

If you're struggling to keep your resolutions (weight or otherwise), read Lalita's story below then write (or rewrite) your goals using this Resolutions That Rock worksheet.

## LALITA'S STORY :

Lalita said she just had to lose 12 kgs because she didn't like the way she looked or felt. She admitted that she had tried many times in the past to lose weight but she always reverted back to her old habits as soon as her resolve wore thin.

She was a busy mom with two kids and a successful career. She typically skipped breakfast or grabbed a sandwich at work. She was starving by lunch time so she would pick up fast food to eat at her desk while doing paperwork. Dinner was either fast food again between her kids' studies and dance classes or a quick-to-fix meal like Biscuits before homework. After the kids were in bed and the house was finally picked up, she would snack until she went to bed.

It would have been easy to focus on what she should or shouldn't be eating but clearly, her weight was really just a result of the choices she made at the many decision points throughout her busy days.

Once she really understood what was really going on, she focused on what was most meaningful to her: spending time with her family and having the energy to be successful at her job. With this focus, she laid out a plan to make one change at a time.

## LALITA'S PLAN :

First, she started getting up ten minutes earlier for a bowl of cereal and some quiet time before anyone else was up. She quickly found that she felt calmer and had more energy throughout the morning.

Her next step was to start bringing her lunch at least several times a week and give herself at least 20 minutes to eat without working. She enjoyed her meals more and felt more recharged by taking a break.

With these positive experiences to fuel her along, she took her next step: walking for ten minutes twice during her work day. She wasn't perfect but it felt great so she did the best she could to be consistent.

Next, she asked her husband to help their family plan ahead for dinner by vegetable cutting and washing  On the occasions they still went out for fast food, she tried to make healthier choices and stopped up-sizing her meal. Not only were they spending less money, but the kids were eating healthier too.

She then turned to her night time snack habit. She realized that most of the time she wasn't hungry but was rewarding herself for getting through the day. She promised herself that she could eat her favorite foods without feeling guilty but she wanted to try rewarding herself in more nurturing ways. Her favorites became hot baths, reading, and scrap booking. She was feeling so much better that she started a dance class while her daughter was in it twice a week.

Looking back, Lalita  realized that if she had just started another diet or joined a gym like every other year, she might have had some quick but temporary results. This time she knew that weight loss was only one of many great results she saw from the small changes she made.

*By making one sustainable values-based change at a time, you'll get the results you want from your resolutions too.*

When will you begin to notice the effects of my diet changes? Do you tend to get discouraged after about 5 days when you don't see results. Do you need more patience ?

Answer : It is difficult to tell when you will notice a change because everyone is a little different The rate of weight loss is affected by many factors, *including gender, age, starting weight, fat to muscle ratio, calorie intake and output, composition of the diet, how carefully you keep food logs, and other factors.*

# Your Personal Nutrition

Q. Does drinking water speed up weight loss ?

Ans. : Drinking water does not produce weight loss per se, except to keep your stomach full so that you are less likely to overeat. Water intake has only a slight and temporary impact on metabolic rate and, therefore, it is considered to be insignificant. Your daily requirement is for fluid, not just water, and so your tea and diet beverages, as well as all other beverages and even the water in fruits and vegetables, all count.

Your fluid requirements depend upon your size, activity level, the ambient temperature, altitude, pregnancy/lactation, medical conditions, and medications. Drink more fluids when you exercise and when it is hot, and to find your personal fluid requirements.

Q. Where should I eat out on my birthday ?

Ans. : Go to a restaurant where you can see the menu ahead of time, and then chose your entire meal from wine to dessert before you walk in the door. Order menu items that contain fewer calories. Generally, fried, breaded and creamy dishes are higher in calories than grilled and roasted foods made with only a little oil. And then watch those portions because many restaurants serve enough food for two or three people. Either split your dish with your husband or take the leftovers home for another meal.

