



## Review Article

# A Review On Diabetes Mellitus: Complications, Management And Treatment

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### ARTICLE INFO

Received: 26 Oct 2023

Accepted: 28 Oct 2023

Published: 02 Nov 2023

#### Keywords:

diabetes mellitus, diagnosis, cause, and treatment

#### DOI:


10.5281/zenodo.10065611

### ABSTRACT

Diabetes is a lifelong (chronic) disease and group of metabolic disorder. Which the main symptom associated with this disease is the high levels in blood for a long period. It can be categorized to the world's major diseases considering that affects high population in earth and presents two main types i and ii. Diabetic is a chronic disease which affects global population from long time. "Diabetes mellitus", is one of the most common non-communicable conditions worldwide. India faces several challenges in diabetes operation, including a rising frequency in civic and pastoral areas, lack of complaint mindfulness among the public, limited health care installations, high cost of treatment, sour glycaemic control and rising frequency of diabetic complications. Insulin remedy for diabetes is most generally delivered via subcutaneous injections, up to four times a day. Long- term insulin remedy, compounded by the invasive nature of its administration, has caused problems with patient compliance, eventually impacting patient issues. There's an increase in the frequency of type 1 diabetes also, but main cause of diabetic epidemic is type2 diabetes mellitus, which accounts for further than 90 percent of all diabetes cases. Type2 diabetes is a serious and common habitual complaint performing from a complex heritageterrain commerce along with other threat factors similar as rotundity and sedentary lifestyle. diabetes mellitus is a complaint occurs due to metabolic problems is most frequent encyclopedically. The main suggestion of diabetes mellitus is a hyperglycemia in blood which is due to unhappy pancreatic insulin stashing or low insulin- directed fostering of glucose by target cells. Diabetes mellitus can be varied into several types but the two major types are type 1 and type 2. For type 1 diabetes cases insulin renewal remedy is the backbone, for case with type 2 diabetes there must be a control diet and life revision in type 2 insulin is vital when blood glucose are unfit to control by nutritive remedy, physical exertion and other specifics for the cure of type 2 dm oral hypoglycemic agents are preferred. In type 1 new approaches like island transplantation and artificial pancreas were developed.

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**Relevant conflicts of interest/financial disclosures:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



By using the pathophysiology of type 2 dm there has been developing of new drug like glucagon such like peptide1 analogues dipeptidyl peptidase 4 impediments, impediments of the sodium- glucose cotransporter 2. Due to some complications some medicines were removed from the request in market.

## INTRODUCTION

The word “diabetes ” & “ mellitus ” come from the greek language. “diabetes ” means “passerby a siphon ” & “ mellitus ” means “ sweet ”. (dm) is a group of insulin resistance pattern characterized by a high blood sugar position over a dragged period of time. It was explained by ancient egyptians 3000 times agone in the original area is comonly known as diabetes/ sugar complaint [1]. It isn't transmittable complaint. Diabetes mellitus (dm) is a series of a metabolic complaint asociated with high glucose position due to either defect in insulin caching, insulin action or both [2] the problem of diabetes mellitus is adding at world position. It's common for both gender i.e substantially and womanish. The main factors responsible for this worldwide problem are heritable complaint, behavioral and environmental trouble factors. The author further stated that malleable trouble factors analogous as obesity and physical inactivity are the mainnon-genetic determinants of diabetes [3]. Rotundity and diabetes are two main problems set up in both relations, all ages, all races, all educational situations, and all smoking situations among the people of united countries. Rotundity is the cause of multitudinous other health problems [4] diabetes is a complaint of metabolic process in which glucose position of the body come increased from normal position due to either increased storing of insulin, inactivity of insulin or both. Increase in glucose position for a long time causes serious complications analogous as dysfunction, and failure of different organs, especially the eyes, feathers, jitters, heart, and blood vessels etc. Diabetes mellitus asociated with some other pathogenic processes. It starts with the destruction of beta cells of the pancreas by autoimmune

complaint causing low stashing of insulin from beta cells of pancreas and desensitization of receptor responsible for the action of insulin. Because of above abnormalities in insulin, the normal metabolic process of proteins, fats, and carbohydrates come perturbed [5]. The american diabetes association further explained the two types of diabete smellitus. i.e.,

