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***ABSTRACT*:**

Background and Objectives*: Diabetes Mellitus is a chronic and metabolic disease exemplified by elevated levels of blood glucose that leads over time to serious dent to the vital organs of the human body. It has several categories, including type 1, type 2, maturity-onset diabetes of the young (MODY), gestational diabetes, neonatal diabetes, and secondary forms due to endocrinopathies, steroid use, etc. Global statistics unfolds that it's the seventh largest killer diseases. Amongst the diabetic patients, the diabetes mellitus type 2 is the most commonly prevalent across the world. Keeping these revelations in mind the present paper strives primarilyi) to portray the anthropological epidemiology and pathophysiology of the disease and ii) to explicate the Anthropo-therapeutic healing considerations in comparison with and pure and combined allopathic, ayurvedic and homeopathic treatment patterns in terms of overall wellness of the diabetic patients among the certain North Indian caste groupsie. Brahmins, Kshatriyas and Kayasthas in Lucknow, Uttar Pradesh.*

Method and Techniques*: On the basis of previously reported data and findings the challenges of the disease are closely comprehend in view of the epidemiology and pathophysiology. Empirical data were collected through survey method employing interview schedules and observation technique from certain caste group populations of Lucknow District.*

Result*: It is noted in the present discourse that diabetes is a metabolic and lifestyle disease which has polymorphic genetic implications in its manifestation. Epidemiology and pathophysiology unfold that associated factors of the disease are pancreatic beta cell dysfunction, insulin resistance, and obesity, lack of physical activities, unbalanced diet, family history, urbanization, stress, hypertension, age, race and ethnicity. Its incidence has increased rapidly making a seventh largest cause of mortality. Its diagnosis reports that more than 537 million people had diabetes worldwide accounting for 10.5% of the adult population. In India, it'sprevalent at fast pace.Major diabetic complications are renal failure, heart strokes, and retinopathy, neuropathy, micro and macro vascular diseases.However, the holistic kind of treatment pattern, anthropotherapy is relatively found on better footing as compared under study as compared to others.*

Conclusion*: it makes out the significance of improving collaboration and care synchronization amongst the likeminded professional health providers in view of improving the delivery of care for patients affected by diabetes mellitus.*

Key Words*: Diabetes Mellitus,Anthropotherapy, Epidemiology, Pathophysiology, Diabetic complications, Allopathy, Ayurveda and Herbal medicines.*

INTRODUCTION

Anthropotherapy is a multifaceted medicinal system of all conventional and modern medicines which is devoted to heal humans holistically with a unique fragrance and patient focused approach. It is the health care system which has emerged through experiences of traditional ethos, continuity and changes in belief system, ecological flora and fauna. Accordingly, it might be recognized as patient focused health care systems where all medicinal disciplines either conventional or modern are integrated or unified as per need of the situational treatment among the community. Studies reveal that it is valuable in the healing of chronic diseases like cancer, kidney disease, diabetes, hypertension etc. (Singh 2007, 2014, 20118, 2023).

Amongst the chronic diseases, diabetes mellitus is a deadly metabolic disease characterized by elevated blood glucose (or blood sugar), which leads over time to serious dent to the heart, blood vessels, eyes, kidneys and nerves. For inhabitants living with diabetes, admittance to affordable treatment, including insulin, is critical to their survival. That is why world agencies came forward for a globally agreed goal to halt the rise in diabetes and obesity by 2025 (WHO, 2023). As today approximately 422 million people worldwide have diabetes, amongst which the majority of the patients living in low-and middle-income countries, and 1.5 million deaths are directly attributed to diabetes each year. Both the number of cases and its prevalence have been gradually increasing over the past few decades. Table 1 depicts the top 10 causes of mortality in India where the diabetes is the eighth largest cause of mortality amongthe females and tenth in males bythe annual data of 2019. However, life expectancy (years**)** at birth has improved by 8.68 years from 62.1 years in 2000 to 70.8 years in India, whereasby 6.52 years from 66.8 years in 2000 to 73.3 years worldwide in 2019 **(**WHO, 2023).

Table1; Top 10 Causes of mortality among females and males in India per 1, 00,000populations. (Source; World Health Organization 2023)

Top Causes of Death in Females	Frequency	Top Causes of death in males	frequency
Ischemic heart disease	90.7	Ischemic heart disease	130
Diarrheal diseases	62.1	Chronic obstructive pulmonary disease	70
Chronic obstructive pulmonary disease	58.7	Stroke	52
Stroke	50	Tuberculosis	38
Neonatal conditions	31.5	Diarrheal diseases	37
Lower respiratory infections	30.9	Neonatal conditions	32
Tuberculosis	25.4	Cirrhosis of the liver	27
Diabetes mellitus	19.7	Lower respiratory infections	27
Falls	17.6	Road injury	23
Asthma	17.1	Diabetes mellitus	20

AIMS, MATERIALS AND METHOD

Anthropotherapeutic healing is identified as a patient focused health care system where all medicinal practices (whether conventional or modern) are applied as per need of the situations arise in a community. It begins with preventive care measures prevailed in an ethnic group for a particular disease. These measures consist of basically social and preventive medicines like sorcery, witchcraft, taboos, mantra chanting, hypnotherapies etc. which endeavor primarily to keep patients healthy and if not several other ethnic medicines are applied on the diseased person in consultation with elders, traditional healers, and ayurvedic or local practitioner's doctors. These ethno medicines incorporate multiple herbs, shoots, roots, leaves, ayurvedic juices, tablets, bati, and naturopathic therapies, diet plan, yoga and meditation, physical exercises etc. If the disease of patients still perpetuates and pathological or diagnostic assessment reports are wretched and unfavorable, the patient himself opts for modern biomedicines or allopathic treatments available in vicinity apart from the previous courses of healing procedure. This unique system of treatment of multiple medicines called as anthropotherapy is a holistic therapy of multiple medicines for total cure of a disease prevailing in the human culture and society. The therapy emergesthrough several courses of successive better experiences of patients in terms of their pain relief and overall health conditions and it continues through generations in community with a mix flavor of bio-cultural, ecological variations and patient's belief level system.

Secondly, it has been noticed that those who do not believe in the system of multiple medicines or anthropotherapy, consider single line treatment approach either allopathy or ayurvedic or homeopathy for the cure of a disease like diabetes mellitus. In addition, it has also been observed that a third group of patients too exists there in the human populations i.e. in urban and rural conglomerations of Lucknow district, Uttar Pradesh who follow a prescribed line of treatment in case of the cure of diabetes mellitus apart from healthy diet plan, meditation, yoga, physical exercises and so on in consultation with their doctors.

Keeping these eye-openersof human healing considerationsin mind the present articlefocuseschieflyupon i) to reveal the etiology, anthropological epidemiology and pathophysiology of diabetes mellitus in view of the available medical science literature and current researches conducted by several investigating agencies, and finally ii) to explicate the Anthropo-therapeutic healing consideration in comparison with single line and combined medical treatment patterns like allopathic, ayurvedic/ herbal and homeopathic etc.in terms of the overall cure and wellness of the diabetic patients.