*Making healthy choices and staying in your daily calorie limit while eating out can be extremely challenging. It's almost impossible to avoid eating out entirely, so having a few ground rules can help you stay on track while you dine out. Here are some of my favorite tactics:

## Prepare Ahead of Time :

If you have the luxury of choosing a restaurant yourself, do some homework ahead of time and research your options online. Look for specialty organic, vegetarian, "raw" or macrobiotic restaurants. Many of them are very tasty and extremely healthy.

Even if you can't choose where you eat, you can prepare for the meal by spending a few extra minutes working out or cutting back your intake the rest of the day. Just make sure you don't starve yourself and show up at the restaurant famished and ready to eat anything and everything.

## General Rules :

Many restaurants prepare foods with lots of fat, oil, and cream (maybe that's why they taste so good), so avoid dishes that are fried, use fatty meats, or come with heavy sauces. One of my friends has vowed to "never eat anything in a white sauce", though I find this rule just a bit too restrictive.

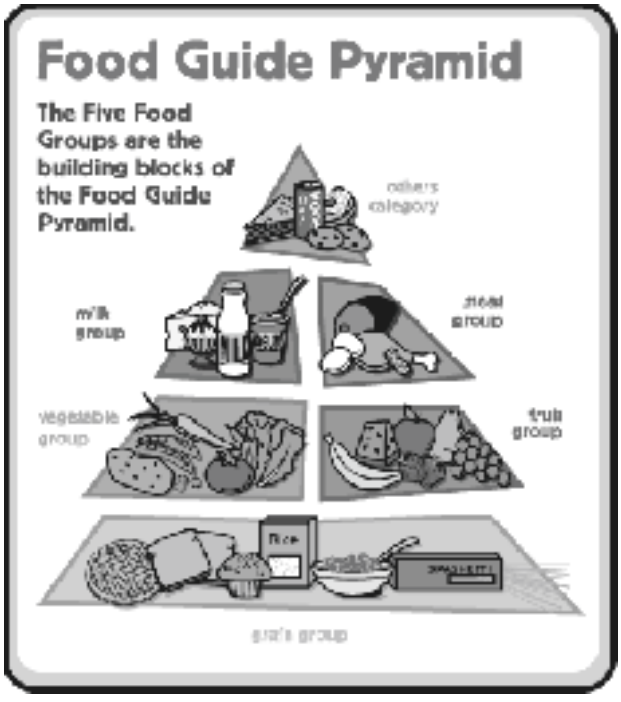
## Drinks :

Obviously the same rules apply as when you are at home. Avoid all those empty calorie aerated drinks , frozen drinks, and alcohol and enjoy the tap water - hey, it's free !

## Appetizers :

It's easy to cave with a delicious bread basket. If there are a few different types of breads you'd like to try, break them into smaller size samples and go light on the butter.

Salads (with dressing on the side) and non-creamy or oily soups are great appetizer options. If you can't find a suitable entree, you can always order two healthier appetizers.



## Main Course :

Again, the general rules of avoiding foods with lots of fat, oil, or cream apply. Look for grilled lean meats, such as chicken or fish, with steamed vegetables or rice on the side. Many restaurants are more than happy to make substitutions or prepare items not listed on the menu, so don't be afraid to bug your waiter with special requests. Be sure to eat slowly and remember you don't have to clean your plate. Some people find it helpful to divide their plate immediately into a portion they intend to eat right away and a portion they intend to take home as leftovers.

## Dessert :

A hot cup of coffee or tea (with sugar substitute if required) can provide a wonderful, low-calorie ending to a delicious meal. If you're still hungry and craving a dessert, you can often find healthy choices such as fresh fruit or fat-free sorbets. Make sure to get extra utensils and split it with the rest of the table.

## Nobody's Perfect :

We can't be expected to make healthy choices 100% of the time. If you made a few bad choices, or even went off the rails completely, remember it's only one meal of many in your life. Most of the time, we eat out to celebrate a special occasion or spend time with our friends and family, so while it's good not to compromise your diet, it's also an occasion that should be enjoyed.

