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Journal of Diabetes Education

To Dispel Darkness Of Diabetes

DIET MANAGEMENT

EXERCISE

MEDICATION

An Official Publication of
Association of Diabetes Educators
(India)

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- **Significantly superior start**[1]
- **Preferred choice for intensification**[2]
- **Convenience of a single pen**[1]

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References: 1. Onishi Y, Ono Y, Rabol R, Endahl L, Nakamura S. Superior glycaemic control with once-daily insulin degludec/insulin aspart versus insulin glargine in Japanese adults with type 2 diabetes inadequately controlled with oral drugs: a randomized, controlled phase 3 trial. *Diabetes Obes Metab.* 2013;15(9):826–832. **2.** Rodbard HW, Cariou B, Pieber TR, *et al.* Treatment intensification with an insulin degludec (IDeg)/insulinaspart (IAsp) co-formulation twice daily compared with basal IDeg and prandial IAsp in type 2 diabetes: a randomized, controlled phase III trial. *Diabetes Obes Metab* 2016;18:274-80.

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JOURNAL OF DIABETES EDUCATION

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DIGITAL DIABETES: PERSPECTIVES FOR DIABETES PREVENTION, MANAGEMENT AND RESEARCH

*** Manish Agarwal**

Introduction

Digital technologies and electronic healthcare (e-healthcare), along with the Big Data they generate and the artificial intelligence (AI) methods that analyze them, represent a major opportunity to rethink diabetes, as they are expected to have a major impact on all aspects of diabetes, from prevention to research, including diabetes care and management. However, these are still early days in the delivery of health services and information using the Internet and related technologies, such as Smartphone apps and connected devices (often referred to as 'health'), but also for social media, telemedicine and e-health records that can completely change the diabetes landscape

Diabetes technology

As 'smart' glucose and blood-pressure monitors, activity trackers and weighing scales become the most commonly used connected devices in the world of diabetes, more sophisticated tools are coming onto the market. From 'smart' socks, which are supposed to monitor foot temperature to prevent inflammation and foot ulcers, to connected portable mini-electrocardiography (ECG) to track cardiovascular health, the increasing variety of devices for people living with diabetes should transform the way the disease is managed. However, to make these tools accessible to the wider population, large-scale real-life studies are needed to assess their safety and usefulness, and to quantify their benefits compared with standard care. In addition, the multitude of Smartphone apps to manage connected devices, but the lack of interoperability between them, may be a potential barrier to efficient diabetes management.

Artificial intelligence(AI) and diabetes

AI has and will continue to have many applications in the field of diabetes. Already, AI has gained significant traction in recent years in the field of medical imaging. Automated diagnosis of diabetic retinopathy (DR) and cardiovascular risk factor monitoring are now possible. Digital tools and sensors allow transition from the occasional assessment of disease to prospective real time, continuous, high-throughput and no-burden remote monitoring of patients' symptoms, physiological data, behaviors, and social and environmental settings.

However, while the combination of digital technologies and AI has the potential to revolutionize healthcare for people with chronic diseases like T1D and T2D, it will also challenge current processes and organization of care, the nature and role of HCPs and their relationships with patients, information systems, the structure of healthcare facilities, funding of healthcare and the entire traditional chain of healthcare values. Indeed, considerable effort is now required to exploit the full potential of these technologies and to overcome barriers to their widespread implementation, while nonetheless preserving the core values of the relationship between patients and their caregivers

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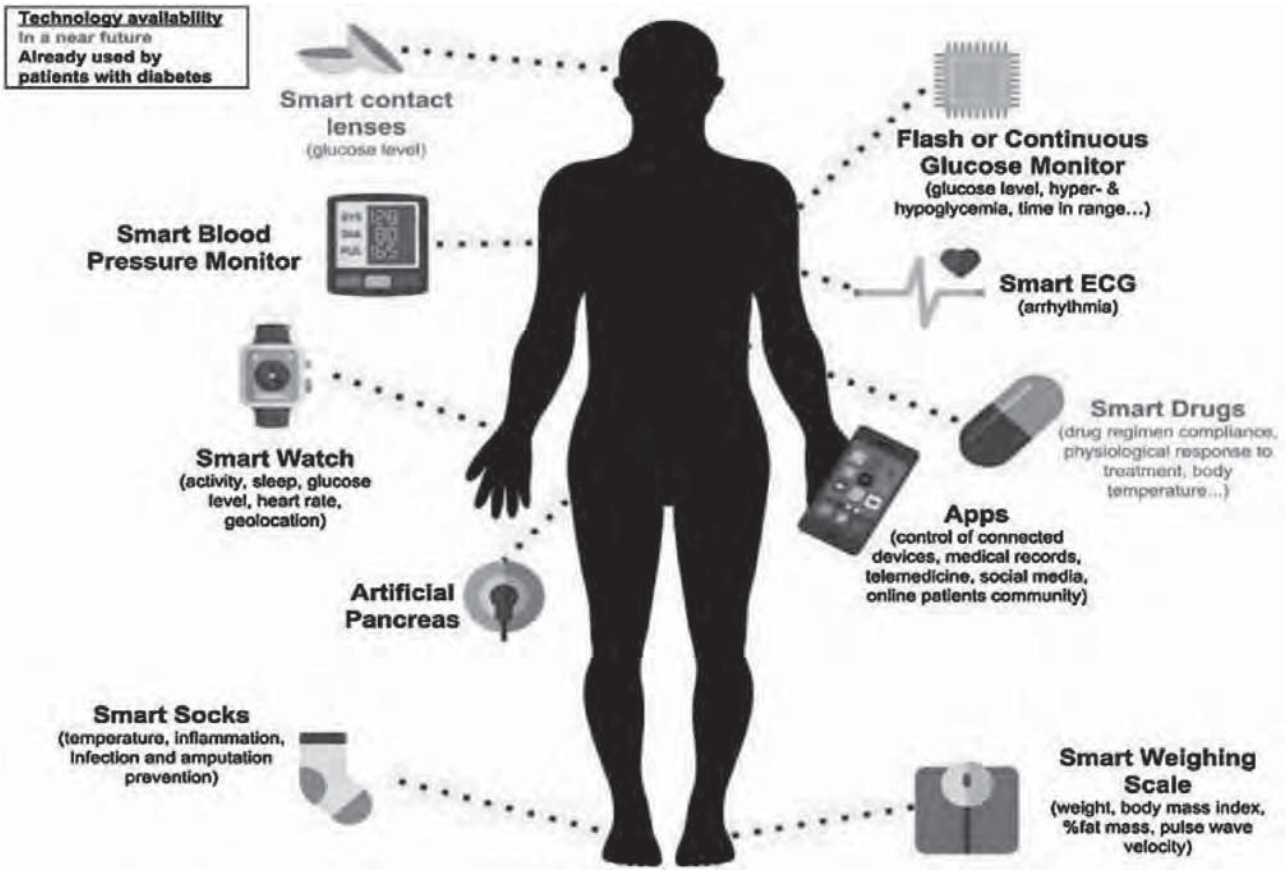
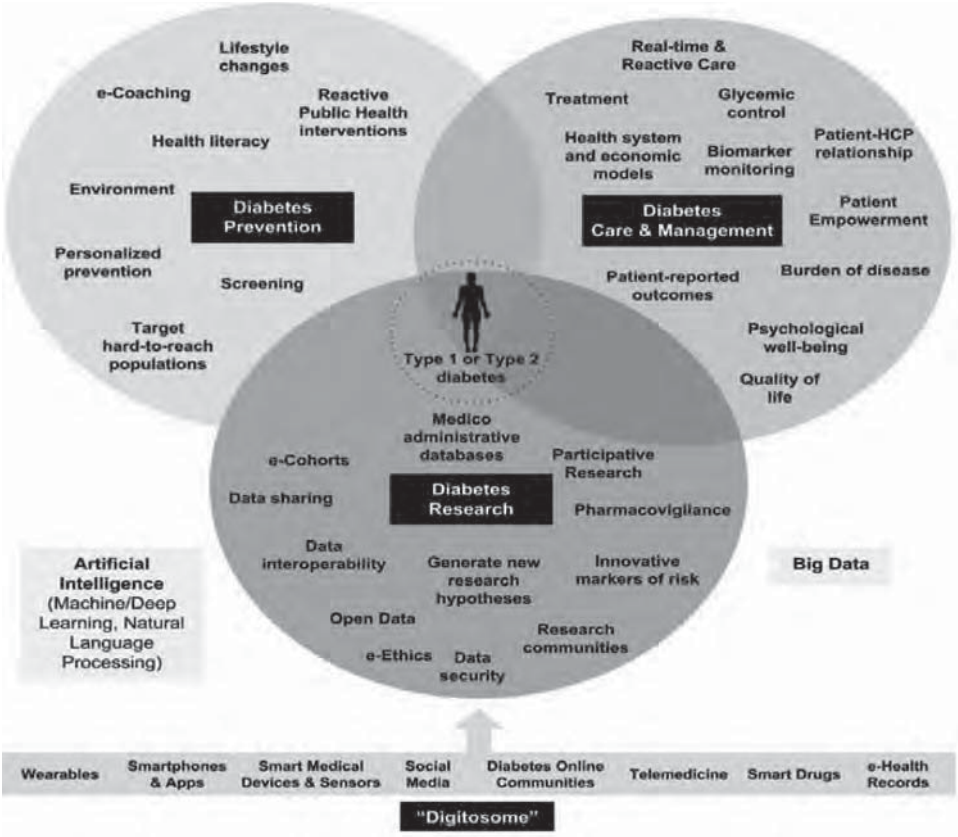