With reference to achieving these two goals the previously reported findings of earlier investigators are comprehended initially in view of threatening current challenges of the disease across the globe. Three sets of diabetic patients were recognized which strictly followed single line treatment of either Allopathy or Ayurvedic/herbal or Homeopathy. Another three sets of patients were found out which preferred to add physical exercises, yoga and naturopathy, balanced diet etc. along with allopathic, ayurvedic/herbal or homeopathic treatment protocols.Lastly a seventh set of patients was also screened who had belief in the procedural path of anthropotherapy and its potentials of treatment in case of diabetes mellitus. The level of healing interventions for all sets of diabetic patients is assessed comparatively in percentile values with respect to understand overall wellness of the patient's health. Thus, for this discourse a sample of 1,295 diabetic persons was collected by adopting survey method from three North Indian Caste Groups ie. Brahmins, Kshatriyas and Kayasthas of Lucknow district, in Uttar

Pradesh, India. During door to door and hospital based surveys an interview schedule was applied in view of finding out patients beliefs in a particular healing pattern as well as the medicinal courses they were following during last calendar year for the cure of their diabetic disease. The overall physical and mental wellness of the diabetic patients was observed in accordance with the complications and diagnosis adopted by selected populations.

RESULTS AND DISCUSSION

i) Etiology and Types of the Disease

The term diabetes mellitus is originated from the Greek root word *diabainein*, meaning "to pass through." It describes the abundant urination, and *mellitus*, from the Latin meaning "sweetened with honey," which refers to sugar in the urine. Its historical appraisal shows that the term "diabetes" was initially used by Apollonius of Memphis around 250 to 300 BC. Ancient Indian,Greek, and Egyptian civilizations discovered the sweet nature of urine in this condition, and hence the propagation of the word diabetes mellitus came into being. In 1889 Joseph Von Mering and Oskar Minkowskifound out the role of the pancreas in the pathogenesis of diabetes (cited from Rogers 2024). In 1922 Banting, Best, and Collip purified the hormone insulin from the pancreas of cows at the University of Toronto, leading to the availability of an effective treatment for diabetes in 1922(cited from Rogers 2024, Sapra and Bhandari, 2023). Over the years, exceptional work has taken place, and multiple discoveries, as well as management strategies, have been created to tackle this growing problem. Nevertheless, even today diabetes is one of the most common chronic diseases in our country and world.

Literary inputs reveal that it has several categories, including type 1, type 2, maturity-onset diabetes of the young (MODY), gestational diabetes, neonatal diabetes, and secondary causes due to endocrinopathies, steroid use, etc. (Sapra and Bhandari, 2023). The main subtypes of are Type 1 diabetes mellitus and Type 2 diabetes mellitus, which classically result from defective insulin secretion and/or action. Type1 presents in children or adolescents, while Type2 is thought to affect middle-aged and older adults who have prolonged hyperglycemia due to poor lifestyle and dietary choices. The pathogenesis for Type1 and Type2 is drastically different, and therefore each type has various etiologies and treatments.

According to Koga Rogers (2024) in fact the islets of Langerhans are responsible for the endocrine function of the pancreas. Each islet contains beta, alpha, and delta cells that are responsible for the secretion of pancreatic hormones. Beta cells secrete insulin, a well-characterized hormone that plays an important role in regulating glucose metabolism.

Insulin is thus a hormone which is secreted by beta cells that are located within clusters of cells in the pancreas called the islets of Langerhans. Insulin's role in the body is to trigger cells to take up glucose so that the cells can utilize this energy-yielding sugar. Persons with diabetes may have dysfunctional beta cells, resulting in decreased insulin secretion, or their muscle and adipose cells may be resistant to the effects of insulin. This results in a decreased ability of these cells to take up and metabolize glucose. In both cases, the levels of glucose in the blood increase, causing high blood sugar. As glucose accumulates in the blood, excess levels of this sugar are excreted in the urine. Because of greater amounts of glucose in the urine, more water is excreted with it, causing an increase in urinary volume and frequency of urination as well as thirst. Other symptoms of diabetes include itching, hunger, weight loss, and weakness.

Amongst diabetic personsType 1 is characterized by the dysfunctional beta cells in the pancreas, typically secondary to an autoimmune process. The result is the absolute destruction of beta cells, and consequentially, insulin is absent or extremely low whereas Type 2Diabetes Mellitus involves a more insidious onset where an imbalance between insulin levels and insulin sensitivity causes a functional shortfall of insulin. An insulin resistance is multifactorial but frequently builds up from obesity and aging.

In both the diabetic patients, Type 2 is rather more common than type 1 diabetes, accounting for approximately 90 percent of all cases. The frequency of type 2 diabetes varies greatly within and between countries and is increasing throughout the world. Most patients with type 2 diabetes are adults, often older adults, but it can also occur in children and adolescents. There is a stronger genetic element to type 2 diabetes than to type 1 diabetes. For example, identical twins are much more likely to develop type 2 diabetes than to develop type 1 diabetes, and 7 to 14 percent of people whose mother or father has type 2 diabetes will also develop type 2 diabetes; this estimate increases to 45 percent if both parents are affected. In addition, it is estimated that about half of the adult Pima Indian population in Arizona has type 2 diabetes, whereas in the entire US it is estimated that about 10 percent of the population has type 2 diabetes (Sapra and Bhandari, 2023).

Thus, Type 2 diabetes is insulin resistant, which may be combined with relatively reduced insulin secretion. The defective responsiveness of body tissues to insulin is believed to involve the insulin receptor. However, the specific defects are not known. Diabetes mellitus cases due to a known defect are classified separately. Many people with type 2 diabetes have evidence of pre-diabetes (impaired fasting glucose and/or impaired glucose tolerance) before meeting the criteria for type 2 diabetes (Risérus et al ;2009). The progression of pre-diabetes to overt type 2 diabetes can be slowed or reversed by lifestyle changes or medications that improve insulin sensitivity or reduce the liver's glucose production (Malik et al.2010).

Malik et al (2010) reiterates that Type 2 diabetes is primarily due to lifestyle and genetic components. A number of lifestyle factors are known to be important to the development of type 2 diabetes. Other influencing factors are obesity (defined by a BMI of greater than 30), lack of physical activity, poor diet, stress and urbanization. Excess body fat is associated with 30% of cases in people of Chinese and Japanese descent, 60–80% of cases in those of European and African descent, and 100% of Pima Indians and Pacific Islanders.(Malik et al.2010; IDA 2023).

Huang et al (2015) found that dietary factors such as sugar-sweetened drinks are also associated with an increased risk. The type of fats in the diet is imperative, with saturated fat and Trans fats increasing the risk and polyunsaturated and monounsaturated decreasing the risk. Eating white rice excessively may increase the risk of diabetes, especially in Chinese and Japanese people(Huang et al. 2015;Zhang et al. 2017).Adverse childhood experiences, including abuse, neglect, and household difficulties, increase the likelihood of type 2 diabetes later in life by 32%, with neglect having the strongest effect. (NDS, 2011).

Many patients with type 2 diabetes are asymptomatic, and they are often diagnosed with type 2 diabetes when routine measurements reveal high blood glucose concentrations. In some patients the presence of one or more symptoms associated with the long-term complications of diabetes leads to a diagnosis of type 2 diabetes. Other patients present with symptoms of hyperglycemia

that have been present for months or with the sudden onset of symptoms of very severe hyperglycemia and vascular collapse.

According to Rajaei et al (2019) the genetic background for both types is critical as a risk factor. As the human genome gets further explored, there are different loci found which bestow risk for Diabetes. Polymorphisms have been also found to influence the menace for Type 1Diabetes, including major histocompatibility complex (MHC) and human leukocyte antigen -HLA (Klein et al 1996). Studies report that with one affected monozygotic twin has a 90% likelihood of the other twin developing Type 2Diabetes in his/her lifetime. (Barnettet al.1981). Approximately 50 polymorphisms till today have been mentioned to contribute to the risk for Type 2Diabetes. According to Saxena et al (2007) these genes encode for proteins involved in various pathways leading to Diabetes, including pancreatic development, insulin synthesis, secretion, and development, amyloid deposition in beta cells, insulin resistance, and impaired gluconeogenesis regulation. A genome-wide association study (GWAS) found genetic loci for transcription factor 7-like 2 gene (TCF7L2), which increases the risk for Type 2Diabetes.(Saxena et. al. 2007). Other loci that have implications in the development of Type 2Diabetes include NOTCH2, JAZF1, KCNQ1, and WFS1(Yasuda et al. 2008; Zegginiet al. 2008, Sapra and Bhandari 2023)).

