Journal of Advances and Scholarly Researches in Allied Education
Vol. XII, Issue No. 23, October-2016, ISSN 2230-7540

Prevention and Management of Diabetes Complications

Bhagwant Singh*

Research Scholar

Abstract – Diabetes is a standout amongst the most imperative medical issues today influencing 15 million of individuals around the world. The commonness of Diabetes in the worldwide was evaluated to be around 4% out of 1995 and will ascend to 5.4% by the year 2025. The quantity of grown-ups with Diabetes on the planet wills ascend from 135 million of every 1995 to 300 million by the year 2025. Nature has given us a rich storage facility of home grown solutions for cure all aliments of humankind. India has immense and endless assets of medications of plants source. There has been resurgence in the utilization and interest for restorative plants. These plants are discovering use as pharmaceutical, nautraceuticals, restorative and sustenance supplements. Indeed, even conventional wellspring of medication they keep on playing a vital part. Plants have been wellspring of prescription from old circumstances for controlling glucose level. In this audit article, an endeavor has been made to assemble the detailed hypoglycemic plants as these medications are likewise portrayed in unani traditional writing for counteractive action and administration of diabetes mellitus and its complexities.

Keywords: Diabetes Mellitus; Complications; Prevention; Unani herbal medicine; Management

----------X----------

1. INTRODUCTION

Hyperglycemia coming about because of deformities in insulin emission, its affectability or both. Overall it influences more than 300 million individuals. India has today turned into the Diabetic capital of the world with more than 20 million diabetes and this number is yet excessively expanded, making it impossible to 57 million by the year 2025. Diabetes is positioned seventh among the main source of death and is viewed as third when its deadly difficulties are considered. For this, treatments created along the standards of regular drug are frequently convey the danger of antagonistic impacts and are regularly costly, particularly for the creating scene. Hence, treating diabetes mellitus with plant inferred mixes which are open effortlessly ((UKPDS, 1998. Boulton, et. al., 2005. Boulton, et. al, 2008). Reasons for diabetes mellitus Diabetes causes fluctuate contingent upon hereditary condition, family history, ethnicity, wellbeing and ecological elements. The reasons for diabetes fluctuate contingent upon the individual and the sort. For example; the reasons for sort 1 diabetes fluctuate impressively from the reasons for gestational diabetes. Likewise, the reasons for sort 2 diabetes are particular from the reasons for sort 1 diabetes. Sort 1 diabetes causes Type 1 diabetes is caused by the safe framework obliterating the cells in the pancreas that produces insulin. This causes diabetes by leaving the body without enough insulin to work typically. This is called an immune system response, or immune system cause. The accompanying triggers might be included: viral or bacterial disease, compound poisons inside sustenance, unidentified segment causing immune system response and hidden hereditary attitude may likewise be a sort 1 diabetes cause. Sort 2 diabetes causes Type 2 diabetes causes are normally multifactorial more than one diabetes cause is included. Regularly, the most overpowering variable is a family history of sort 2 diabetes. There are an assortment of hazard factors for sort 2 diabetes, any or all of which increment the odds of building up the condition. These include: nervousness, push, propel age, weight, stationary way of life, sporadic eating routine and so forth. Corpulence has been found to add to around 55% sort II diabetes and diminishing utilization of soaked fats. Diabetes is frequently at first oversaw by changing the eating regimen to point of confinement and control glucose consumption, and in result, blood glucose levels, is known to help sort 2 patients, particularly right on time throughout the condition's movement. Furthermore, weight reduction is prescribed and is frequently useful in patients experiencing sort 2 diabetes Complications Long-term confusions of diabetes incorporate retinopathy with potential loss of vision Diabetic Retinopathy is driving reason for visual deficiency in individuals with between 20-74 years old (Kitzmiller, et. al., 2008. Cheung, et. al., 2001. O'Connor, 2003). Perpetual hyperglycemia brings about different end organize organ harm and disappointment including the Heart, kidneys, eyes, nerves, veins. Diabetes related with cardiovascular complexities are accepted to be in charge of the high dreariness and mortality saw in

Diabetes (Eppens, et. al., 2006). There is expanded occurrence of atherosclerotic cardio-vascular maladies and cerebrovascular infections, Hypertension and anomaly of lipoprotein digestion are frequently found in individuals with Diabetes mellitus (Davidson, 2009). Diabetic Nephropathy prompting renal disappointment, fringe neuropathy with danger of foot ulcers, removal and Charcot joint and Autonomic neuropathy is causing gastro-intestinal, genitor urinary and cardiovascular manifestations and sexual brokenness (Ajit Auluck, 2007).