Technology availability
In a near future
Already used by patients with diabetes
Smart contact lenses
(glucose level)
Flash or Continuous Glucose Monitor
(glucose level, hyper- & hypoglycemia, time in range...)
Smart Blood Pressure Monitor
Smart ECG
(arrhythmia)
Smart Drugs
(drug regimen compliance, physiological response to treatment, body temperature...)
Smart Watch
(activity, sleep, glucose level, heart rate, geolocation)
Apps
(control of connected devices, medical records, telemedicine, social media, online patients community)
Artificial Pancreas
Smart Socks
(temperature, inflammation, infection and amputation prevention)
Smart Weighing Scale
(weight, body mass index, %fat mass, pulse wave velocity)


Lifestyle changes
e-Coaching
Reactive Public Health interventions
Health literacy
Environment
Diabetes Prevention
Personalized prevention
Screening
Target hard-to-reach populations
Real-time & Reactive Care
Treatment
Glycemic control
Health system and economic models
Biomarker monitoring
Patient-HCP relationship
Diabetes Care & Management
Patient Empowerment
Patient-reported outcomes
Burden of disease
Psychological well-being
Quality of life
Type 1 or Type 2 diabetes
Medico administrative databases
e-Cohorts
Participative Research
Data sharing
Diabetes Research
Pharmacovigilance
Data interoperability
Generate new research hypotheses
Innovative markers of risk
Big Data
Open Data
Research communities
e-Ethics
Data security
Artificial Intelligence (Machine/Deep Learning, Natural Language Processing)
Wearables
Smartphones & Apps
Smart Medical Devices & Sensors
Social Media
Diabetes Online Communities
Telemedicine
Smart Drugs
e-Health Records
"Digitosome"

Challenges for diabetes research

The development of data science methods and AI adapted for health data (development of methods to train new algorithms without breaching data privacy, transferability of algorithms in different settings) has led to the development of ecosystems of digital tools and sensors to remotely monitor patients, methods to co-construct, with patients, digital interventions for behavioral changes tailored to patient preferences and characteristics, but adapted over time, and methods for rigorous evaluation of the efficacy and efficiency of these new digital technologies. Nevertheless, thoughtful consideration of the philosophical and ethical issues underlying the use of digital tools and AI in diabetes (and chronic diseases more generally) is essential when dealing with various other related aspects, such as individually predicted prognoses, the 'Orwellian' nature of continuous remote monitoring and real-time alert systems, the balance between benefits and risk of data privacy exploitation, and the impact of digital medicine on patients, caregivers, care organizations and society in general. Indeed, patients' informed consent to participate in medical research, one of the fundamental rights of patients, will soon be radically transformed by new technologies involving block-chain tools.

DIABETIC FOOTWEAR AND ITS IMPORTANCE

*** D. K. Kelkar**

It is obvious that when one mentions proper or appropriate footwear, it implies that the footwear worn commonly by people or commercial footwear is not proper. Then the question arises why? Let us examine this issue.

When one stands on the floor barefoot the entire length and width of the foot touches the ground. There is no pressure on the first and fifth metatarsal heads sideways. This condition is not fulfilled in commercially available footwear. It is mainly designed for people living in areas having snowfall. There they must wear footwear even inside the house and shoes outside the house. Otherwise they may develop frostbite. So they are wearing shoes for generations and from childhood. A numbering system is designed for them by the King of England in 1324 AD. After that there is no improvement till 2007 AD when an Indian patent improved it to a great extent for Indian feet.

The regular Indian standard is also based on the same old concept. Later the width of Indian standard was increased by four millimeters. In reality the width of Indian feet is much more. For example for a foot of length 10 inches or 254 mm the width at the toe is 84 mm as per English standard. The Indian foot of that length varies in width from 84 to 127 mm. Even widest Indian standard of usually marketed special shoes has a width of 96 mm. The width 127 mm may be considered rare, but widths up to 115 mm are very common. As per standards the width of the shoe increases by 2 mm per size. So for a difference of 127-88=39 at least 19 width sizes should be available. Does one find more than one width in shoe shops?

When the width of the shoe is smaller than the foot ball width i.e. width at the metatarsal heads {MTH} the tissue between the MTHs gets compressed and crushed and rubbed while walking. It's a potential cause for internal injury. This painful condition also restricts the walking speed.

A popular myth is second toe is longest, rather longer than big toe. If one observes carefully in diabetic population, in many cases the second toe is nearly equal to or smaller than big toe. The standard available shoes are designed assuming the second toe is largest, and a gap of 8 to 13 mm is provided ahead of it. This causes excessive pressure on the big toe from medial side. In case of a hit on the foot from any obstruction on the road, the chances of big toe getting hurt are more, as there is less margin or buffer for same, in conditions where the big toe is longer or equal to second toe. This may explain why the big toe amputations are about 27% in people with foot problems.

Foot has two main axes, a foot axis and a walking axis. Shoe is designed to match its axis with the walking axis. In Indian foot population there are many foot forms and shapes. In these shapes the foot axis and walking axis differ from each other. This is another hindrance in comfortable walk.