Fajans et al (2010) opine that MODY diabetes is a heterogeneous disorder identified by non-insulin-dependent diabetes diagnosed at a young age or before 25 years. It carries an autosomal dominant gene and does not involve auto-antibodies as in Type 1Diabetes. Several genes have connotation in this disease. Itincludes mutations to HNF1A (hepatocyte nuclear factor-1-alpha) and the GCK (glucokinase) gene, that occurs in 52 to 65 and 15 to 32 percent of MODY cases, respectively(Fajans et al 2001; Shields et al. 2010). The genetics of this illness are still unclear as some patients have mutations but never develop the disease, and others will develop clinical symptoms of MODY but have no identifiable mutation (Shields et al. 2010).

In accordance with Kuhl (1998) the gestational diabetes essentially manifests during pregnancy. It is still unknown why it grows; however, speculations claim that HLA antigens may play a role, specifically HLA DR2, 3, and 4. Excessive proinsulin is also thought to play a role in gestational diabetes, and some suggest that proinsulin may induce beta-cell stress. Others believe that high concentrations of hormones such as progesterone, cortisol, prolactin, human placental lactogen, and estrogen may affect beta-cell function and peripheral insulin sensitivity (Sapra and Bhandari 2023; Roger 2024).

ii) Anthropological Epidemiology

World statistics uncovers that diabetes mellitus is a one of the top ten major killer diseases. In 2021, an estimated 537 million people had diabetes worldwide accounting for 10.5% of the adult population, with type 2 making up about 90% of all cases. It is estimated that by 2045, approximately 783 million adults, or 1 in 8, will be living with diabetes, representing a 46% increase from the current figures.(IDF, 2023). The prevalence of the disease continues to increase, most dramatically in low- and middle-income nations. *(*De Silva et al 2018) Rates are similar in women and men, with diabetes being the seventh leading cause of death internationally. The global expenditure on diabetes-related healthcare is an estimated US$760 billion a year **(**Bommer et al 2017*).*

Global data unfolds that today 1 in 11 adults has diabetes. The onset of Type 1-Diabetes gradually increases from birth and peaks at ages 4 to 6 years and then again from 10 to 14 years (Felner et al. 2005). Approximately 45% of children present before age ten years. The prevalence in people under age 20 is about 2.3 per 1000. While most autoimmune diseases are more common in females, there are no apparent gender differences in the incidence of childhood Type 1 -Diabetes. According to Dabelea et al (2013) in some populations, such as in older males of European origin (over 13 years), they may be more likely to develop Type-1 compared to females (3:2 male to female ratio). Thus the incidence of Type-1Diabetes too has been increasing worldwide. In Europe, Australia, and the Middle East, rates are rising by 2% to 5% annually.

Zheng et al (2018) attempt to reveal that the onset of Type-2diabetes is usually later in life, though obesity in adolescents has led to an increase in Type-2Diabetes in younger populations. Type-2Diabetes has a prevalence of about 9% in the total population of the United States, but approximately 25% in those over 65 years. The International Diabetes Federation estimates that in 2015, 1 in 11 adults between 20 and 79 years had diabetes globally. Experts anticipate the occurrence of Diabetes is likely to increase from 415 to 642 million by 2040, with the most significant increase in populations transitioning from low to middle-income levels.(Zheng et. al. 2018). Type-2Diabetesfluctuates among ethnic groups and is 2 to 6 times more prevalent in Blacks, Native Americans, Pima Indians, and Hispanic Americans compared to Whites in the United States (Harris et el 1998). While ethnicity alone plays a vital role in Type-2Diabetes, environmental factors also greatly confer risk for the disease. For instance, Pima Indians in Mexico are less likely to develop Type-2Diabetes compared to those Pima Indians who reside in the United States i.e.6.9% vs. 38%(Carter et al.,2006).

In 2017, 425 million people had diabetes worldwide, up from an estimated 382 million people in 2013 and from 108 million in 1980. Accounting for the shifting age structure of the global population, the prevalence of diabetes is 8.8% among adults, nearly double the rate of 4.7% in 1980. Type 2 makes up about 90% of the cases. Some data indicate rates are approximately equivalent in women and men, but malessurplus in diabetes has been found in many populations with higher type 2 occurrence, possibly due to sex-related differences in insulin sensitivity, consequences of obesity and regional body fat deposition, and other contributing factors such as high blood pressure, tobacco smoking, and alcohol intake. (World Health Organization.Retrieved 20, 2018. Gale and Gillespie 2001).

The WHO estimates that diabetes resulted in 1.5 million deaths in 2012. However, another 2.2 million deaths worldwide were attributable to high blood glucose and the increased risks of cardiovascular disease and other associated complications (e.g. kidney failure), which often lead to premature death and are often listed as the primary cause of death certificates rather than diabetes. For instance, in 2017, the IDF estimated that diabetes resulted in 4.0 million deaths worldwide, using a model to estimate the total number of deaths that could be directly or indirectly attributed to diabetes *(*World Health Organization. 2016. Retrieved 2018; Galeand Gillespie 2001).

According to Wild et al (2004) the diabetes occurs throughout the world but is more common (particularly type 2) in more developed countries. The greatest increase in rates has however been seen in low- and middle-income countries like Shri Lanka, where more than 80% of diabetic deaths occur.(Wild et al.2004). The fastest increase is expected to occur in Asia and Africa, where most people with diabetes will probably live in 2030.(CDC.2022). The increase in rates in developing countries follows the trend of urbanization and lifestyle changes, including increasingly sedentary lifestyles, less physically demanding work and the global nutrition transition, marked by increased intake of foods that contain high energy but nutrient-poor (often high in sugar and saturated fats, sometimes referred to as the "Western-style" diet. In consequence, the global number of diabetes cases may increaseby 48% between 2017 and 2045. (CDC, 2022).

iii) Pathophysiology of Diabetes Mellitus

As we know that a patient with diabetes has a strong probability for hyperglycemia but the pathology of diabetes can be unclear since several factors can often contribute to the disorder. Hyperglycemia alone can impair pancreatic beta-cell function and contributes to impaired insulin secretion. Consequentially, there is a vicious cycle of hyperglycemia leading to an impaired metabolic state. Blood glucose levels above 180 mg/dL are often considered hyperglycemic in this context, though because of the variety of mechanisms, there is no clear cutoff point. Patients experience osmotic diuresis due to saturation of the glucose transporters in the nephron at higher blood glucose levels. Although the outcome is variable, serum glucose levels above 250 mg/dL are likely to cause symptoms of polyuria and polydipsia.

Sapra and Bhandari(2023) report that insulin resistance is attributable to excess fatty acids and pro-inflammatory cytokines, which leads to impaired glucose transport and increases fat breakdown. Since there is an inadequate response or production of insulin, the body responds by inappropriately increasing glucagon, thus further contributing to hyperglycemia. While insulin resistance is a component of Type 2Diabetes, the full extent of the disease results when the patient has inadequate production of insulin to compensate for their insulin resistance.