Counteractive action The most essential anticipation measure in patients with diabetes is the eating routine. Sufferers need to screen firmly every nourishment and each supper. There is a little push to watch count calories and to focus on everything eat, if contrasted and the way that will have the capacity to dodge a pack of entanglements that transform diabetes into an exceptionally hazardous condition. Diabetes inconveniences can be counteracted and even turned around. In a large portion of the cases the patients needs a considerable measure of will to acknowledge the progressions. The patient needs to take after strict eating regimen administration and deliberate way of life. In this manner treatment which would actuate the pancreas is additionally required.

2. REVIEW OF LITERATURE:

Environmental Factors:

In this type of diabetes, the rate of β-cell decimation is very factor, being fast in a few people (primarily newborn children and youngsters) and moderate in others (for the most part grown-ups). A few patients, especially youngsters and youths, may give ketoacidosis as the primary indication of the malady. Others have unassuming fasting hyperglycemia that can quickly change to extreme hyperglycemia and additionally ketoacidosis within the sight of infection or different anxiety. Still others, especially grown-ups, may hold leftover β-cell work adequate to forestall ketoacidosis for a long time; such people inevitably wind up plainly subject to insulin for survival and are in danger for ketoacidosis. At this last phase of the illness, there is next to zero insulin emission, as showed by low or imperceptible levels of plasma C-peptide. Invulnerable interceded diabetes generally happens in youth and immaturity, yet it can happen at any age, even in the eighth and ninth many years of life.

Idiopathic diabetes

A couple of sorts of Type 1 diabetes have no known etiologies. Some of these patients have never-ending insulinopenia and are slanted to ketoacidosis, yet have no affirmation of autoimmunity. But only a minority of patients with sort 1 diabetes fall into this characterization, of the people who do, most are of African or Asian parentage. Individuals with this sort of diabetes encounter the evil impacts of indirect ketoacidosis and show changing degrees of insulin deficiency between scenes. This sort of diabetes is solidly gained, needs immunological evidence for β-cell autoimmunity, and isn't HLA related. A level out essential for insulin substitution treatment in impacted patients may come and go.

Sort 2:

This kind of diabetes, which speaks to ~90– 95% of those with diabetes, already implied as non-insulin-subordinate diabetes, Type 2 diabetes, or adult starting diabetes, joins individuals who have insulin security and by and large have relative (instead of aggregate) insulin inadequacy in any occasion at to begin with, and every now and again all through their lifetime, these individuals needn't mess with insulin treatment to survive. There are in all likelihood an extensive variety of explanations behind this sort of diabetes. Notwithstanding the way that the specific etiologies are not known, insusceptible framework annihilation of β-cells does not occur, and patients don't have any of exchange purposes behind diabetes recorded.

Most patients with this kind of diabetes are powerful, and heaviness itself causes some level of insulin assurance. Patients who are not forceful by standard weight criteria may have an extended level of muscle versus fat passed on overwhelmingly in the stomach region. Despite having lower regularity of power as portrayed by weight record (BMI), Asian Indians tend to have more vital waist border and midriff to hip extents thusly having a more unmistakable level of central chunkiness. Afresh, Asian Indians have more total stomach and natural fat. For any given BMI and for any offered muscle to fat proportion they have extended insulin security. Moreover, they have cut down levels of the cautious adipokine, adiponectin and have extended levels of fat tissue metabolites. Focuses on neonates prescribed that Indian newborn children are considered more diminutive yet decently fatter stood out from Caucasian kids and are insinuated as "the thin fat Indian baby". A present report attested this finding and suggested that the "thin fat phenotype" in neonates proceeded in youth and could be an antecedent of the diabetogenic grown-up phenotype. These revelations prescribe that Asian Indians are more disposed to diabetes and related metabolic abnormalities.