Pressure sock is an important aspect of offloading. An inch of pressure sock made of MCR or 10 mm to 12 mm pressure sock made of EVA foam is normal. In commercial footwear only 2 to 4 mm pressure sock is provided. Thus it cannot accommodate thicker pressure sock.

Often the sole of the shoe has square or round holes in it to reduce the weight and save on material used. On the walls of these holes the pressure mounts and causes discomfort.

Due to all these factors commercial footwear is not suitable for even normal people. In diabetic condition and with DPN (diabetic peripheral neuropathy) adjusting with these problems while walking becomes difficult for the person.

* Seffshoe Diabetic Footwear

Therefore custom made or customized footwear becomes essential in diabetic or pre diabetic person.

What are the types of Diabetic footwear?

Comfortable footwear for pre-diabetic condition and diabetes without DPN is important as it motivates walking and activity.

Prophylactic and therapeutic footwear provides offloading and redistributes the higher pressures, provides relief from pressure at wound and corn sites.

What are the Clinical Foot Measurements, How They Should Be Done and What Information they may give?

The paramedic or the laboratory personnel should be trained to do the following measurements.

1. Both feet should be measured separately preferably in standing position. Ask the patient to place one foot on one A 4 or legal Size paper depending on the foot length, squarely vertically for the various clinical measurements. It should be done with a thin metallic refill held vertically and snugly to the foot and an as accurate a tracing be made by holding the refill snugly and vertically throughout the tracing. Foot outline be made going round the heel, lateral arch, outlining the toes, head of the first metatarsal, mid foot and join back to the starting point.
2. Measure the foot length by first drawing a line along foot axis of the foot from the posterior most heel point through the second metatarsal Head . Also measure the distance from posterior most heel point to the longest toe along the foot axis. Measure the distance between the head of the 1st metatarsal's outer point to that of the 5th metatarsal head.
3. Measure the distance between the head of the 1st metatarsal's outer point or big toes outer most point whichever is widest to that of the 5th metatarsal head or small toes outer most point whichever is widest, perpendicular to the foot axis.

4 Cut the paper as closely to the outline as possible and put it in the footwear of the patient neatly and then take it out gently. See which portions of the outline get crumpled. This will reveal the points of pressure.

All these efforts help convince the person that his footwear is not comfortable and can lead to ulcer. Otherwise he is reluctant to use the same. Non compliance is the measure cause of non-healing ulcers and new ulcers . Normally the person hides from the physician that he doesn't wear the footwear all the time or doesn't wear it at all. But he may admit it to the educator. The difficult part is to convince him to wear it on all the occasions except sleeping?

Best way is to make him wear a sample pair and ask him to walk and get a feel of it. A well designed footwear pair will make him feel the difference immediately.

What are the Characteristics of Diabetic Footwear? What Purpose Do They Serve? What Other Issues Are Associated With It?

There are four types of diabetic footwear. One is the regular shoe, the other a sandal and the third is a long boot and home wear slip-ons.

<u>General Guidelines for Size, Length and Fitment:</u>

Two feet may not be identical in length, shoes constructed accordingly.

Measure both feet, they could differ in length as well as size.

The size should be determined in the evening since edema at that time is common.

Fit shoes on both feet separately while weight bearing, in the evening with regular socks on feet.

Look for snug fit around the heel.

The need for change in the footwear is common. There are manufacturers providing durable and good looking footwear with replaceable pressure sock. This reduces the financial burden.

<u>Shoes for People with Diabetes:</u>

<u>A wide toe box:</u> Such a toe box allows free

wriggling of the toes.

The toes do not come in contact with the sides of the shoe and upper surface, avoiding constant friction that may lead to thickening of the skin especially of the first and last toe, which in turn may become a site of ulcer. Minor deformities like crowding and overriding toes caused by narrow shoes also lead to excess pressure or pain.

Narrow and extremely narrow toe boxes are the fashion. Wide toe boxes are considered unfavorably. It results in people with diabetes not accepting proper footwear.

As Philip Home said many years ago the Indian feet are wider than the English. The shoe standards adopted by ISI are English shoe standards to promote exports. These are not suitable for Indians. Indian feet are at least half to one and half inch wider or more than English foot.

Width is the widest distance generally at the level of 1st metatarsal head and the fifth metatarsal head. Check for positioning of 1st metatarsal joint with the widest part of the shoe front; ensure it does not rub against the shoe. This does not however always place the ball of the foot, i.e. the first metatarsal head, the widest point of the foot at the widest portion of the toe box. The line of flexion for the ball and the flexing crease of the shoe do not match, creating an angular crease which is diagnostic of the mismatch. That creates friction on the lateral margin of the first metatarsal head.

Shoe Length: Allow at least 1/2" more from end of longest toe till the end of shoe.

A Toughened Front of the Toe Box is necessary since it protects the foot from frontal trauma during walking.

Extra Depth: The diabetic shoe should have extra depth to accommodate thick pressure sock and orthotic supports.. There will be minor or major deformities in a diabetic foot which need ? Simultaneous corrections to avoid and normalize pressures by distribution. That can be achieved by placing orthotic devices like arch supports, insoles inside the shoes.

The sole of the footwear of, a shoe should be rigid. Often the sole of the shoe has square or round holes in it to reduce the weight and save on material used. On the walls of these holes the pressure mounts and causes discomfort. Uniformly level insole at both heel and toe prevents equines, hence no high heels.

The shoe should be made without using the belts with metallic buckles touching the skin, laces with metallic tips, metallic eyelets and nails should be avoided in making a shoe or a sandal since they can lead to ulcer formation on the dorsum while walking. All such material can hurt the foot. It should have as many of the parts pasted and not stitched with strong thick threads as possible.

Ankle high leather boot prevents excessive pronation or inward bending or supination or outward bending of the foot helping to distribute pressures more equally on all area of the plantar surface. It also stabilizes the ankle in the right position and controls long axis rotation at the ankle. It is the ideal diabetic footwear. It compensates for proprioception loss and the frequent falls are avoided.

Long Leather shoes, extending above knees are not easy to wear and should be reserved for exceptional circumstances.

Velcro in place of laces improves adjustability since edema increases over the day and the shoe may have to be loosened.

Tongue is padded to reduce pressure since under it the tightening of the shoe is felt.

Sports shoes worn by people are normally running shoes. It has an high angle in front for ease in running. While walking it exerts extra pressure on toes especially the big toe. So should be avoided. Person with diabetes is not supposed to run.

Sandals and slip-ons are less costly. It should always be with a heel counter because people with diabetic neuropathy do not sense if the sandals slips away from the foot which may lead to ulceration. The stitching and avoidance of metallic parts, nails adequate width and Velcro

straps are same as in the shoes. Since sandals are more open they do not hold as much moisture as a shoe or boot, and will not have a tough toe box.

Hawaii Chappal with a Thong: This typical Indian phenomenon makes the toes to hold on to the thong leading to claw toes. They may slip from the foot since it has no heel counter, without the patient knowing, exposing him to heat, pebbles on the road. It should be totally discouraged. Sandals are more amenable to provide a wider base and also have heel counters.

Classification of the diabetic foot wear:

Comfortable Pressure Reducing Walking Footwear: Aids faster, pleasurable and graceful walk, motivates walking in a sensate foot without foot or gait deformity.