1. Diabetes mellitus 1
2. Diabetes mellitus 2

## CLASSIFICATION

The first principally accepted type of diabetes was revealed by un agency within the time 1980 [6]. And, it's changed within the time 1985 [7]. The foremost common and necessary kind of primary or upset diabetes, that's focus of our discussion. It should vary from secondary diabetes which incorporates kinds of symptom related to recognizable causes within which destruction of exocrine gland islets is induced by inflammatory exocrine gland conditions, surgery, excrescences, certain medicine, iron full (hemochromatosis) and sure acquired or heritable endocrinopathies. Primary diabetes most presumably represents a eclectic group of conditions that have symptom as a typical point [8] the type encompasses each clinical stages and aetiological feathers of diabetes and different classes of hyperglycemia [9]. The recent and new terms of insulin-dependent (IDDM) or non insulin-dependent (niddm) that were planned by un agency in 1980 and 1985 have faded and also the terms of bottommost type system identifies four feathers of polygenic complaint mellitus type 1 (IDDM), sort 2 (NIDDM), — other specific types and enceinte polygenic complaint (who) professional commission 1999). These were imaged within the sequent transnational language of conditions (IND) in 1991and the tenth revision of the transnational type of conditions (ICD- 10) in 1992 [10]. Assigning a kind of polygenic complaint to a particular generally depends on the circumstances



gift at the time of identification, and many diabetic people don't simply match into one order. The new type of diabetes contains stages which image the varied degrees of symptom in individual subjects with any of the sickness processes that may be get diabetes [11,12].

1. **Insulin dependent diabetes mellitus (type 1 IDDM)** This type of diabetes is also known as response diabetes and formerly appertained to as juvenile-onset or ketosis-prone polygenic complaint. The existent may also ask for with different autoimmune conditions like graves 'malady, hashimoto's thyroiditis, and Addison's sickness [13]. Kind I diabetes is also appertained to as insulin-dependent diabetes (IDDM), this occurs primarily in youths and immature grown-ups; the onset is generally abrupt and may be life threatenin [14]. Kind one is sometimes characterized by the presence of anti – glutamic aciddecarboxylase, island cell or hormone antibodies that determine the response processes that ends up in beta-cell destruction. There's a severe insufficiency or absence of hormone storing because of destruction of  $\beta$ - islets cells of the conduit gland. Treatment with injections of hormone is demanded. The exact reason behind diabetes is stay unknown, although, in the maturity,) the exact reason behind diabetes is stay unknown, although, in the maturity there's substantiation of an response medium involving machine- antibodies that destroy the betaislet cells [15] kind one polygenic complaint (due to the destruction of  $\beta$ - cell that's generally performing in absolute hormone insufficiency) (American Diabetes Association, 2014). The speed of destruction of beta cell is kind of variable; it is constantly do hastily in some individualities and slow in others [16].

2. **Non-insulin dependent diabetes mellitus (type 2 NIDDM)**- Type 2 diabetes mellitus (T2DM) is a habitual complaint characterized by insulin resistance, which leads to hyperglycemia. Further than 180 million people worldwide have diabetes

as estimated by the World Health Association (WHO). T2DM is anticipated to reach epidemic situations, rising from 171 million in 2010 to 366 million in 2030. T2DM is the more current form and accounts 90% of all diabetes cases worldwide [17,18]. The pivotal features of type 2 diabetes is insulin resistance associated with obesity due to the release of free fatty acids (FFA) and the release of inflammatory cytokines from the expanded adipose kerchief mass. The dropped capability of insulin to regulate glucose metabolism is known as insulin resistance. Intracellular lipid accumulation occurs due to increased import of FFA into non-adipose cells [19]. Reported that disturbances of lipids in the body lead to development of insulin resistance and metabolic conditions.

3. **Gravid diabetes mellitus (GDM)**- GDM occurs in roughly 7% of gestation and there's a lower trouble of morbidity and mortality to mother, fetus and posterior bambino. Ferocious monitoring and treatment is necessary for GDM. Women with the history of GDM have a significantly increased trouble of T2DM and of cardiovascular complaint during the coming times after delivery [20,21].