The thing to remember in this is that you are the one paying at the end of the day. If they can't serve you don't have to bring them any custom. This can also somewhat apply to those of you who're simply looking to watch your calorie intake: never be afraid to ask for that dressing on the side, or simply, "I am watching my weight, can you recommend me anything?"

The other thing I want to stress/second is that even if you're dining out it's not all about food! Take in the atmosphere, the company, the smells and tastes and flavours. Especially if you don't get to eat out often. Enjoy it and take your time - there is no rush!

# NHI Dialogue

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# NEW GUIDELINES FOR EXERCISE IN TYPE 2 DIABETES:

## The CDRS Diabetes News Service

*December 16, 2010 – New guidelines issued jointly by the American Diabetes Association and the American College of Sports Medicine stress the crucial role that physical activity plays in the management of type 2 diabetes.*

They replace recommendations made in the American College of Sports Medicine Position Stand "Exercise and Type 2 Diabetes" that were issued in 2000.

Developed by a panel of 9 experts, the new guidelines are published concurrently in the December issue of Medicine & Science in Sports & Exercise and Diabetes Care.

***"High-quality studies establishing the importance of exercise and fitness in diabetes were lacking until recently," the expert panel writes, "but it is now well established that participation in regular physical activity improves blood glucose control and can prevent or delay type 2 diabetes mellitus, along with positively affecting lipids, blood pressure, cardiovascular events, mortality, and quality of life."***

***Most of the benefits of exercise are realized through acute and long-term improvements in insulin action, accomplished with both aerobic and resistance training.***

*For people who already have type 2 diabetes, the new guidelines recommend at least 150 minutes per week of moderate to vigorous aerobic exercise spread out at least 3 days during the week, with no more than 2 consecutive days between bouts of aerobic activity. These recommendations take into account the needs of those whose diabetes may limit vigorous exercise.*

- The panel specifically recommends that such moderate exercise correspond to approximately 40% to 60% of maximal aerobic capacity and states that for most people with type 2 diabetes, brisk walking is a moderate-intensity exercise.
- The expert panel also recommends that resistance training be part of the exercise regimen. This should be done at least twice a week ideally 3 times a week on nonconsecutive days. The panel also recommends that people just beginning to do weight training be supervised by a qualified exercise trainer "to ensure optimal benefits to blood glucose control, blood pressure, lipids, and cardiovascular risk and to minimize injury risk."
- Regular use of a pedometer is also encouraged. In a meta-analysis of 8 randomized controlled trials and 18 observational studies, people who used pedometers increased their physical activity by 27% over baseline. Having a goal, such as taking 10,000 steps per day, was an important predictor of increased physical activity, according to the expert panel.
- Finally, the new guidelines emphasise that exercise must be done regularly to have continued benefits and should include regular training of varying types.

This joint position statement from the American College of Sports Medicine and the American Diabetes Association addresses the benefits and recommendations for physical activity in persons who at risk for, or have, type 2 diabetes.

### Study Highlights :

◆ Acute effects of physical activity

- Physical activity increases glucose uptake into active muscles, with greater effect as the intensity of physical activity increases.
- Muscle contractions during physical activity stimulate blood glucose transport via a mechanism that is separate and additive to insulin-stimulated blood glucose uptake into skeletal muscle at rest.

- Moderate physical activity acutely improves blood glucose and insulin action with minimal risk for hypoglycemia in those not taking insulin or insulin analogues.
- Intense physical activity can cause transient hyperglycemia.
- Resistance exercise leads to lower fasting for at least 24 hours in those with impaired fasting glucose levels.
- The acute effects of resistance exercise in type 2 diabetes are not reported.
- Combined aerobic and resistance exercise vs separately might be more effective in blood glucose control, but more studies are needed.
- o Milder exercise has mixed results on blood glucose control.
- o Physical activity acutely improves systemic insulin action for 2 to 72 hours.