Prophylactic Walking Footwear: Aimed at avoiding ulcer formation in particularly vulnerable insensate and / or mildly deformed foot, and defective gait, redistributes uneven pressures to safe limits of 300 kilo Pascal

Custom-molded shoes: These are constructed over a positive model of the patient's foot using leather or other suitable material of equal quality for alterable, removable and replaceable inserts. A total contact, multiple density removable inlays that is directly molded to the patient's foot or a model of the patient's foot and that is made of a suitable material with regard to the patient's condition.

Rigid rocker bottom shoe: It has on its sole an exterior elevation. The apex of the elevation is placed from 51 percent to 75 percent distance measured from the back end of the heel. When the apex is positioned behind the metatarsal heads, the Apex height helps eliminate pressure at the metatarsal heads by lifting them away from the ground contact. The rest of the front sole ahead of the apex turns upward sharply, to the tips of the toes ensuring no contact of the toes. The steel plate inserted by splitting the sole along its length ensures rigidity. The heel of the shoe tapers off in the back in order to cause the heel to strike in the middle of the heel.

Roller bottoms (sole or bar): Same as rocker bottom, heel is tapered from the apex to the front tip of the sole.

In Orthowedge footwear part of the sole below an area of plantar ulcer ie in the forefoot, mid foot or the hind foot is removed so that ground contact does not occur. This will reduce the pressure to zero. However it is quite difficult to walk with these shoes, calling for other appliances to offload an ulcer.

HONEY AND JAGGERY ARE THEY BETTER THAN SUGAR ???

*** Vikram Sabharwat**

Understanding diabetes In layman's terms, diabetes is a disease characterized by consistently high blood sugar levels. This is mainly caused due to either of the following reasons: the pancreas don't secrete sufficient amount of the insulin hormone, or, the insulin produced is not efficiently being utilized to catalyze the metabolic activities of converting the consumed sugars to energy (insulin resistance). Either way, the sugars consumed through food don't get utilized the way they are supposed to, leading to accumulation in the blood. As a result, the blood sugar levels increase and the cells don't get the required energy. This gives way to the many symptoms of diabetes including fatigue, excessive thirst and hunger and weight-related issues. Depending on the cause of diabetes, there are three main types of diabetes: Type 1 diabetes: a chronic condition caused by insufficient insulin production in the body. The cells in the pancreas responsible for producing the insulin hormone are destroyed by the body itself mostly due to genetic factors. Type 2 diabetes, the more common type is making 90-95% of total diabetics and is primarily caused due to insulin resistance. Here, the body fails to respond to the insulin efficiently giving rise to a vicious cycle of increased blood sugars followed by stress on the pancreas to produce more and more insulin. Ultimately, the pancreas also begins to fail. Obesity and a sedentary lifestyle could be a few contributing factors in addition to genetics in this kind of diabetes. The third common form of diabetes is Gestational diabetes: This diabetes is seen in some women during pregnancy. Of late, a large population is also found to show prediabetes, a condition where blood sugars are higher than normal, but not yet in the diabetic range. In all cases, dietary and lifestyle changes are key stratergies to prevent further complications of diabetes including kidney diseases, cardiac diseases, frequent infections and skin problems.

Honey, Is it better than sugar?

Honey is a natural, sweet liquid produced by bees from the nectar of flowers which plays a vital role sustaining and nourishing bee colonies. Each bee will make, on an average, about half a teaspoon of honey in its lifetime. Considering the tons of honey produced each year, that's a lot of bees at work! The honeybee (Apis Mellifera) collects nectar from flowers in its mouth. Enzymes in the bee's saliva cause a chemical reaction that turns the nectar into honey, which is deposited into the walls of the hive. The texture and flavour of the honey depends on which flowers the honeybees choose to collect from.

Honey has a lower GI value than sugar, meaning that it does not raise blood sugar levels as quickly. Honey is sweeter than sugar, so you may use less of it, but is does have slightly more calories per teaspoon, so it's wise to keep a close eye on your portion sizes. For diabetics, or those trying to manage their blood sugar levels, there is no real advantage to substituting sugar for honey as both will ultimately affect blood sugar levels. If you do prefer honey, try to choose a raw variety, which contains more vitamins, enzymes, antioxidants and nutrients than white sugar and use it in moderation.

Honey is made up of fructose (40%), glucose (30%), water and minerals such as iron, calcium, potassium and magnesium. Due to the high level of fructose, honey is sweeter than table sugar. Honey is a high carbohydrate food and has a GI value of 55 (moderate range). Some varieties

* Diabetes Educator, jammu, J&K

of honey have a lower GI however, because of fluctuating fructose levels (the more fructose, the lower the GI). Honey is still high in calories and causes increases in blood sugar. While refined sugar brings little to the table in terms of nutrition, honey provides antioxidants - including phenolic acids and flavonoid.

One study in 48 people with type 2 diabetes showed that though honey increases blood sugar levels, it may not be to the same extent as sugar. Studies also suggest that using honey instead of table sugar may decrease triglycerides, as well as total and "bad" LDL cholesterol to support your heart health.

However, while honey may be a better option than refined sugar, it should still be consumed in moderation to prevent adverse effects on your health. Honey is high in sugar and calories — packing approximately 64 calories into a single tablespoon (21 grams).While this may not seem like much, even a few servings per day can cause the calories to stack up. Over time, this could lead to weight gain ,especially if other dietary modifications are not made to account for these extra calories.

Honey is also high in glucose, which is digested rapidly and can cause your blood sugar levels to spike and peaks, resulting in increased hunger and potential long-term weight gain. What's more, research consistently associates a higher intake of added sugar with a higher risk of weight gain and obesity. Despite the health benefits that may be associated with honey, it's high in sugar which can be detrimental to your health. In fact, studies show that high-sugar diets may be linked to obesity, inflammation, insulin resistance, liver issues, and heart disease. Excess sugar intake may also be tied to a higher risk of depression, dementia, and even certain types of cancer.

Therefore, the best way to take advantage of the potential benefits linked to honey is to opt for a high-quality brand and use it to replace unhealthy sweeteners, such as high-fructose corn syrup or refined sugar.

Yet, be sure to moderate your intake and use it sparingly to minimize your risk of side effects on health.

Jaggery versus Sugar

Both jaggery and sugar originate from the same source, sugarcane juice. The way in which the cane juice is processed decides the fate of the sweetener. Sugar in its well-known form is crystallized, white and translucent. On the other hand, jaggery is not as solid as sugar and its color can range anywhere from golden to brown. The aesthetics of the two throw a hint on the kind of processing they go through.

, in other words, is an unrefined version of sugar, which is obtained by molding and cooling the boiled cane sugar syrup. The same boiled cane sugar syrup, when treated further through different stages like absorption, condensation and crystallization yields sugar.

Since sugar goes through these additional stages of processing, it tends to lose all its nutritional value. The end product when it reaches your table consists of only sucrose, which only provides empty calories as against jaggery that manages to retain few micronutrients from the source. So on a nutritional level, jaggery scores higher than sugar.

An important point to note is that both jaggery and sugar score the same in terms of calories. The glycemic index of both sugar and jaggery are high in the range of 65-85 (highest score of 100 for glucose). There's no stark difference seen there. Both belong to the hyperglycemic category. This is one major concern as a high glycemic index food item is neither good for diabetics nor for the health conscious non-diabetics.

On that note, is jaggery really scoring over sugar? Indeed not. For individuals with diabetes especially, despite the other health benefits of jaggery, it is simply not worth the calories and glycemic index.