The ailment happens more from time to time in women with prior GDM (Gestational Diabetes Mellitus) and in individuals with hypertension or dyslipidemia, and its repeat changes in different racial/ethnic subgroups. It is as often as possible associated with a strong genetic slant, more so than is the insusceptible framework kind of sort 1diabetes. Nevertheless, the genetic characteristics

of this sort of diabetes are flighty and not clearly defined.

A couple of examinations on transient Indians over the globe have exhibited that Asian Indians have an extended risk for making sort 2 diabetes and related metabolic varieties from the standard appeared differently in relation to other ethnic gatherings.

Regardless of the way that the right reasons are so far not clear, certain stand-out clinical and biochemical characteristics of this ethnic assembling all in all called as the "Asian Indian phenotype" is believed to be one of the principle contemplations adding to the extended slant towards diabetes Epidemiology of sort 2 diabetes: Indian scenario.

Debilitated insulin outflow is found reliably in sort 2 diabetic patients in each and every ethnic people. The β-cells can't read the earnestness of insulin security and disregard to alter their release of insulin to keep up common glucose protection. In these patients, the fasting plasma insulin obsession is common or extended and basal insulin release is raised. Gluco-destructiveness, lipo-harmful quality are among the gotten absconds that can incite blocked insulin release. Starting late, absence of or assurance from "incretins" have been captured in the pathogenesis of β-cell brokenness in sort - 2 diabetic patients.

Amylin generally called IAPP (islet amyloid polypeptide) has been trapped in powerful β-cells frustration in type– 2 diabetes mellitus. IAPP, which is packaged with insulin in secretary granules and co-radiated into the sinusoidal space, is the trailblazer for the amyloid stores that are as frequently as conceivable found in sort – 2 diabetics. Following its outflow, amylin assembles extracellularly in closeness to the β-cells and it has been recommended that amylin stores cause β-cell brokenness. However this theory isn't recognized, on account of frustration of inhibitory effect of amylin on insulin release when the peptide was infused in pharmacologic measurements in rats, rabbits and individuals.

The amount of β-cells inside the pancreas is a basic determinant of the measure of insulin that is radiated. Most yet not all examinations have displayed an unassuming reducing (20%-40%) in β-cells mass. Low birth weight is connected with the headway of IGT and sort - 2 diabetes in different peoples. Formative investigations in creatures and people have exhibited that poor sustenance hinder insulin discharge or lessen β-cell mass.

The cross sectional examinations and whole deal, inevitable longitudinal examinations have demonstrated hyper insulinemia to go before the start of sort - 2 diabetes in each and every ethnic masses with high recurrence of sort 2 diabetes Himsworth and Kerr in 1939 were the first to demonstrate that the tissue affectability to insulin is reduced in sort 2 diabetic patients.

De Fronzo et al using the more physiological euglycemic insulin cut strategy, have given the most persuading documentation that insulin assurance is trademark feature of lean, and furthermore that of heavy, sort 2 diabetic individuals. The joined effects of insulin and hyperglycemia to propel glucose exchange are liable to three immovably coupled instruments.

- Suppression of endogenous (in a general sense hepatic) age
- Stimulation of glucose take-up by the splanchnic tissue. (hepatic notwithstanding gastrointestinal)
- Stimulation of glucose take-up by periphery tissues, in a general sense muscle.

In sort 2 diabetes, the reason is a blend of assurance from insulin action and a lacking compensatory insulin secretary response. In the last order, a level of hyperglycemia sufficient to cause pathologic and pragmatic changes in various target tissues, yet without clinical reactions, may be accessible for a drawn out extend of time before diabetes is recognized. In the midst of this asymptomatic period, it is possible to show an oddity in sugar absorption by estimation of plasma glucose in the fasting state or after a test with an oral glucose stack.