4. **Other specific types**- Other specific type of diabetes mellitus (monogenic types) it's into Mody, LADA & endocrinopathies. It's also caused by heritable abnormalities in the internal caching of insulin hormone. 1 to 5% of people who have suffered from it develop by mutations. This includes conditions of the pancreas, certain surgeries, heritable scars in beta cells, cancer antidotes, specific & infections etc. Some medicines are employed or mixed with the treatment of HIV/AIDS or organ transplantation [22]. It's had sub-types Mody, LADA & endocrinopathies.

a. **MODY**- They may or may not be demanded insulin. Mody stands for maturity onset diabetes of immature [23]. Mody is inherited diabetes mellitus by a heritable mutation in an autosomal dominant gene that affects the



caching of insulin storing or product & it's not an insulin dependant diabetes. Individual opinion is generally in children lower than age 25 with heritable factors. Hnf1- birth (hepatocyte nuclear factor) gene causes about 70 of cases of mody [24]. It associates with a heritable defect of the  $\beta$ - cells. In this type occurs hyperglycemia at an early age. They 're clinically near to t2dm.

b. **LADA-** It's daises for idle autoimmune diabetes in grown- ups. After opinion, it's not demanded for insulin for months to a time. They don't produce any insulin and it's clinically similar to t1dm, lada occurs because pancreatic cells stop insulin product. 'lada' is present in immature grown- ups in their twenties & can be confused with type 2 diabetes mellitus because of age. Type1dm are different from lada.

c. **ENDOCRINOPATHIES-** Several hormones play exertion on insulin action or inhibit insulin action. Impaired fasting blood glucose presents as an fbg advanced than 100 mg/ dl but lower than 126 mg/ dl . It may include polycystic ovarian pattern, pancreatic cancer or tumours & other hormonal disruptions in insulin product [25].

## CAUSES

1. Reduced perceptivity of supplemental apkins to insulin reduction in number of insulinreceptors, 'down regulation of insulin receptors. Numerous hypertensive and hyperinsulinaemic, but normal glycaemic; and have associated dysilidaemic, hyperuriaemic, abdominal rotundity. Therefore there's relative insulin resistance, particularly at the position of liver, muscle and fat. Hyperinsulinaemic has been intertwined in causing angiopathy. [26]
2. Skipping or delaying the time refections with wrong timing to take drug

3. Eating an inadequate mess portions or the medicine overdose of the medicine taken.
4. Shy alcohol input and to reduce the diurnal physical exertion. [27]
5. Over eating, smoking, increase in alcohol input, diseases of nervous and endocrine systems, increase in cortisol, abnormality in coitus hormone stashing, lowered energy consumption due to the lack of exercise and inheritable factors similar as aging can begetdiabetes mellitus (dm) [28]

## SYMPTOMS OF DIABETES

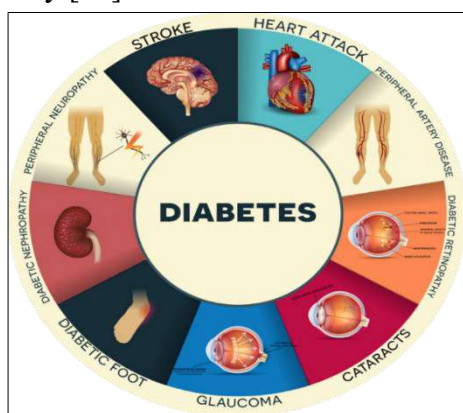
- Polyuria (frequent urination)
- Blurred Vision
- Pain or Impassiveness in the bases or hands
- Erectile dysfunction
- Bladder, order, Skin, or other infections, fatigue and Weight loss
- Polyphagia (Increased Hunger)
- Polydipsia (Increased Thirst)
- Rapid breathing
- Nausea, puking, Stomach pain, frazzle
- Blisters that are slow to heal [29,30].
- Sexual abnormalities in men.
- Vaginal infection in women.
- Unheroic slate achromatism [31].
- Gluconeogenesis from amino acids and body Protein, causing muscle wasting, towel breakdown and further increase the blood glucose position.
- Catabolism of body fat, releasing some of its energy and redundant product of ketone bodies [32].