High glycemic index items are a strict 'no' to diabetics as they tend to raise blood sugar levels

drastically, causing unnecessary pressure on the already disturbed insulin action.

Sweet Tricks For Diabetics! By now, we have established that jaggery is sure not a replacement for sugar amongst diabetics. The next question is, what is? Artificial sweeteners? That topic is again debatable. As of now, the safest, natural and most effective sugar replacements for diabetics are stevia and monk fruit. However, taste of Stevia is not pleasant. Sucralose as well as aspartane are safe to use, unless the amount consumed exceeds the limits laid down. However the limits are very high and can only be exceeded by using a large number of diet drinks daily.

The next smart option is to understand the concept of the glycemic index (GI) and to follow a low GI diet. Foods with a low GI are best for diabetics as they are gradually digested, leading to stable blood sugar levels. Whole grains, green vegetables, unsweetened yoghurt, nuts, legumes are a few items that have to be on every diabetic's list. In fact, fruits like apples and oranges can also be consumed due to their low GI, and even better they can satisfy those sudden sweet cravings as well. Not just wise food choices, but crucial lifestyle choices have to also be made to effectively manage the excessive sweet in you! A disciplined routine comprising of exercise, shorter and more frequent meals, regular sleep patterns and a less-stressful environment can do wonders. So put on your shoes, walk/cycle around, keep yourself active, meet those friends you've been wanting to meet for ages, chat up, laugh out loud, eat right, sleep well, dream, stay contented and manage your diabetes. It's that easy when you think about it.

NUTS AND OILSEEDS

*** Sakina Lanewala**

According to World Health Organization (WHO), India had 69.2 million people living with diabetes in 2015. Nearly 98 million people in India may have type 2 diabetes by 2030, according to a study. India has more men that die from diabetes than any other country, a new study says. The number of people who suffer from the condition is soaring. Type 2 diabetes is associated with an increased risk for high cholesterol, heart disease and stroke, and is a widespread public health problem affecting more than 30 million Americans

Data of studies provide novel evidence that supports the recommendation of incorporating nuts into healthy dietary patterns for the prevention of CVD complications and premature deaths among individuals with diabetes mellitus.

What consumption of nuts can be permitted in Diabetes?

Almonds, walnuts, cashews, pistachios, pecans, macadamias, hazelnuts, pine nuts and even peanuts are permitted in diabetes. But it should be taken in moderation and not be taken with major meals but as in between meal or snack. Dietitians or diabetes educators must specify the quantity when prescribing these nuts.

While the exact biological mechanisms of nuts on heart health are unclear, researchers report that nuts appear to improve blood sugar control, blood pressure, metabolism of fats, inflammation and blood vessel wall function

Nuts are full of unsaturated fatty acids, phytochemicals, fiber, vitamins such as vitamin E and folate, as well as minerals including calcium, potassium and magnesium

Eating more nuts, particularly tree nuts, may reduce the risk of cardiovascular disease among people with type 2 diabetes, according to new research in *Circulation Research,* an American Heart Association journal.

Researchers found that eating all kinds of nuts offered some heart-healthy benefits, with tree nuts showing the strongest association. The results also showed that eating even a small amount of nuts had an effect. Among their findings:

Compared to people with type 2 diabetes who ate less than a single 28-gram serving per month, eating five servings of nuts per week had a 17 percent lower risk of total cardiovascular disease incidence, a 20 percent lower risk of coronary heart disease, a 34 percent lower risk of cardiovascular disease death, and a 31 percent reduced risk of all-cause mortality.

Compared with people who did not change their nut-eating habits after being diagnosed with diabetes, those who increased their intake of nuts after being diagnosed with diabetes had an 11 percent lower risk of cardiovascular disease, a 15 percent lower risk of coronary heart disease, a 25 percent lower risk of cardiovascular disease death, and a 27 percent lower risk of all-cause premature death.

In a study conducted which was published in the Journal, Diabetes Care, people with type 2 diabetes replaced some of their usual carbohydrates with about a half cup of mixed nuts each day, their blood sugar and bad cholesterol levels dipped slightly over three months. By contrast no such improvements were seen among people who exchanged their normal carbohydrates for a daily whole wheat muffin. So nuts can be a part of a healthy diet for better control of blood sugar levels

* Dietician and Diabetes Educator at Dr. Chandalia's Diabetes Endocrine Nutrition Management & Research Centre

In a three-month report of the larger PREDIMED study also showed that the Mediterranean diet enriched with nuts was associated with improved insulin sensitivity and fasting glucose levels in non diabetic and diabetic participants, respectively. Finally, two studies from the same group reported reduced postprandial glucose and insulin excursions after almond meals compared with those elicited after meals containing carbohydrates with a high glycemic index. Thus, in spite of their high energy and fat load, nuts do not worsen and may even improve metabolic control or insulin sensitivity in insulin-resistant states, but more evidence is necessary.

A study published in Circulation Research revealed that people with type 2 diabetes who ate five servings of nuts weekly had a 34% lower risk of cardiovascular disease mortality, 31% reduced all-cause mortality risk, 20% lower coronary heart disease risk and 17% reduced risk of total cardiovascular disease incidence than those who ate little or no nuts each month. Researchers also found a lower risk of CHD, CVD, CV mortality and all-cause premature death among those who increased their nut consumption after being diagnosed with diabetes, compared with individuals who did not change their nut-eating habits after the diagnosis.

Difference between tree nuts and groundnuts

Tree nuts like almonds, walnuts, cashews, pistachios, pecans, macadamias, hazelnuts and pine nuts were strongly associated with reduced cardiovascular risk compared with peanuts, which are actually legumes because unlike tree nuts, peanuts grow underground

Also, researchers explain that tree nuts may offer more benefits because they contain higher levels of these nutrients than peanuts.

Advantages of eating nuts and disadvantages of eating more amount of nuts

- Health Benefits of Eating Nuts

1) Nuts have many nutritional benefits: they are high in monounsaturated and polyunsaturated fats, fiber, vitamin, minerals, and phytonutrients. Population studies indicate that individuals who regularly consume nuts have reduced risk for cardiovascular disease and diabetes. In clinical trials, nuts appear to have a neutral effect on glucose and insulin, and a beneficial effect on lipid profile. Thus, nuts can be a healthy dietary component for individuals with diabetes or those at risk for diabetes, providing overall caloric intake which is regulated to maintain a healthy body weight.
2) In general, nuts are good sources of fat and protein. Most of the fat in nuts is monounsaturated fat, as well as omega-6 and omega-3 polyunsaturated fat. However, they do contain some saturated fat.
3) Researchers have found that eating a handful of nuts a day like almonds, hazelnuts, macadamias, pecans, pine nuts and pistachios could result in a longer lifespan, and may even reduce the risk of death from heart disease and cancer.
4) Nuts are antioxidant powerhouses.

   Antioxidants, including the polyphenols in nuts, can combat oxidative stress by neutralizing free radicals - unstable molecules that may cause cell damage and increase disease risk
5) Nuts are high in fat, low in carbs, and a great source of several nutrients, including vitamin E, magnesium, and selenium.
6) One study found that walnuts have a greater capacity to fight free radicals than fish. Research shows that the antioxidants in walnuts and almonds can protect the delicate fats in your cells from being damaged by oxidation
7) Though they are considered a high-calorie food, research suggests that nuts may help you lose weight
8) Many nuts are high in fiber, which can reduce disease risk of diabetes and obesity, help keep you full, decrease calorie absorption, and improve gut health.