Hazard factors for the improvement of sort 2 diabetes

- Age more noteworthy than 45 years
- Diabetes amid a past pregnancy
- Excess body weight (particularly around the abdomen)
- Family history of diabetes
- Given birth to a child measuring more than 9 pounds
- HDL cholesterol under 35 mg/dL
- High blood levels of triglycerides, a kind of fat atom (250 mg/dL or more)
- High circulatory strain (more noteworthy than or equivalent to 140/90 mmHg)
- Impaired glucose resilience

- Low movement level (practicing under 3 times each week)
- Metabolic disorder
- Polycystic ovarian disorder
- A condition called acanthosis nigricans, which causes dim, thickened skin around the neck or armpits

People from certain ethnic gatherings, including African Americans, Hispanic Americans, Asian Americans, and Native Americans, have a higher hazard for diabetes.

Other particular sorts of diabetes

Hereditary deformities of the β-cell.

A few types of diabetes are related with monogenetic abandons in β-cell work. These types of diabetes are ordinarily portrayed by beginning of hyperglycemia at an early age (by and large before age 25 years). They are alluded to as development beginning diabetes of the youthful (MODY) and are described by disabled insulin discharge with negligible or no deformities in insulin activity. They are acquired in an autosomal overwhelming example. Variations from the norm at six hereditary loci on various chromosomes have been distinguished to date. The most well-known shape is related with transformations on chromosome 12 out of a hepatic translation factor alluded to as hepatocyte atomic factor (HNF)- 1α. A moment shape is related with transformations in the glucokinase quality on chromosome 7p and brings about a blemished glucokinase particle. Glucokinase changes over glucose to glucose-6-phosphate, the digestion of which, thusly, invigorates insulin discharge by the β-cell. Consequently, glucokinase fills in as the "glucose sensor" for the β-cell. As a result of imperfections in the glucokinase quality, expanded plasma levels of glucose are important to inspire ordinary levels of insulin discharge. The less normal structures result from changes in other interpretation factors, including HNF-4α, HNF-1β, insulin promoter factor (IPF)- 1, and NeuroD1.

Point changes in mitochondrial DNA have been seen to be connected with diabetes and deafness. The most understood change occurs at position 3,243 in the tRNA leucine quality, provoking an A-to-G advance. A vague sore occurs in the MELAS issue (mitochondrial myopathy, encephalopathy, lactic acidosis, and stroke-like issue); regardless, diabetes isn't a bit of this issue, proposing unmistakable phenotypic verbalizations of this innate sore.

Innate varieties from the standard that result in the inability to change over proinsulin to insulin have been perceived in two or three families, and such qualities are procured in an autosomal overpowering case. The resultant glucose extremism is smooth. Correspondingly, the formation of mutant insulin particles with resultant incapacitated receptor confining has similarly been perceived in several families and is connected with an autosomal heritage and just to some degree crippled or even normal Glucose.

Hereditary imperfections in insulin activity

There are irregular reasons for diabetes that outcome from hereditarily decided variations from the norm of insulin activity. The metabolic anomalies related with changes of the insulin receptor may run from hyperinsulinemia and humble hyperglycemia to serious diabetes. A few people with these changes may have acanthosis nigricans. Ladies might be virilized and have extended, cystic ovaries. Before, this disorder was named sort an insulin protection. Leprechaunism and the Rabson-Mendenhall issue are two pediatric issues that have changes in the insulin receptor quality with coming about alterations in insulin receptor limit and remarkable insulin assurance. The past has trademark facial features and is for the most part deadly in beginning periods, while the latter is connected with varieties from the standard of teeth and nails and pineal organ hyperplasia.

Changes in the structure and limit of the insulin receptor can't be displayed in patients with insulin-safe lip atrophic diabetes. In this way, it is normal that the lesion(s) should live in the post receptor hail transduction pathways.