## COMPLICATIONS

Diabetes is root cause for several serious complications similar as cardiovascular conditions, cerebrovascular conditions, renal diseases, inflammation and impunity, and rotundity [33]. The complications are divided in microvascular and macrovascular. The macrovascular, which are more severe, are



coronary complaint, stroke and supplemental neuropathy [34].



**Fig 3: complications of diabetes**

## DIAGNOSIS

The opinion of cases with diabetes or pre diabetes some test are demanded to performed, like oral glucose forbearance testing etc. A high threat factor of diabetes mellitus is following similar as rotundity, hypertension, and family history diabetes. The 1997 american diabetes association (ADA) recommendation for opinion of dm factor. Focus on overeating tube glucose (FPG). While who is focus on the ogtt. Diabetes mellitus is diagnosed by any following type of test.

- Fasting tube glucose position it should be 8 hour fasting before taking this test. Condition of dm further than 126 mg/ dl.
- Tube glucose further than or equal to 200 mg/ dl two hours after a 75 gram oral glucose weight as in a OGTT.
- Symptoms of high blood sugar and casual tube glucose it's lower than or equal to 200 mg/dl.
- 4-glycated hemoglobin (hba1c) it's lower than or equal to 48m mol/ asset. [35]

According to the americal diabetes association (ADA), the fasting glucose attention should be used in routine webbing for diabetes; but postprandial blood sugar, arbitrary blood sugar and glucose tolerancetest are also used for blood sugar determination. For the opinion of diabetes, at least one criterionmust apply [36]

- 1) Rotundity- a condition that greatly raise a person's threat for t2dm.
- 2) High BP- a condition frequently present in people with t2dm, that together with diabetes, will increase the threat of cardiovascular conditions.
- 3) Weak beats in the bases- a condition that can help or reduce bottom sore mending & possibly amputation. To drop the threat of ulceration orre-ulcerationby using technical footwear's [37].

## PREVENTION

The onset of type 2 diabetes can be delayed or averted through proper nutrition and regular exercise. Ferocious life measures may reduce the by over half. [38]

## TREATMENT OF DIABETES MELLITUS

T1DM is necessary because it's caused by a problem with the vulnerable system. Nearly diabetes forestallment or treatment strategies involve making simple changes to your diet and fitness routine. Some causes of t2dm, analogous as your genes or age, are out of your control. Yet multitudinous other diabetes mellitus trouble factors are manageable. These are n't the only ways to help diabetes mellitus. Diabetes mellitus is a habitual complaint with an unknown cure [39]. In the EDTRS, 3711 cases with macular edema who had either mild-to-severe nonproliferative retinopathy or mild early proliferative retinopathy were treated with panretinal photocoagulation followed by treatment with either aspirin (650 mg per day) or placebo.[40] metformin is generally recommended as a first line treatment for type2 diabetes, as there's good validation that it decreases mortality. [41] the main end of the treatment is to help or delay the complications of diabetes. It's also necessary to give the education regarding the significance of diet, exercise, and nethermost care. Diabetic treatment

- 1) oral hypoglycaemic remedy
- 2) insulin treatment

3) diet (combined with exercise) [42]

**1. Oral Hypoglycaemic Remedy-** Clinically helpful biguanide phenformin was made similar to sulfonylurea's in 1957. Newer approaches have constantly been explored and have of late yielded thiazolidinediones, meglitinide analogues,  $\alpha$ -glucosidase inhibitors, and also the bottommost are dipeptidyl peptidase-4 (dpp-4) inhibitors [43].

**2. Insulin Treatment-** People with t1dm need insulin remedy [44]. The thing of insulin remedy is to maintain or control blood sugar position. It's administered subcutaneously using a syringe, insulin pen or insulin pump. Insulin remedy is the most important part of t1dm & sometimes for t2dm [45]. When your doctor addresses about insulin, they'll mention three main effects,

a. Onset

b. Peak time

c. Duration [46]

**3. Diet-** respectable sweet value dietary operation should be taken properly by the both diabetic and non-diabetic cases analogous as a high fibre & low-fat diet predicated on fruits, vegetables, and whole grains are suggested by doctors. Avoid clarified sugar containing foods. Alcohol contains a lot of sugar, so consumption of alcohol (drunkenness) should be reduced [47]

**4. Exercise-** Exercise effect on physical, internal & social health. Exercise helps to lower blood glucose situations. Regular exercise also helps maintain healthy body weight and control high blood pressure and high blood cholesterol situations.