9) Nuts may significantly lower your risk of heart attack and stroke. Eating nuts decreases "bad" LDL cholesterol, raises "good" HDL cholesterol, improves artery function, and has various other benefits.

10) One large study assessing the effects of the Mediterranean diet found that people assigned to eat nuts lost an average of 2 inches (5 cm) from their waists - significantly more than those given olive oil. Thus nuts help in inch loss as well

As long as you eat them in moderation, nuts make for a tasty addition to a healthy, balanced diet.

- Disadvantages of eating more amount of nuts

1) Digestive problem: If you are consuming a lot of almonds, it can cause constipation, bloating and upset your stomach. This is because there is a lot of fiber in almonds and your body is not used to consuming so much of it.

The National Institutes of Health reports that adults should consume between 20 and 35 grams of fiber per day. A handful of almonds contain 4 grams of fiber, the most of any nut

2) Salted nuts can lead to high blood pressure.

3) Eating more than the recommended daily handful, and you'll quickly accomplish the exact opposite effect by gaining weight- and much more rapidly than you might by overeating other foods. That's because nuts are extra calorie-dense, meaning they have more energy per ounce than most other foods.

4) If too many nuts especially brazil nuts are eaten than symptoms of selenium poisoning are seen, which is a rare but serious condition. The hair falls out, nails get brittle, breath stinks, and muscles and joints might begin to ache.

3) Eating a lot of fiber, consuming large quantities can lead to bloating, gas and diarrhea. Eating too many nuts in front of the television one evening could leave you in misery the next day

References

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www.mayoclinic.org

RECIPES

BEANS SALAD

Ingredients:

- Rajma,Chawli,and Chick pea 30gm
- Tomato, sliced 15g
- Onion, chopped 15g
- Cucumber, chopped 1 medium
- Chaat masala ½ tsp
- Cumin seed powder ½ tsp
- Coriander leaves 1 tsp
- Mint leaves(chopped) 1 tsp
- Lemon juice ½ tsp
- Salt, red chilli powder & pepper to taste

Method:

1. Soak beans overnight. Drain out the water and boil with 3 cups of water till it tenders.
2. Combine all the above listed ingredients in a deep bowl and mix well. Refrigerate for 1 hour and serve it chilled.

Nutritive value for 1 serving:

Energy (Kcals)	Protein (gms)	Carbohydrates (gms)	Fats (gms)	GI
120	22	7.4	1.5	Low

Note:

- It is a high protein high fibre snack.
- One can have it as a healthy snack or as a light meal.

OATS PALAK UTTAPAM

Ingredients

- Oats 15g
- Semolina (Suji) 15g
- Spinach 150g
- Mixed sprouts 15g
- Carrot 15g
- Tomato 20g
- Onion 15g
- Oil 7.5 g

Method:

1 Grind oats to a powdered form.

2 Add semolina, spinach puree, red chilli powder, cumin seeds, ginger and water as required to make the batter

3. Cover and keep aside for 10-20 minutes

4. Now heat a non-stick pan and grease it lightly with oil and spread a spoonful of batter.

5. Top the uttapam using vegetables and mixed sprouts.

6. When its golden brown flip it to the other side to cook

7. Serve hot with a bowl of sambhar.

Nutritive value for 1 serving :

Energy (Kcals)	Protein (gms)	Carbohydrates (gms)	Fats (gms)	GI
175	6	34	8	Low

Note:

- It is rich in fiber, proteins, iron, folic acid and vitamin A.
- It is a healthy recipe especially for pregnant women to produce satiety.

QUESTION AND ANSWERS

When is it appropriate to introduce SG2T2 inhibitors in the treatment of type 2 diabetes?

SGLT2 inhibitors or sodium glucose cotransporter 2 inhibitors are new drugs used in the treatment of type 2 diabetes.

They can be used after the failure of metformin to control blood glucose in a type 2 diabetic patient.

Thus the first choice of treatment is metformin; failing which an SG2T2 inhibitor can be exhibited.

Ther are multiple advantages of SG2T2 inhibitors and hence they are appropriate to be used in overweight/obese patients or in patients with hypertension. This is because in addition to glycemic control, they help in reducing weight and controlling blood pressure. But perhaps the most compelling case for their use is in diabetic patients with established cardiovascular disease, heart failure and/or chronic kidney disease. This is because in these groups of patients, the use of SGLT2 inhibitors reduces the risk of heart attcks, heart failure and /or progression of kidney disease. This is a paradigm shift in the treatment of type 2 diabetes, as you are not only controlling blood glucose, but also altering the natural history of complications that may occur and lead to death and disability in our patients.

Shaival Chandalia.

Diplomate, American Board Internal Medicine. Former Fellow, Endocrinology and Metabolism; UT South Western, Dallas Endocrinologist & Diabetologist, Jaslok, HN Reliance, Bhatia hospital.

HOW TO DISPOSE DIABETIC Patients NEEDLES AND LANCETS, Used by

Diabetes is grossing on the top of the list amongst the fastest growing illnesses in today's world. In India, around 72 million cases of diabetes have been recorded till now.Diabetes is characterized by 2 types: TYPE 1 and TYPE 2 Diabetes.

The insulin dependent type 1 patients use insulin needles , and lancets in their homes to take insulin injections and monitor diabetes. Type 2 diabetes can also be insulin requiring, especially after 10-20 years of duration. This being common, accounts for the major group taking insulin injections. An important question is: Where do these needles and lancets, which are BIOHAZARDOUS waste products go after using? Have you ever thought about it?

These waste products cannot be thrown in our normal domestic waste. They need to be sent to a proper authorized place and personnel for their disposal as it can prove dangerous to handlers.

In Dr Chandalias (Diabetic Endocrine Nutrition Management and Research centre) DENMARC clinic, the patients are advised to carry all their previously used needles and lancets in a hard glass or plastic bottle and give it to the clinic for disposal.

The needles are DE punctured with the help of an incinerator. Incinerators are machines which use high temperature to puncture the needles on high flame.

Many clinics have incinerators in their blood collection rooms, hence it aids in proper disposal of used needles.

Patients are also advised not to recap the needles as it is hazardous and give a greater chance of needle stick injury. Needle stick injury can cause diseases like HIV and HEPATITIS-B, the risk of hepatitis-B being greater than that of HIV. Both however are deadly diseases.

These collected wastes should be sent to the bio-waste management authorities of BRIHANMUMBAI MUNCIPAL COORPORATION. The BMC sends these for ultimate disposal to Shank nagar, Ghatkoper .The needles and sharps are buried deep in the ground, away from nearby habitat so that it does not hinder the normal living of people nearby.

Let us resolve: it is our responsibility to handle all used biological products smartly.

DEEPIKA LAKHANI

Bsc Nurse (Maharashtra affiliation) educator at Dr chandalias DENMARC.

DIABETES TODAY

Dr. Chandalia's DENMARC in collaboration with Help Defeat Diabetes Trust and Association for Diabetes Care and Prevention (ADCP) presents to you Diabetes Today Magazine

Help Defeat Diabetes is a non-profit public trust whose main objective is promoting education and awareness in people suffering from diabetes as well as people in those at increased risk.

It is a lifestyle magazine that demonstrates how to live fully each and every day while managing diabetes.