Thus according to research sources that insulin is the principal hormone that regulates the uptake of glucose from the blood into most cells of the body, especially liver, adipose tissue and muscle, except smooth muscle, in which insulin acts via the IGF-1. Therefore, deficiency of insulin or the insensitivity of its receptors plays a central role in all forms of diabetes mellitus.(Shoback and Gardner, 2011).

Murray et al. (2012) describe that the body obtains glucose from three main sources: the intestinal absorption of food; the breakdown of glycogen, the storage form of glucose found in the liver; and gluconeogenesis, the generation of glucose from non-carbohydrate substrates in the body. Insulin plays a critical role in regulating glucose levels in the body. Insulin can inhibit the breakdown of glycogen or the process of gluconeogenesis, it can stimulate the transport of glucose into fat and muscle cells, and it can stimulate the storage of glucose in the form of glycogen.(Murray et al. 2012).

Mugotlane(2013) narrates that insulin is released into the blood by beta cells (β-cells), found in the islets of langerhans in the pancreas, in response to rising levels of blood glucose, typically after eating. Insulin is used by about two-thirds of the body's cells to absorb glucose from the

blood for use as fuel, for conversion to other needed molecules, or for storage. Lower glucose levels result in decreased insulin release from the beta cells and in the breakdown of glycogen to glucose. This process is mainly controlled by the hormone glucagon, which acts in the opposite manner to insulin.

If the amount of insulin available is insufficient, or if cells respond poorly to the effects of insulin (insulin resistance), or if the insulin itself is defective, then glucose is not absorbed properly by the body cells that require it, and is not stored appropriately in the liver and muscles. The net effect is persistently high levels of blood glucose, poor protein synthesis, and other metabolic derangements, such as metabolic acidosis in cases of complete insulin deficiency (Mogotlane2013).

According to the established sources when there is too much glucose in the blood for a long time, the kidneys cannot absorb it all and reach a threshold of reabsorption and the extra glucose gets passed out of the body through urine -gycosuria. This increases the osmotic pressure of the urine and inhibits reabsorption of water by the kidney, resulting in increased urine production - polyuria and increased fluid loss. Lost blood volume is replaced osmotically from water in body cells and other body compartments, causing dehydration and increased thirst known as polydipsia. In addition, intracellular glucose deficiency stimulates appetite leading to excessive food intake called as polyphagia (Murray et al. 2012; Mogotlane2013; Singh 2023).

WHO standardizes that a positive result, in the absence of unequivocal high blood sugar, should be confirmed by a repeat of any of the above methods on a different day. It is preferable to measure a fasting glucose level because of the ease of measurement and the considerable time commitment of formal glucose tolerance testing, which takes two hours to complete and offers no prognostic advantage over the fasting test. According to the current definition, two fasting glucose measurements at or above 7.0 mmol/L (126 mg/dL) is considered diagnostic for diabetes mellitus.(World Health Organization. 2006).

Table 2; WHO diabetes diagnostic criteria(2006)

Condition	**2-hour glucose**		**Fasting glucose**		**HbA_{1c}**	
Unit	*mmol/L*	*mg/dL*	*mmol/L*	*mg/dL*	*mmol/mol*	*DCCT %*
Normal	< 7.8	< 140	< 6.1	< 110	< 42	< 6.0
Impaired fasting Glycemia	< 7.8	< 140	6.1–7.0	110–125	42–46	6.0–6.4
Impaired glucose tolerance	≥ 7.8	≥ 140	< 7.0	< 126	42–46	6.0–6.4
Diabetes Mellitus	≥ 11.1	≥ 200	≥ 7.0	≥ 126	≥ 48	≥ 6.5

Jacobson, Haller and Schatz (2018) acclaim that glycated hemoglobin is better than fasting glucose for determining risks of cardiovascular disease and death from any cause. Chronic hyperglycemia also causes non-enzymatic glycation of proteins and lipids. The extent of this is measurable via the glycation hemoglobin (HbA1c) test. Glycation leads to damage in small

blood vessels in the retina, kidney, and peripheral nerves. Higher glucose levels speed up the process. This damage leads to the characteristic diabetic complications of diabetic retinopathy, nephropathy, and neuropathy and the preventable outcomes of blindness, dialysis, and amputation, respectively (Unger and Orci.2010).

iv) Diabetic Complications

Regardless of the specific type of diabetes, complications involve microvascular, macrovascular, and neuropathic issues. Microvascular and macrovascular complications vary according to the degree and the duration of poorly controlled diabetes that include nephropathy, retinopathy, neuropathy, and ASCVD incidences, if it is associated with other co-morbidities like dyslipidemia and hypertension (Yamazaki et al 2018). One of the most devastating consequences of Diabetes is its influence on cardiovascular disease (ASCVD). It is expected that approximately two-thirds Diabetic patients die from a myocardial infarction or stroke. In Type 2Diabetes, fasting glucose of more than 100 mg/dL significantly contributes to the risk of ASCVD and cardiovascular risk can develop before guileless hyperglycemia (Yamazaki et el. 2011).

Diabetes is also a familiar cause of blindness in adults aged 20 to 74 years in the United States. Diabetic retinopathy contributes to 12000 to 24000 new cases of blindness annually, and treatments generally consist of laser surgery and glucose control. Renal disease is another significant cause of morbidity and mortality in Diabetes patients. It is the leading contributor to end-stage renal disease (ESRD) in the United States, and many patients with ESRD will need to start dialysis or receive a kidney transplant (Forbes and Cooper 2013). If the albuminuria persists in the range of 30 to 300 mg/day (micro albuminuria), it seems to be a predictable earliest marker for the onset of diabetic neuropathy. Once macro albuminuria (greater than 300 mg/24 hr) sets in, the progression to ESRD hastens up. The random spot urine specimen for measurement of the albumin-to-creatinine ratio is a quick, easy, predictable method that is the most widely used and preferred method to detect micro albuminuria. Two of three tests, done over a six month showing a persistent level greater than 30 mcg/mg creatinine, confirm the diagnosis of micro albuminuria.

Diabetes is also the leading cause of limb amputations. This is primarily due to vasculopathy and neuropathy. Many patients who develop neuropathy need to have regular foot exams to prevent infection from wounds that go unnoticed.(Forbes and Cooper 2013)

Small-artery disease (micro angiopathy) consists of thickening of the walls of small arteries and capillaries, which initially renders them permeable (leaky) to fluids and subsequently renders them prone to obstruction (thrombosis). These changes occur primarily in the retina (diabetic retinopathy) and kidneys (diabetic nephropathy), and as a result diabetes is the most common cause of blindness and end-stage kidney disease. Vascular complications are provoked by hypertension and hyperlipidemia (high serum levels of lipids), both of which are common in patients with diabetes.

There are other, nonvascular complications of diabetes, including cataract formation and neuropathy (diabetic neuropathy). The most common type of neuropathy is symmetric polyneuropathy. This causes abnormal sensation (numbness or tingling) or loss of sensation, loss

of position sense and vibratory sense, and weakness of the muscles of the feet, lower legs, and hands. Other patients have single-nerve neuropathy, such as loss of function of a nerve to the muscles of one eye, causing visual disturbances, or of a nerve to the muscles of the forearm, causing wrist drop. They may also have autonomic neuropathy, which may result in postural hypotension (fainting upon sitting up or standing), gastric retention, erectile dysfunction, or urinary bladder dysfunction. These complications may be caused by glycosylation of ocular tissue or nervous tissue, accumulation of osmotically active glucose metabolites in these tissues, or disease of the small vessels in these tissues. (Rogers,2024).