**5. Weight-** Fat is high trouble [48]. People with t2dm and fat (bmi > 35) may be suitable for weight-loss surgery (bariatric surgery) [49].

**6. Skin-** Dm cause some skin related complications analogous as bacterial &

fungal infections, itching and some anti-pathetic responses.,[50].

**7. Age-** The high trouble of t2dm due to family history.

**8. Family History-** trouble of diabetes increases as you get youthful, especially after 45 times old [51].

**Newer Agent-**

❖ Tzds

❖ Dpp-4 inhibitors [52]

**Herbal treatment of diabetes**

In the last many decades eco-friendly, bio-friendly, cost effective and fairly safe, factory-grounded drugs have moved from the borderline to the main sluice with the increased exploration in the field of traditional drug. There are several literature reviews by different authors about anti-diabetic herbal agents, but the most instructional is the review by Atta-ur-Rahman who has proved further than 300 factory species accepted for their hypoglycaemic properties. This review has classified the shops according to their botanical name, country of origin; corridor used and nature of active agents. One similar factory is Momordica charantia (family Cucurbitaceae) [53]. Who has listed 21,000 shops, which are used for medicinal purposes around the world. Among these 2500 species are in India, out of which 150 species are used commercially on a fairly large scale. India is the largest patron of medicinal saucers and is called the botanical garden of the world [54].

**MANAGEMENT**

The operation of diabetes is so important for diabetics to understand because it helps in dealing with or controlling the complaint and also in avoiding complications. Conservation of normal blood glucose situations suppresses the onset and progression of vascular and neurological complications in t1dm cases. Strategies analogous as diet, exercise and stress operation have been strongly recommended and espoused to control t2d. [55] according to [56] without knowing about



the opinion of a complaint we can't manage a complaint. In the case of diabetes mellitus we've to control the glucose position not only but also considered the other associated trouble factor analogous as smoking, hyperlipidimias, obesity, as well as blood pressure. The author further stated that operation of diabetes mellitus requires a deep attention means without the collaboration between nurse and another member of health care team, operation of the complaint isn't possible. Awareness about diabetes of his or her family member plays a vital part in the operation of diabetes mellitus. Because without alive-ness case can't take the medicine regularly. A person with diabetes mellitus should be encouraged and enable to partake laboriously in operation and covering their condition.

### **General operation of diabetic case's education education must need**

1. Process of treatment of complaint
2. Planning of food
3. Planning of physical exertion
4. Proper awareness of drug
5. Blood sugar position monitoring
6. Awareness in acute and habitual issues
7. Nutrition remedy
8. Promoting health strategies.

And it will generally appear in people of all age's in the future. Medical nutrition remedy-Salutary calculation is predicated on the body weight in pounds which is multiplied by 10 to maintain a kilo joule/ kilocalorie which is essential, plus 30- 100 added for physical task. The diet must include 50-55 carbohydrates, 30 fat fibre (of which not further than 10 should be saturated adipose acids, and 15-20 proteins) Physical exertion-inactive life is a strong threat factor type 2 diabetes so, exercise is useful in cases [57].

### **CONCLUSION**

The below review has given information about diabetes mellitus, types, signs & symptoms, causes, opinion, and treatment. Diabetes mellitus

come a common complaint among children and more severe if no action is taken to control it. Diabetes mellitus is a non-curable (incurable) disease, but it can handle or help by insulin remedy & anti-diabetic drugs for a while. Proper diet and exercise for diabetics case is a must-have. 80- 90 of diabetic cases suffer from t2dm in india & us. however, the complaint if not meetly treated. Will affect 90- 95 of the world's population.

### **ACKNOWLEDGEMENT**

I would like to thank professor mr. Momin abrarul haque, for shearing his experience and Knowledge to this article. I also thank to other faculty member of m. s. college of Pharmacy, devghar.

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**HOW TO CITE:** Manasi Patil\*, Abraul Haque, Tanmaya Patil, A Review On Diabetes Mellitus: Complications, Management And Treatment, *Int. J. in Pharm. Sci.*, 2023, Vol 1, Issue 11, 71-80. <https://doi.org/10.5281/zenodo.10065611>