◆ Long-term effects of physical activity :

- Aerobic and resistance training improve insulin action, blood glucose control, and fat oxidation and storage in muscle.
- Resistance exercise improves skeletal muscle mass.
- Physical activity might reduce low-density lipoprotein cholesterol levels, but does not increase high-density lipoprotein cholesterol levels or reduce triglyceride levels.
- Combined weight loss and physical activity vs physical activity alone might have greater effect on lipids.
- Physical activity might improve systolic more than diastolic blood pressure in type 2 diabetes.
- Physical activity and physical fitness are linked with reduced risk for all-cause and cardiovascular mortality.
- If relying on exercise alone for weight loss, up to 60 minutes per day of physical activity might be needed.
- Supervised vs unsupervised training in type 2 diabetes results in greater compliance and blood glucose control.
- Physical activity and fitness can decrease depression symptoms and improve health-related quality of life in type 2 diabetes.

◆ Prevention of type 2 diabetes :

- In high-risk adults, at least 2.5 hours per week of moderate to vigorous physical activity is recommended as part of lifestyle changes to prevent type 2 diabetes.
- Physical activity might decrease the risk for the development of gestational diabetes.

◆ Pre-exercise evaluation for patients with type 2 diabetes :

- Pre-exercise evaluation is recommended for sedentary patients with type 2 diabetes who plan physical activity more intense than brisk walking.
- Pre-exercise electrocardiogram exercise stress testing for asymptomatic patients might be indicated for those at high risk for cardiovascular disease.

◆ Physical activity for patients with type 2 diabetes :

- The recommended physical activity for persons with type 2 diabetes is at least 150 minutes per week of moderate to vigorous aerobic exercise spread out during at least 3 days of the week, with no more than 2 consecutive days between physical activity.
- Persons with type 2 diabetes need moderate to vigorous resistance training at least 2 to 3 days per week.
- Supervised and combined aerobic and resistance training might have greater benefits.
- Milder physical activity has mixed results.
- Increase in total daily unstructured physical activity is recommended.
- Flexibility training should not replace other recommended physical activity.

- Patients with blood glucose levels greater than 300 mg/dL should use caution.
- Carbohydrate supplementation or medication dose changes might be needed to prevent hypoglycemia in those taking insulin and insulin secretagogues.
- Recommendations for patients with diabetes complications include a supervised cardiac rehabilitation program if angina is present and is classified as moderate or high risk, foot care if there is peripheral neuropathy, possible exercise stress test and prescribed exercise intensity if there is cardiovascular autonomic neuropathy, avoidance of physical activity that increases intraocular pressure and hemorrhage risk in uncontrolled proliferative retinopathy, and screening for cardiovascular disease in kidney disease.
- Promoting physical activity should include development of self-efficacy, social support, and encouragement of mild or moderate physical activity.
- Clinical Implications

◆ For adults at risk for type 2 diabetes mellitus, the recommended physical activity is at least 2.5 hours per week of moderate to vigorous physical activity to prevent the development of this disease.

◆ The recommended physical activity for persons with type 2 diabetes mellitus is at least 150 minutes per week of moderate to vigorous aerobic exercise during at least 3 days of the week, with no more than 2 consecutive days between exercise. Moderate to vigorous resistance training for 2 to 3 days per week is also recommended.

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**(A Voluntary Organisation For Prevention of Heart, Diabetes & Lifestyle Diseases)**

*Aims & Objectives :*

- To create awareness in masses about heart problems, specially in diabetes patients.
- To evaluate diabetes patients who are at high risk of heart diseases.
- To organize Free / affordable treatment for Diabetes & Heart Ailments.
- Health Education to General Public.
- Continuing Medical Education to Practicing Doctors.
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- Concessions for Tests & treatment at various Organizations & Hospitals.
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