The duration of diabetes mellitus is the most crucial risk factor for the escalation of diabetic retinopathy. In people with type 1 diabetes, it typically sets in about 5 years after disease onset. Hence it is recommended to start the yearly retinal exams in these patients about five years after diagnosis. Among patients with type 2 diabetes, many patients might already have retinal changes at the time of diagnosis. Approximately 10% at ten years, 40% at 15 years, and 60% at 20 years will have nonproliferative retinal disease. In these patients, the recommendation is to start the yearly retinal screening at the time of diagnosis. Study after study has shown that reasonable glycemic control favorably affected the onset and progression of diabetic retinopathy. Uncontrolled blood pressure is an added risk factor for macular edema. Lowering the blood pressure in patients with diabetes thus also affects the risk of progression of the retinopathy. Injection of antibodies vascular endothelial growth factor (anti-VEGF) agents are generally in use as the initial therapy in cases of macular edema. In cases of nonproliferative diabetic retinopathy, pan-retinal photocoagulation is being used. In cases of diabetic proliferative retinopathy, combined modalities of anti-VEGF agents and pan-retinal photocoagulation are now in use. Sudden loss of vision can occur for several reasons in patients with diabetes mellitus, the most common being vitreous hemorrhage. Less common causes that merit consideration include vascular occlusion (central retinal vein or branch vein occlusion involving the macula), retinal detachment, end-stage glaucoma, and ischemic optic neuropathy.

Furthermore, evidence suggests that Type 2Diabetes may also contribute to cancer development, specifically bladder cancer, in those using pioglitazone. Patients using metformin had improved cancer-specific survival in those with prostate, pancreatic, breast, and colorectal cancers. However, it is unclear how metformin plays a role in modulating cancer in patients with diabetes (Yin et al. 2013).

The combination of hyperglycemia and ketosis causes diuresis, acidemia, and vomiting leading to dehydration and electrolyte abnormalities, which can be life-threatening. In T2DM, hyperosmolar hyperglycemic syndrome (HHS) is an emergent concern. It presents similarly to DKA with excessive thirst, elevated blood glucose, dry mouth, polyuria, tachypnea, and tachycardia. However, unlike DKA, HHS typically does not present with excessive urinary ketones since insulin still gets produced by pancreatic beta cells.

The major long-term complications of diabetes relate to damage to blood vessels at both macrovascular and microvascular levels. Diabetes doubles the risk of cardiovascular disease, and about 75% of deaths in people with diabetes are due to coronary artery disease (Sapra and bhandari, 2023). Other macrovascular morbidities include stroke and peripheral artery disease.(Better Health Channel. Victoria: Department of Health. Retrieved 2023).

Microvascular disease affects the eye, kidneys and nerves. Damage to the retina, known as diabetic retinopathy, is the most common cause of blindness in people of working age. The eyes can also be affected in other ways, including development of cataract and glaucoma. It is recommended that people with diabetes visit an ophthalmologist once a year. In addition, Diabetic nephropathy is a major cause of chronic kidney disease, accounting for over 50% of patients on dialysis in the United States. Diabetic neuropathy, damage to nerves, manifests in various ways, including sensory loss, neuropathic pain and autonomic dysfunction (such as postural hypotension, diarrhoea, and erectile dysfunction. Loss of pain sensation predisposes to trauma that can lead to diabetic foot problems, the most common cause of non-traumatic lower-limb amputation.(Rogers 2024).

Based on extensive data and numerous cases of gallstone disease, it appears that a causal link might exist between type 2 diabetes and gallstones. People with diabetes are at a higher risk of developing gallstones compared to those without diabetes (Yuan et al. 2022).

There is a link between cognitive deficit and diabetes; studies have shown that diabetic individuals are at a greater risk of cognitive decline, and have a greater rate of decline compared to those without the disease. The condition also predisposes to falls in elderly, especially those treated with insulin.

Table 3: Comparison of type 1 and 2 diabetes(Skov et al. 2020)

Feature	**Type 1 diabetes**	**Type 2 diabetes**
Onset	Sudden	Gradual
Age at onset	Mostly in children	Mostly in adults
Body size	Thin or normal	Often obese
Ketoacidosis	Common	Rare
Autoantebodies	Usually present	Absent
Endogenous insulin	Low or absent	Normal, decreased or increased
Heritability	0.69 to 0.88 *Condon J, Shaw JE, Luciano M, Kyvik KO, Martin NG, Duffy DL (February 2008)*	0.47 to 0.77*Tinajero MG, Malik VS (September 2021).*
Prevalence (age standardized)	<2 per 1,000	~6% (men), ~5% (women)

v) Diabetic stigma

Diabetes stigma describes the negative attitudes, judgment, discrimination, or prejudice against people with diabetes. Often, the stigma stems from the idea that diabetes (particularly Type 2 diabetes) resulted from poor lifestyle and unhealthy food choices rather than other causal factors like genetics and social determinants of health. Manifestation of stigma can be seen throughout

different cultures and contexts. Scenarios include diabetes statuses affecting marriage proposals, workplace-employment, and social standing in communities.*(*Schabert et al.2013).

Stigma is also seen internally, as people with diabetes can also have negative beliefs about themselves. Often these cases of self-stigma are associated with higher diabetes-specific distress, lower self-efficacy, and poorer provider-patient interactions during diabetes care*(* Puhl et al .2020.*)*.

vi) Diagnosis

It is found in clinical sciences that patient history, queries about family history, autoimmune diseases, and insulin-resistance are decisive to making the diagnosis of Diabetes. It often presents asymptomatically, but when symptoms develop, patients usually present with polyuria, polydipsia, and weight loss. Sapra and Bhandari (2023) recite that on physical examination of someone with hyperglycemia, poor skin turgor (from dehydration) and a distinctive fruity odor of their breath (in patients with ketosis) may be present. In the setting of diabetic ketoacidosis (DKA), clinicians may note Kussmaul respirations, fatigue, nausea, and vomiting.

It is noted that funduscopic examination in a patient with Diabetes may show hemorrhages or exudates on the macula. In frank diabetic retinopathy, retinal venules may appear dilated or occluded. Diabetologists acclaim that the proliferation of new blood vessels is also a concern for ophthalmologists and can hasten retinal hemorrhages and macular edema, ultimately resulting in blindness. On the other hand, while Type 1Diabetes and Type 2Diabetes can be noted for resemblance, they can be distinguished based on clinical history and examination. Type 2Diabetes patients are typically overweight/obese and present with signs of insulin resistance, including acanthosis nigricans, which are hyper-pigmented, velvety patches on the skin of the neck, axillary, or inguinal folds. Patients with a longer course of hyperglycemia may have blurry vision, frequent yeast infections, numbness, or neuropathic pain. The clinicians must ask the patient bout any recent skin changes in their feet during each visit. The diabetic foot exam, including the monofilament test, should be a part of the routine physical exam (Sapra and Bhandari 2023; Rogers 2024).