3. PREVENTION AND MANAGEMENT OF DIABETES COMPLICATIONS

A. Cardiovascular disease

CVD is the genuine explanation behind inauspiciousness and mortality for individuals with diabetes and the greatest supporter of the quick and indirect costs of diabetes. The typical conditions existing together with sort 2 diabetes (e.g., hypertension and dyslipidemia) are clear risk factors for CVD, and diabetes itself gives self-governing danger. Different examinations have exhibited the practicality of controlling individual cardiovascular danger factors in maintaining a strategic distance from or subsiding CVD in people with diabetes. Immense preferences are seen when various danger factors are had a tendency to generally Risk for coronary sickness and CVD all things considered can be assessed using multivariable peril factor approaches, and such a strategy may be alluring to endeavor in grown-up patients going before establishing preventive treatment.

1. Hypertension/pulse control

Hypertension is an average comorbidity of diabetes that impacts most of patients, with ordinariness endless supply of diabetes, age, heaviness, and ethnicity. Hypertension is an important danger factor for both CVD and micro vascular burdens. In sort 1 diabetes, hypertension is every now and again the eventual outcome of concealed nephropathy, while in sort 2 diabetes it normally exists together with other cardio metabolic chance factors.

PROPOSALS

Screening and conclusion

- Blood weight should be measured at every standard diabetes visit. Patients found to have systolic heartbeat ≥130 mmHg or diastolic circulatory strain ≥80 mmHg should have circulatory strain certified on an alternate day. Repeat systolic circulatory strain ≥130 mmHg or diastolic heartbeat ≥80 mmHg insists an assurance of hypertension.

Goals

- Patients with diabetes should be managed to a systolic circulatory strain <130 mmHg.
- Patients with diabetes should be managed to a diastolic circulatory strain <80 mmHg.

Treatment

- Patients with a systolic circulatory strain 130–139 mmHg or a diastolic heartbeat 80– 89 mmHg may be given lifestyle treatment alone for a most outrageous of 3 months, and after that if targets are not refined, patients should be treated with the development of pharmacological administrators.
- Patients with more outrageous hypertension (systolic circulatory strain ≥140 mmHg or diastolic heartbeat ≥90 mmHg) at conclusion or follow-up should get pharmacologic treatment despite lifestyle treatment.
- Lifestyle treatment for hypertension contains weight decrease if overweight, DASH-style dietary illustration including diminishing sodium and extending potassium affirmation, control of alcohol permit, and extended physical activity.
- Pharmacologic treatment for patients with diabetes and hypertension should be coordinated with a regimen that consolidates either an ACE inhibitor or an angiotensin II receptor blocker (ARB). In case one class isn't persevered through, the other should be substituted. On the off chance that important to fulfill circulatory strain concentrates on, a thiazide diuretic should be added to those with a normal glomerular filtration rate (GFR) (see underneath) ≥30 ml • min/1.73 m2 and a hover diuretic for those with a normal GFR <30 ml • min/1.73 m2.
- Multiple quiet treatment (no less than two experts at maximal measurements) is generally required to finish circulatory strain targets.
- If ACE inhibitors, ARBs, or diuretics are used, kidney limit and serum potassium levels should be eagerly watched.
- In pregnant patients with diabetes and unending hypertension, beat target destinations of 110– 129/65– 79 mmHg are prescribed in light of a honest to goodness worry for whole deal maternal prosperity and constraining incapacitated fetal improvement.

Master inhibitors and ARBs are contraindicated in the midst of pregnancy

Because of the unmistakable synergistic perils of hypertension and diabetes, the symptomatic cutoff for an examination of hypertension is carry down in people with diabetes (circulatory strain ≥130/80 mmHg) than in those without diabetes (circulatory strain ≥140/90 mmHg) in sort 2 patients with immense nephropathy, ARBs were superior to anything calcium channel blockers for diminishing heart disillusionment. Amid pregnancy in diabetic ladies with perpetual hypertension, target pulse objectives of 110– 129 mmHg systolic and 65– 79 mmHg diastolic are sensible, as they add to long haul maternal wellbeing. Lower pulse levels might be related with debilitated fetal development. Amid pregnancy, treatment with ACE inhibitors and ARBs is contraindicated, since they can cause fetal harm.