Who can subscribe?

Professionals working in the field of diabetes education, patients, relatives of patients and anyone else who is interested in diabetes.

How many issues are published in a year?

It is a quarterly magazine, having 4 issues in a year. Each issue offers delicious, diabetes-friendly recipes, weight-loss strategies, blood glucose monitoring tips, medication-information based on standards of medical care. It promotes a sense of confidence in our readers who want to take responsibility for their diabetes.

Kindly mail us on denmarc100@gmail.com or you can contact us at:
Kala Bhavan clinic- 02223633695/ 23634320

To subscribe, mail the following form with your cheque to: 18 Kala Bhavan, 3 Mathew Road, Mum-400004

HELP DEFEAT DIABETES TRUST

I am pleased to donate an amount of _____ to above trust, to be spent towards its objective of patient education.

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Date: _____

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For further details visit helpdefeatdiabetes.org

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Dr Chandalia's DENMARC in association with Help Defeat Diabetes Trust (HDDT) presents to you a course to be a Certified Diabetes Educator (CDE)!

Help Defeat Diabetes Trust (HDDT) is a registered, non-profit public trust, having amongst its many objectives, the main objective of promoting education and awareness about diabetes among people from different fields.

Who can enroll?

Graduates in Nutrition, Nursing, Pharmacy, Occupational and Physiotherapy.

What is the duration of the course?

6 months, including 3 months of hands-on training and experience with a recognized mentor.

How will I get the course material?

All course material is available online on our website.

What are the course fees?

The standard fees for the course are INR 10,000/- only.

Where can I get more information about this course?

Kindly visit our website http://www.helpdefeatdiabetes.org or you can get in touch with us on our email ID heldefeatdiabetesinfo@gmail.com.

MEMBERSHIP FORM

Association of Diabetes Educators (ADE)

(For eligibility criteria: Check Website www.diabeteseducatorsindia.com)

Name ……………………………………………………………………………………………………

Address ……………………………………………………………………………………………………

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Telephone: Res: …………………………… Office: ………………………… Cell: ……………………

E-mail id: ……………………………………………………………………………………………………

Educational Qualifications:……………………………………………………………………………

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Work Experience: ……………………………………………………………………………………

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Currently employed at: ……………………………………………………………………………

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Certificates attached regarding educational qualification and work experience:

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₹ 2000/- is payable in cash / cheque / draft with the application form

Add ₹ 100/- for outstation cheques

Cheque Drawn in favour of: Association of Diabetes Educators

Payment Details: Cheque No./Draft No. ______________________ Dated ______________

Bank ______________________________________ Branch ______________

……………………………

Signature

Invitation to write in the

JOURNAL OF DIABETES EDUCATION

Be a lifelong student

The more you teach, the more you learn and more self confidence you have!!!

Journal of Diabetes Education is the quarterly educational journal of the Association of Diabetes Education. It is currently printed and distributed to a readership of 1500 diabetes educators, diabetologists, nutritionists and pharmacists.

Each issue features some selected topics, in addition to regular columns like Questions and Answers, Recipes, MCQs and Myths and Facts.

GUIDELINES FOR CONTRIBUTORS:

The chief editor of JDE welcomes contributions for future issues. The article will be published if found suitable by the Editors.

Biographical information:

Please include biographical information, including affiliation of all authors and email of corresponding author.

Language and format:

Manuscripts should be in English and submitted electronically to ademembers@gmail.com. Interested candidates can e-mail their topics for approval. Please note that your targeted readership consists of diabetes educators, diabetologists, nutritionist, nurses and pharmacists.

Length:

About 2000 words is optimum, but this can change if required.

Permission:

Authors are responsible for obtaining permission from the copyright holder(s) to reproduce any material with copyright protection. Make sure there is no plagiarism.

Reference style:

Please do not cite references in the text. About 5-15 key references at the end of article are needed. Use Vancouver style of references.

CHALLENGES IN DIABETES EDUCATION

AN AWARD FOR PROBLEM RESOLUTION IN DIABETES EDUCATION

SPONSORED BY DR. CHANDALIA'S DIABETES ENDOCRINE NUTRITION MANAGEMENT & RESEARCH CENTRE

Prize money of Rs. 10,000 for reporting a problem case

Dr. Chandalia' s DENMARC aims to enhance the quality of Diabetes education in India by creating a world-class research and education environment and to build up a platform of networking and knowledge sharing within diabetologists and/or diabetes educators.

Challenges in Diabetes Education 2019 places special emphasis on supporting educational initiatives that have the potential to improve and significantly revolutionize diabetes care, enhance self-management and/or support patients with Type 1 or Type 2 Diabetes Mellitus. The educator should describe an individual or group case history and identify the problem in diabetes education. Furthermore, s/he should describe the plan of education to resolve the issue, partly or totally. The issue described may be related to patient perceptions, knowledge, behaviors and implementation of advice given. S/He should describe her struggle in resolving the issue including her triumphs and failures, the methodologies used and ethical, socio-economic and behavioral aspects of the case.

General Rules and Regulations regarding the eligibility Criteria for the Award

- The applicant of the Award should be a citizen of India.
- The case discussion should be on the subject of Diabetes Education.

The best case chosen by a group of referees will be awarded "Challenges in Diabetes Education Award- 2019" - which will carry a cash prize of Rs 10,000. The awardee will get the opportunity to present the case in The annual meeting of Association of Diabetes Educators and publish it in the journal of Diabetes Education.