According to ADA standards(2012) the diagnosis of Type 1Diabetes is usually through a distinctive history supported by elevated serum glucose levels (fasting glucose greater than 126 mg/dL, random glucose over 200 mg/dL, or hemoglobin A1C (HbA1c exceeding 6.5%) with or without antibodies to glutamic acid decarboxylase (GAD) and insulin. Fasting glucose levels and HbA1c testing are useful for the early identification of Type 2Diabetes. If borderline, a glucose tolerance test is an option to evaluate both fasting glucose levels and serum response to an oral glucose tolerance test (OGTT). Prediabetes, which often precedes T2DM, presents with a fasting blood glucose level of 100 to 125 mg/dL or a 2-hour post-oral glucose tolerance test (post-OGTT) glucose level of 140 to 200 mg/dL (American Diabetes Association, 2010; 2012)

Thus, in view of American Diabetes Association (ADA), a diagnosis of Type 2 diabetes is through any of the following: An HbA1c level of 6.5% or higher; A fasting plasma glucose level of 126 mg/dL (7.0 mmol/L) or higher (no caloric intake for at least 8 hours); A two-hour plasma glucose level of 11.1 mmol/L or 200 mg/dL or higher during a 75-g OGTT; A random plasma glucose of 11.1 mmol/L or 200 mg/dL or higher in a patient with symptoms of hyperglycemia (polyuria, polydipsia, polyphagia, weight loss) or hyperglycemic crisis. The ADA recommends

screening adults aged 45 years and older regardless of risk, while the United States Preventative Service Task Force suggests screening individuals between 40 to 70 years who are overweight (Selphet al. 2015).

For the testing of gestational diabetes, all pregnant patients have screening between 24 to 28 weeks of gestation with a 1-hour fasting glucose challenge test. If blood glucose levels are over 140mg/dL, patients have a 3-hour fasting glucose challenge test to confirm a diagnosis. A positive 3-hours OGTT test confirms when there is at least one abnormal valueie. "greater than or equal to 180, 155, and 140 mg/dL for fasting one-hour, two-hour, and 3-hour plasma glucose concentration", respectively(Karagianniset al. 2010).

It is noticed that several lab tests are helpful in the management of chronic diabetes although home glucose testing can show trends of hyper- and hypoglycemia. The HbA1c test indicates the extent of glycation due to hyperglycemia over three months ie. 'the life of the red blood cell'. Urine albumin testing can categorize the early stages of diabetic nephropathy. In view of the fact that patients with diabetes are also prone to cardiovascular disease, serum lipid monitoring is worthwhile at the time of diagnosis. Correspondingly, ADA recommends monitoring thyroid status by obtaining a blood level of thyroid-stimulating hormone annually due to a higher incidence of hypothyroidism. (American Diabetes Association, 2010; 2012).

Despite the fact that the blood glucose concentrations used to define diabetes and impaired fasting glucose are somewhat arbitrary, they do correlate with the risk of macrovascular and microvascular disease. Patients with impaired fasting glucose are likely to have diabetes later in life. It is univerasally accepted that oral glucose tolerance tests, in which blood glucose is measured hourly for several hours after ingestion of a large quantity of glucose i e. usually 75 or 100 grams, are applied in pregnant women to examine gestational diabetes. The criteria for diagnosing gestational diabetes are more inflexible than the criteria for diagnosing other types of diabetes. It is a reflection of the existence of decreased blood glucose concentrations in healthy pregnant women as compared with non-pregnant women.

Sapra and Bhandari (2023) reiterate that the duration and severity of hyperglycemia can be detected by measuring levels of *advanced glycosylation end* productsi e.-AGEs. AGEs are formed when hemoglobin molecules in RBC undergo binding to glucose (glycosylation), and the bound substances remain together until the red blood cell dies (after approximately 120 days). AGEs are believed to inflict the majority of vascular damage that occurs in people with diabetes. A glycosylated hemoglobin called hemoglobin subtype A1C (HbA1c) is particularly useful in monitoring hyperglycemia and the effectiveness of diabetes treatments.
Thus there are several tests which diagnose the types and severity of diabetes mellitus. The advanced diagnosis helps in monitoring to the enhanced blood glucose levels and its serious complications. In accordance with the diagnosis the line of the treatment might be comprehensively planned which may minimize the probability of long standing complications on one side and prevent the diabetic mellitus to impact the body system on the other.

vii) Outcome of the Healing Process

Healing is a process of holistic treatment given by health care providers. Before the advancement in medical science most diabetic patients were treated by local healers through ethnic medicines. This lifestyle disease was barely acknowledged by the traditional doctors. But modern lifestyle

and urbanization process catalyze the onset of diabetes mellitus. In rural areas physical activities and dietary pattern always prevent this metabolic disorder to manifest. Heavy fat and carbohydrate intake induced obesity and imbalance of lipid profile which further have contributed to the genesis of diabetes mellitus. Untreated diabetes goes ahead to ketoacidosis, the accumulation of ketones (products of fat breakdown) and acid in the blood. Constant buildup of these products of disordered carbohydrate and fat metabolism result in nausea and vomiting, and eventually the patient goes into a diabetic coma. That is why the treatment of it might refer to its genesis as well the quick relief from the onset disease. For it a holistic treatment, anthropotherapeutic healing method is need of the day while several fatal complications are still unaddressed by the modern medicine alone i e. allopathy.

Anthropotherapeutic healing/treatment for diabetes mellitus is aimed atto cure and to restore good health by reducing blood glucose concentrations to normal levels. It focuses on the health care practices emerged through continuity and changes in cultural belief systems and current manifestations in the biology of patients. It attempts to bring the adaptable changes in dietary behavior and physical activity first thereaftercheck obesity for monitoring desired level of blood glucose by implementing yoga therapy, allopathic medicines as per need (insulin or pharmaceuticals), ethnic medicines like ayurveda,herbal and other alternative therapies practiced in vicinity if needed.Thus anthropotherapeutic healing pattern is a typically hybrid method evolved in the vicinity. As it is adopt by a person or population in addition to the prescriptions of the health providers, so it is entirely patient focused and ultimate goal of it is to restore the previousstate of good health of the patient. (Singh 2018, 2023) This is imperative in promoting well-being and in minimizing the development and progression of the fatal complications of diabetes. Regular monitoring of the concentration of blood glucose levels and targeted value of HbA1c can be used to assess whether an individual’s treatment for diabetes is effective.

Table 4: Comparative Distribution of multiple treatment patterns and their complication ratio among thedifferent Caste Groups ie.Brahmins,Kshatriyas, and Kayasthas of Lucknow District, Uttar Pradesh.

Treatment Patterns	Brahmins/complications		Kshatriyas/complications		Kayasthas/complications		Total/complications	
Allopathy	50	21(42%)	50	23(46%)	50	18(36%)	150	62(41.3)
Allopathy Plus	50	13(26%)	50	14(28%)	50	11(22%)	150	38(25.3)
Ayurved/Herbal	50	18(36%)	50	19(38%)	50	19(38%)	150	50(33.3 %)
Ayurveda/ herbal Plus	50	12(24%)	50	10(20%)	50	9(18%)	150	31(20.6)
Homeopathy	50	28(56%)	43	27(62.7%)	50	31(62%)	143	86(60.1)
Homeopathy Plus	50	24(48%)	40	23(57%)	50	23(46%)	140	60(42.8 %)
Anthropotherapeutic Treatment	150	29(19.3%)	142	22(15.5)	120	31(25.8%)	412	82(19.9 %)

It has been observed in a survey that in case of diabetes the treatment pattern like allopathy, ayurvada/herbal, or homeopathywhich hasbeen followed by diabetic peoples either in pure means or by combining other therapies like yoga, meditation, physical exercises, diabetic diet etc among North Indian populations ie. Brahmins, Kshatryas and Kayashas of Lucknow district, Uttar Pradesh. Accordingly the diabetic persons were sampled in seven sets ie. allopathy, allopathy plus, ayurved/herbal, ayurved/herbal plus, homeopathy, homeopathy plus and anthropotherapeutic treatment . It has been apparently noted that effectiveness of all the known three pure patterns is slightly lower than that of combined method of same treatment patterns as depicted in the table 4.