CONCLUSION:

Diabetes mellitus is a most regular endocrine issue, influencing more than 300 million individuals around the world. Treating diabetes mellitus with plant determined mixes which can available effortlessly. Plants have assumed a huge part in human wellbeing and life for thousand of year. Utilizing home grown or regular medications for the treatment of diabetes and its inconveniences has a long and broad history. All these home grown medications talked about in this audit display noteworthy clinical and pharmacological exercises. The intensity of natural medications is noteworthy and they have unimportant reactions. Supplementation of these

home grown medications for diabetic patients keeps the improvement of oxidative anxiety and its related difficulty.

REFERENCES:

Ajit Auluck (2007). Diabetes mellitus: an emerging risk factor for oral cancer? Debate and opinion. JCDA. ; 73(6): pp. 501-502.

American Diabetes Association consensus on self monitoring of blood glucose. Diabetes care 1987; 10: pp. 95-9.

Ana Carolina U., Vasconcelos, Maria Sueli M. Soares, Paulo C. Almeida and Teresa C. Soares (2010). Comparative study of the concentration of salivary and blood glucose in type 2 diabetic patients. Journal of Oral Science; 52(2): pp. 293-298. (No Title)

Boulton A. J., Armstrong D. G., Albert S. F., Frykberg R. G., Hellman R., Kirkman M. S., Lavery L. A., Lemaster J. W., Mills J. L. Sr, Mueller M. J., Sheehan P., Wukich D. K. (2008). American Diabetes Association, American Association of Clinical Endocrinologists. Comprehensive foot examination and risk assessment: a report of the task force of the foot care interest group of the American Diabetes Association, with endorsement by the American Association of Clinical Endocrinologists. Diabetes Care; 31: pp. 1679–685.

Boulton A.J., Vinik A.I., Arezzo J.C., Bril V., Feldman E.L., Freeman R., Malik R.A., Maser R.E., Sosenko J.M., Ziegler D., (2005). American Diabetes Association. Diabetic neuropathies:a statement by the American Diabetes Association. Diabetes Care 2005;28: pp. 956–962.

C. O. Reuterving, G. Reuterving, E. Hagg, and T. Ericson (1987). Salivary flow rate and salivary glucose concentration in patients with diabetes mellitus influence of severity of diabetes. Diab`ete et M´etabolisme; 13(4): pp. 457–462.

Cheung B. M., Ong K. L., Cherny S. S., Sham P. C., Tso A. W., Lam K. S. (2009). Diabetes prevalence and therapeutic target achievement in the United States, 1999 to 2006. Am J Med 2009;122: pp. 443–453.

Clark C. M., Jr, Snyder J. W., Meek R. L., Stutz L. M., Parkin C. G. (2001). A systematic approach to risk tratification and intervention within a managed care environment improves diabetes outcomes and patient satisfaction. Diabetes Care 2001; 24: pp. 1079–1086.

Daneman D., Siminera L. (1985). The role of self monitoring of blood glucose in the routine management of children with insulin dependent diabetes mellitus. Diabetes care; 8: pp. 1-4.

David B. Ferguson (1999). Text book of Oral Bioscience, 1st edition, Churchill Livingstone. An Imprint of Harcout Publishers Limited. publication. Printed in China.

Davidson M. B. (2009). How our current medical care system fails people with diabetes:lack of timely, appropriate clinical decisions. Diabetes Care 2009; 32: pp. 370–372.

Eduardo Jose Calderia, Progresso Jose Garcia, Elaine Minatel, Jose Angelo Cailli, Valeria Helena Alves Cagnon (2004). Braz. J. Morphol. Sci; 21(4): pp. 197-205.

Eppens M. C., Craig M. E., Cusumano J, Hing S., Chan A. K., Howard N. J., Silink M., Donaghue K. C. (2006). Prevalence of diabetes complications in adolescents with type 2 compared with type 1 diabetes. Diabetes Care; 29: pp. 1300–1306.

Fushini H. (1980). The effect of parabiosis on serum and kidney glucosidase activities in spontaneous diabetic mice. Diabetologica; 19(50): pp. 50-53.

Joseph L. Evans, Ira D. Goldfine, Betty A. Maddux and Gerold M. Grodsky (2003). Are oxidative stress-Activated signaling Pathways mediators of insulin resistance and B-cell dysfunction?: Diabetes 2003; 52.