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INSULIN GLARGINE INJECTION
TOUJEO™ Solostar® **Abridged Prescribing Information**
COMPOSITION: Insulin glargine 300 U/ml. 1 ml contains 10.91 mg insulin glargine I.P., corresponding to 300 U of insulin glargine. **INDICATION:** For the treatment of diabetes mellitus in adults. **DOSAGE AND ADMINISTRATION:** Toujeo™ is given subcutaneously.Toujeo™ is administered once daily, at any time during the day, preferably at the same time every day. The recommended daily starting dose is 0.2 U/kg once daily followed by individual dosage adjustments. When needed, patients can administer their injections up to 3 hours before or after their usual time of administration. The desired blood glucose levels as well as the doses and timing of anti-hyperglycaemic medications must be determined and adjusted individually. Toujeo™ is not the insulin of choice for the treatment of diabetic ketoacidosis. Changing from once-daily basal insulin products to once-daily Toujeo™ can be done unit-to-unit based on the previous basal insulin dose. Changing from twice-daily basal insulin products to once-daily Toujeo™ , the recommended initial Toujeo™ dose is 80% of the total daily dose of the basal insulin that is being discontinued. Toujeo™ must not be mixed with any other insulin products. Toujeo™ must not be diluted. The safety and effectiveness of Toujeo™ has not been established in paediatric patients (under 18 years of age). Toujeo™ can be used in elderly patients, in patients with renal impairment and in patients with hepatic impairment. Close glucose monitoring is recommended. **SAFETY-RELATED INFORMATION Contraindications:**Toujeo™ must not be used in patients hypersensitive to insulin glargine or any of the excipients. **Warnings:** No Core Safety Information **Precautions: General** :Insulin treatment generally requires appropriate diabetes self-management skills including glucose monitoring, proper injection technique and hypo and hyperglycaemia management. Patients and their relatives must know what steps to take if hyperglycaemia or hypoglycaemia occurs or is suspected, and they must know when to inform a physician. Hypoglycemia: The time of occurrence of hypoglycaemia depends on the action profile of the insulins used and may, therefore, change when the treatment regimen is changed. As with all insulins, particular caution should be exercised, and intensified blood glucose monitoring is advisable, in patients in whom sequelae of hypoglycaemic episodes might be of particular clinical relevance. The prolonged effect of subcutaneous Toujeo™ may delay recovery from hypoglycaemia. In patients with renal impairment or severe hepatic impairment, insulin requirements may be diminished. In the elderly, progressive deterioration of renal function may lead to a steady decrease in insulin requirements. Hypoglycaemia can generally be corrected by immediate carbohydrate intake. So that initial corrective action can be taken immediately, patients must carry a minimum of 20 grams of carbohydrates with them at all times. Intercurrent illness: Requires intensified metabolic monitoring. In many cases urine tests for ketones are indicated, and often it is necessary to adjust the insulin dose. **Medication errors prevention:** Insulin label must always be checked before each injection to avoid medication errors between Toujeo™ and other insulins. The patients must also be instructed to never use a syringe to remove Toujeo™ from the SoloStar pre-filled pen into a syringe and not to re-use the needles. **Pregnancy & Lactation:** It is essential for patients with pre-existing or gestational diabetes to maintain good metabolic control throughout pregnancy to prevent adverse outcomes associated with hyperglycaemia. Toujeo can be used during pregnancy, if clinically needed. Insulin requirements may decrease during the first trimester and generally increase during the second and third trimesters. Immediately after delivery, insulin requirements decline rapidly. Careful monitoring of glucose control, is essential in such patients. Patients with diabetes must inform their doctor if they are pregnant or are contemplating pregnancy. **Adverse Reactions:** Hypoglycaemia is most frequent and may occur if the insulin dose is too high in relation to the insulin requirement. A marked change in glycaemic control may cause temporary visual impairment. Lipodystrophy may occur at the injection site. Allergic reactions at the injection site includes redness, pain, itching, hives, swelling or inflammation. Immediate type allergic reactions are rare
For full prescribing information please write to Sanofi India Ltd., Sanofi House, CT Survey No 117-B, L&T Business Park, Saki Vihar Road, Powai, Mumbai 400072
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References:

1. INVOKANA® India Prescribing Information (January 2014) **2.** Lavalle-González FJ et al. Diabetologia. 2013;56(12):2582-92 **3.** Cefalu WT et al. Lancet 2013;382(9896):941-50 **4.** Leiter LA et al. Diabetes Care. 2014. **5.** Stenlöf K et al. Diabetes Obes Metab. 2013;15(4):372-82.

For the use of a Registered Medical Practitioner or a Hospital or Laboratory Canagliflozin tablets 100mg / 300mg

INVOKANA®

Composition and Strength: Canagliflozin 100 mg / 300mg. Each 100 mg tablet contains 102 mg Canagliflozin hemihydrate, equivalent to 100 mg Canagliflozin. Each 300 mg tablet contains 306 mg Canagliflozin hemihydrate, equivalent to 300 mg of Canagliflozin. **Pharmaceutical form:** 100 mg - The tablet is yellow, capsule-shaped, immediate-release and film-coated, with "CFZ" on one side and "100" on the other side. 300 mg - The tablet is white, capsule-shaped, immediate-release and film-coated, with "CFZ" on one side and "300" on the other side. **Therapeutic Indications:** INVOKANA® is indicated as an adjunct to diet and exercises to improve glycemic control in adults with type 2 diabetes mellitus as monotherapy and combination therapy. **Dosage and Administration:** The recommended starting dose for adult > 18 years is 100 mg or 300 mg once daily orally preferably before the first meal of the day. A starting dose of 100 mg once daily should be used in patients on loop diuretics and patients ≥ 75 years of age. In patients with an eGFR 45 mL/min/1.73 m2 to < 60 mL/min/1.73 m2, the dose of INVOKANA® is limited to 100 mg once daily. The 300 mg dose may be considered for patients with an eGFR > 60 mL/min/1.73 m2, who need tighter glycemic control and who have a low risk of adverse reactions associated with reduced intravascular volume with INVOKANA® treatment. **Contraindications:** Hypersensitivity to the active substance or to any of the excipients. **Warnings and Precautions:** INVOKANA® has not been studied in pediatric patients (< 18 years), patients with type 1 diabetes and is therefore not recommended for use. INVOKANA® should not be used for the treatment of diabetic ketoacidosis or in patients with an eGFR < 45 mL/min/1.73 m2 [CrCl < 45 mL/min], as it would not be effective in these settings. In patients with evidence of reduced intravascular volume, correcting this condition prior to initiation of INVOKANA® is recommended. **Drug Interactions:** The metabolism of INVOKANA® is primarily via glucuronide conjugation mediated by UDP glucuronosyl transferase 1A9 (UGT1A9) and 2B4. If a combined inducer of these UGTs and drug transport systems (e.g., rifampicin, phenytoin, barbituates, phenobarbitol, ritonavir, carbamazepine, efavirenz) must be co-administered with INVOKANA®, monitor HbA1c in patients receiving INVOKANA® 100 mg once daily with consideration to increasing the dose to 300 mg once daily if additional glycemic control is needed. INVOKANA® neither inhibits cytochrome P450 CYP1A2, CYP2A6, CYP2C19, CYP2D6, or CYP2E1, CYP2B6, CYP2C8, CYP2C9, nor induces CYP1A2, CYP2C19, CYP2B6, CYP3A4 at higher than therapeutic concentrations. INVOKANA® is a P-glycoprotein (P-gp) substrate, and inhibits P-glycoprotein mediated transport of digoxin with low potency. Patients taking digoxin or other cardiac glycosides (e.g., digitoxin) should be monitored appropriately. **Pregnancy, Breast-feeding and Fertility:** There are no adequate and well-controlled studies in pregnant women. INVOKANA® should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. It is not known if INVOKANA® is excreted in human milk. A risk to the breast-fed child cannot be excluded. The effect of INVOKANA® on fertility in humans has not been studied. **Adverse reactions:** In clinical studies of INVOKANA® the most commonly reported adverse reactions during treatment (≥ 5%) were vulvovaginal candidiasis, urinary tract infection, and polyuria or pollakiuria. Other adverse reactions in clinical studies of INVOKANA® that occurred at a rate < 2% in placebo-controlled studies were adverse reactions related to reduced intravascular volume (postural dizziness, orthostatic hypotension, hypotension, dehydration, and syncope), skin rash, and urticaria. In the event of an overdose, it is reasonable to employ the usual supportive measures, including monitoring of vital signs and observation of clinical conditions. **Overdose:** Single doses up to 1600 mg of INVOKANA® in healthy subjects and INVOKANA® 300 mg twice daily for 12 weeks in patients with type 2 diabetes were generally well-tolerated. In the event of an overdose, it is reasonable to employ the usual supportive measures, e.g., remove unabsorbed material from the gastrointestinal tract, employ clinical monitoring, and institute supportive treatment as dictated by the patient's clinical status. Canagliflozin was negligibly removed during a 4-hour hemodialysis session. Canagliflozin is not expected to be dialyzable by peritoneal dialysis.
Storage: Store below 30°C and in dry place. Protect from light. Keep out of reach of children.

Warning: To be sold by retail on the prescription of Registered Medical Practitioner only. Version: CCDS 09 Jan 2014
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