The survey reveals that the intervention level of anthropotherapeutic treatment pattern among diabetic patients is slightly more potentialrather than other treatment patterns prevailed in the north Indian caste groups (see table 4). This treatment pattern is highly effective among Kshatriya diabetic person than those of Brahmins and Kayasthas of Lucknow. The table also demonstrates that both the Allopathic and Ayurvedic treatment patterns are relatively more effective than the Homeopathic one. The study reveals that Homeopathic treatment method is the least efficient for the cure of diabetic patients. Enlightening fact is uncovered hereby in the anthropological survey that Yoga and meditation, physical exercise and healthy dietary intake have universally increased the efficacy of all treatment patterns given particularly to type 2 diabetes patients as exposedin cases of allopathic, ayurvedic/herbal, and homeopathic line of treatment.It has been noticed universally that diabetic complications are sharply minimized in all three patterns of treatment whenever yoga and meditation, increased physical activities and balanced dietary plan have been adopted by the ppatients. Nonetheless, anthropotherapeutic healing pattern has surpassed each one in view of the effective treatment of diabetic patients exhibited in the present analysis.

viii) Therapeutic Management

So, thetreatment of diabetes is a complex method which requires a multitude of interventions for successful disease management. Diabetic education and patient engagement in yoga, meditation and physical activities are vital.Umpierre et al (2011) suggest that patients have better results if they can manage their diet (carbohydrate and overall caloric restriction), exercise regularly (more than 150 minutes weekly), and independently monitor glucose. Lifelong treatment is often necessary to prevent unwanted complications. Ideally, glucose levels should be maintained at 90 to 130 mg/dL and HbA1c at less than 7%. While glucose control is decisive, excessively aggressive management may lead to hypoglycemia, which can have adverse or fatal outcomes (Umpierre et al. 2011).

Diabetes supervision concentrates on keeping blood sugar levels close to normal, without causing low blood sugar. This can usually be accomplished with dietary changes, exercise, weight loss, and use of appropriate medications like oral and intake of insulin if needed.

That is why learning about the disease and actively participating in the treatment is imperative, since complications are far less common and less severe in people who have well-managed blood sugar levels. So, the goal of treatment is an HbA1C level below 7%.(Qaseem et al. 2018). Attention is also paid to other health problems that may accelerate the negative effects of diabetes. These include smoking, high blood pressure, metabolic syndrome obesity, and lack of

regular exercise.(Toumpanakiset al.2018). Foot examination for patients living with diabetes should be done annually which includes sensation testing, foot biomechanics, vascular integrity and foot structure.

While Type 1Diabetes is a disease primarily due to the absence of insulin, insulin administration through daily injections is the stronghold of allopathic treatment. In Type 2Diabetes diet and exercise may be adequate treatments, especially in initial stage. Other therapies like yoga, ayurvedic and herbal may target insulin sensitivity or increase insulin secretion by the pancreas. The specific subclasses for allopathic drugs include biguanides (metformin), sulfonylureas, meglitinides, alpha-glucosidase inhibitors, thiazolidinediones, glucagonlike-peptide-1 agonist, dipeptidyl peptidase IV inhibitors (DPP-4), amylinomimetics, and sodium-glucose transporter-2 (SGLT-2) inhibitors.

In ethnic medicine i e. ayurvedic/herbal treatment there are several medicinal plants in India whose roots, shoots, leaves etc are effectively used to control blood sugar level in tribal and rural India. Increasing trend of using ayurvedic and herbal medicines is also noted in 21st century A.D.These are *neem, tulsi(holy basil), paneer doda, bael, gudmar, chirayata, jamun, cinnamon, giloy, vinaygar, methi, guduchi, gugalu, garlic, dhaniya, shilajeet, karela, kutaki, ginger, insulin, turmeric,triphala, amla, pterocarpusmasupium, fenugreek*etc. Pharmaceutical companies like Vaidyanath, Dabar, Patanjali, meghdoot,jeevaetc began to manufacture diabetic capsule, tablet/bati, powder, churn/husk, juceetcunder the supervisory controls of Ministry of Ayush, Govt. of India for diabetic patient to reduce the increased level of blood glucose. The results unfolds that such treatment effectively lowered HbAIc by 87%, sugar level by 73% .(https://gynoveda.com/products/ayurvedic-diabetes 2024 ;Gordon et al. 2019).

In allopathic treatment, metformin is the first line of the prescribed diabetic medications and works by lowering basal and postprandial plasma glucose. Insulin administration may also be necessary for Type 2Diabetes patients, especially those with inadequate glucose management in the advanced stages of the disease. In morbidly obese patients, bariatric surgery is a promising way to normalize glucose levels. It is recommended for individuals who have been unresponsive to other treatments and who have significant co-morbidities. Knowler and others (2002) suggested that the GLP-1 agonistsliraglutide and semaglutideshow a relationship with improved cardiovascular outcomes. The SGLT-2 inhibitors empagliflozin and canagliflozin have also shown to improve cardiovascular outcomes along with potential renoprotection as well as prevention for the development of heart failure (Knowler et al. 2002).

Regular screenings are necessary since microvascular complications are a feared impediment of diabetes. Regular diabetic retinal exams should be performed by qualified medical personnel to assess for diabetic retinopathy. Neurologic examination with monofilament testing can identify patients with neuropathy at risk for amputation. Clinicians can also recommend patients perform daily foot inspections to identify foot lesions that may go unnoticed due to neuropathy. Low-dose tricyclic antidepressants, duloxetine, anticonvulsants, topical capsaicin, and pain medications may be necessary to manage neuropathic pain in diabetes. Urine microalbumin testing can also reveal for early renal changes from diabetes with albuminuria greater than 30mg/g creatinine along with the estimated GFR. The anti proteinuric effect of the angiotensin-converting enzyme (ACE) inhibitors and the angiotensin receptor blockers (ARBs) makes them the preferred agents to delay the progression from micro albuminuria to macro albuminuria in patients with both Type 1 and Type 2 diabetes mellitus.

The FDA has also approved pregabalin and duloxetine for the treatment of diabetic peripheral neuropathy. Tricyclic antidepressants and anticonvulsants have also seen use in the management of the pain of diabetic neuropathy with variable success.

The ADA also recommends regular blood pressure screening for diabetics, with the goal being 130 mmHg systolic blood pressures and 85 mmHg diastolic blood pressures. (de Boer IH, Bangalore S, Benetos et al. 2017). Pharmacologic therapy for hypertensive diabetics typically involves angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, diuretics, beta-blockers, and/or calcium channel blockers. The ADA recommends lipid monitoring for diabetics with a goal of low-density lipoprotein cholesterol (LDL-C) being less than 100 mg/dL if no cardiovascular disease (CVD) and less than 70 mg/dl if atherosclerotic cardiovascular disease (ASCVD) is present. Statins are the first-line treatment for the management of dyslipidemia in diabetics. The ADA (2000) suggests that low dose aspirin may also be beneficial for diabetic patients who are at high risk for cardiovascular events; however, the role of aspirin in reducing cardiovascular events in patients with diabetes remains unclear.

One of the most common adverse effects of insulin is hypoglycemia. Gastrointestinal upset is the most common side effect of many of the T2DM medications. Metformin can lead to lactic acidosis and should be used with caution in patients with renal disease and discontinued if the estimated glomerular filtration rate (e-GFR) is under 30 mL/min. Sulfonylureas can lead to hypoglycemia and may promote cardiovascular death in patients with diabetes (Zeller et al 2010).