K. K. Mehrotra, T. N. Chawla, and A. Kumar (1968). Correlation of salivary sugar with blood sugar. Journal of the Indian Dental Association; 40(10): pp. 265–269.

Kitzmiller J. L., Block J. M., Brown F. M., Catalano P. M., Conway D. L., Coustan D. R., Gunderson E. P., Herman W. H., Hoffman L. D., Inturrisi M., Jovanovic L. B., Kjos S. I., Knopp R. H., Montoro M. N., Ogata E. S., Paramsothy P., Reader D. M., Rosenn B. M., Thomas A. M., Kirkman M. S. (2008). Managing preexisting diabetes for pregnancy: summary of evidence and consensus recommendations for care. Diabetes Care; 31: pp. 1060–1079.

O'Connor P. J. (2003). Electronic medical records and diabetes care improvement: are we waiting for Godot? Diabetes Care; 26: pp. 942–943.

P. Marchetti, M. Tognarelli, R. Giannarelli (1989). Decreased salivary glucose secretory rate: usefulness for detection of diabetic patients with autonomic neuropathy. Diabetes Research and Clinical Practice; 7(3): pp. 181–186.

Pohl S. l., Gonder-Fredrick L. A. (1985). Self measurement of blood glucose concentrations. Clinical significance of patient generated measurements. Diabetic care; 8: pp. 617-19. http://www.mydr.com.au/tests-investigations/diabetes-and-urine-glucose-monitoring.

Proteomic Identification of Salivary Biomarkers of Type-2 Diabetes, Paturi V. Rao, Ashok P. Reddy, Xinfang Lu, Surendra Dasari, Adiraju Krishnaprasad, Evan Biggs, Charles T. Roberts, Jr. and Srinivasa R. Nagalla, J. (2009). Proteome Res., 2009; *8*(1): pp. 239–245.

Radha V., Vimaleswaran K. S., Babu H. N., Abate N., Chandalia M., Satija P., et. al. (2006). Role of genetic polymorphism peroxisome proliferator-activated receptor-gamma2 Pro12Ala on ethnic susceptibility to diabetes in South-Asian and Caucasian subjects: Evidence for heterogeneity. Diabetes Care; 29: pp. 1046-51.

Ramachandran A., Snehalatha C., Kapur A., Vijay V., Mohan V., Das A. K. et. al. (2001). Diabetes epidemiology study group in Indian (DESI). High prevalence of diabetes and impaired glucose tolerance in India. National Urban Diabetes Survey. Diabetologia; 44: pp. 2094-101.

Raz I., Wilson P. W., Strojek K., Kowalska I., Bozikov V., Gitt A. K., Jermendy G., Campaigne S. J. (2009). Effects of prandial versus fasting glycemia on cardiovascular outcomes in type 2 diabetes: the HEART2D trial. Diabetes Care; 32: pp. 381–386.

Seema Hallikerimath, Gaurav Sapra, Alka Kale, P. R. Malur (2010). Cytomorphometric analysis and assessment of Periodic Acid Schiff positivity of Exfoliated cells from apparently normal buccal mucosa of type 2 diabetic patients. Acta Cytologica; 55: pp. 197-202.

Siliva Chiappin, Giorgia Antonelli, Rasalba Gatti, Elio F. De Palo (2007). Saliva specimen : A new laboratory tool for diagnostic and basic investigation. Clinica Chimica Acto; 383(12): pp. 30-40.

The diabetes control and complications trial research group. Lifetime benefits and costs of intensive therapy as practiced in the Diabetes Control and Complication Trail JAMA 1996; 276: pp. 1409-15.

The diagnostic applications of saliva - A review. Crit Rev Oral Biol Med 2002; 13(12): pp. 197-212

UK prospective Diabetes Study (UKPDS) (1998). Group: Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes (UKPDS 34): Lancet 1998; 352: pp. 854–865.

Corresponding Author

Bhagwant Singh*

Research Scholar

E-Mail – unibhagwant@rediffmail.com