The prospects of Diabetes get significantly influenced by the extent of glucose management. Chronic hyperglycemia significantly increases the risk of complications. A study by the Diabetes Control and Complications Trial and the United Kingdom Prospective Diabetes established that individuals with Type 1 and Type 2Diabetes respectively had increased micro vascular complications with chronic hyperglycemia. Patients who can revert to normal glucose during the progression from pre-diabetes to frank Diabetes had a good prognosis and may be able to slow disease progression. (Albers et al 2010).

Thus anthrotherapeuticcare of diabetes mellitus needs holistic management which combines every possible step of ongoing current researches in each stream of medical sciences.

ix) Prevention and Patient Education

Anthropotherapeutic and biomedicinal guidelines propel out that all patients of diabetes mellitus, predominantly those taking insulin, should measure blood glucose concentrations periodically at home, especially when they have symptoms of hypoglycemia. This is done by pricking a finger, obtaining a drop of blood, and using an instrument called a glucometer to measure the blood glucose concentration. Using this technology, many patients become skilled at evaluating their diabetes and making appropriate adjustments in therapy on their own initiative.

Type 2 diabetes—which accounts for 85–90% of all cases worldwide—can often be prevented or delayed by maintaining a normal body weight, engaging in physical activity, and eating a healthy diet. Higher levels of physical activity (more than 90 minutes per day) reduce the risk of diabetes by 28%.(The Nutrition Source. Harvard T.H. Chan School of Public Health, 2012). Dietary changes known to be effective in helping to prevent diabetes include maintaining a diet rich in whole grain and fiber, and choosing good fats, such as the polyunsaturated fats found in nuts,

vegetable oils, and fish. Limiting sugary beverages and eating less red meat and other sources of saturated fat can also help prevent diabetes. Tobacco smoking is also associated with an increased risk of diabetes and its complications, so smoking cessation can be an important preventive measure as well.(Willi et al.2007).

The association between type 2 diabetes and the main adjustable risk factors like excess weight, unhealthy diet, lack of physical activities and tobacco useis analogous in all regions of the world. There is mounting evidence that the underlying determinants of diabetes are a reflection of the major forces which motivate social, economic and cultural change i.e. globalization, urbanization, population aging, and the general health policy milieu.(US National Institutes of Health. 2016).

Healthcare professionals should take an active and comprehensive approach to educate patients with Diabetes. It is a false notion to think that lifestyle changes for a limited time are appropriate to manage, but instead, lifelong daily routine changes are necessary to control their Diabetes adequately. A randomized, controlled trial identified that individualized education is more effective compared to group education in patients who had poorly controlled Diabetes. Often, non-clinician healthcare professionals e.g., diabetic educator, nurses, pharmacists have extensive training in Diabetes education and have more time for individualized education.

Weight loss can put off succession from pre-diabetes to diabetes type 2, reduce the risk of cardiovascular disease, or result in a partial remission in people with diabetes. No single dietary pattern is best for all people with diabetes. Healthy dietary patterns, such as the Mediterranean diet, low carbohydrate diet or DASH diet (Dietary Approach to Stop Hypertension), are often recommended, although evidence does not hold up one over the others (Evert et al. 2019*).* According to the ADA, "reducing overall carbohydrate intake for individuals with diabetes has demonstrated the good sign for improving glycemia", and for individuals with type 2 diabetes who cannot meet the glycemic targets or where reducing anti-glycemic medications is a priority, low and very low carbohydrates diets are a viable approach. For overweight people with type 2 diabetes, any diet that achieves weight loss is effective.(Emadianet al.2015).

x) Promoting Healthcare Team

Primary health care doctors and local healers are frequently the first to identify diabetes in their patients. Since Diabetes is a complex disease, it requires an inter-professional team approach to management. Nurse practitioners and physician assistants can be critical to ensuring proper patient follow-ups and monitoring the efficacy of treatments. Nutritionists and diabetes educators can also provide consultations to help educate patients on appropriate lifestyle modifications and at-home glucose management.

Since anthropotherapeutic healing ensures the total cure of the diabetic person, so it includes all superspecialised experts to properly address to the challenging issues of the diabetic complications. Hence, endocrinologists, ophthalmologists, neurologists, podiatrists, and nephrologists may also be part of the healthcare team to ensure that patients with diabetes have adequate screenings to prevent devastating microvascular complications. Endocrinologists may be consulted when patients have a complex presentation or are unresponsive to initial treatments. Of course, pharmacists play a crucial role in evaluating proper medication administration to prevent the emerging complications; they can ensure optimal dosing and recommend the most

efficient regimens to achieve glycemic control, and also educate the patient on the medications and disease process.(Sapra and Bhandari, 2023).

Sperl-Hillen et al. found that patients with suboptimally controlled diabetes had better glucose control outcomes when given individualized education compared to group education. These patients also had better psychosocial and behavioral outcomes. Consequentially this emphasizes the role of an interprofessional team approach, including clinicians, specialist healers, specialty trained diabetic nurses educators, and pharmacists who are conversing across disciplines to optimize patient-specific management leading to improved outcomes.(Sapra and Bhandari, 2023)

xi) Focus on the Healthy Diet Plan and regular Physical Exercise

Anthrotherapeutic healing focuses on the up-keeping healthy dietary behavior and regular physical activities. It includes yoga therapy and meditation. The diabetic patients are suggested to follow the diets designed to help them reach and maintain normal body weight, and they often are encouraged to exercise regularly, which enhances the movement of glucose into muscle cells and dull the rise in blood glucose that follows carbohydrate ingestion. Patients are promoted to follow a diet that is relatively low in fat and contains adequate amounts of protein. In practice about 30 percent of calories should come from fat, 20 percent from protein, and the remainder from carbohydrates, preferably from complex carbohydrates rather than simple sugars.

The total caloric content should be based on the patient's nutritional requirements for growth or for weight loss if the patient is obese. In overweight or obese patients with type 2 diabetes, caloric restriction for even just a few days may result in considerable improvement in hyperglycemia. In addition, weight loss, preferably combined with exercise, can lead to improved insulin sensitivity and even restoration of normal glucose metabolism.

Conclusion

Thus, its crystal clear that diabetes mellitus is one of the fastest growing health crisis of 21st century in India and world. Adults living with diabetes amplified more than tripled over the past 20 years. Its incidence India has rapidly risen from 7.1% to 8.9% in 2019in Indian peninsula too.As per Indian Council of Medical Research – India Diabetes (ICMR INDIAB) study published in 2023, the prevalent cases of diabetes are 10.1 crores which are 7.2% of the total Indian population. A bigger challenge before us is that over 3 in 4 adults with diabetes live in low- and middle-income countries as per data of global health supervisory agencies. Despite this naked fact, allopathic medicine single-handedly, neither could prevent nor can properly address this fast growing health crisis on one side and adda massive amount of side effects and complications to the patients on the other side.

Hence, there is an urgent need of holistic health care system i.e.anthropotherapeutic treatment pattern for the effective management of the diabetic cure.At this venture, Ministry of AYUSH of Indian Govt. is playing an optimistic initiative by promoting the pharmaceutical produce of traditional and alternative medicines in the country. Thus the results and discussion depicted on preceding pages exhibit that now allopathic health provider customized their treatment norms by including yoga, physical exercises, dietary pattern, life style changes etc. Such step taken by diabetologistshas increased the likelihood graph of treatment efficacy. Nevertheless, a healthcare team based on the holistic vision of anthropotherapeutic healing is the urgent need of the day in

India and worldwide too in view of not only halting the progression of the disease but also finding out holistic cure of the calamity of the mass.

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