A review of diabetes mellitus

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Diabetes mellitus (DM) is a chronic and potentially disabling disease. It is a major and growing threat to global public health. The prevalence of diabetes and its adverse health effects have risen more rapidly in India and Pakistan. In Pakistan, majority of people live on or below the poverty line and having lack of access to healthcare services, lack of national welfare schemes and provision of health insurance for the poor population. In this article, different types of diabetes, risk factors and associated complication have been studied.

Key words: Diabetes mellitus, risk factors, hyperuricemia, gout, global public health.

INTRODUCTION

Diabetes mellitus (DM) is a chronic and potentially disabling disease. It is a major and growing threat to global public health. The biggest impact of the disease is on adults of working age; particularly in developing countries. The prevalence of diabetes and its adverse health effects have risen more rapidly in South Asia than in any other region of the world (Ghaﬀar et al., 2004). Diabetes mellitus is a serious public health concern all over the world. In Pakistan, diabetes is on rise and if proper intervention and preventive strategies were not adopted the epidemic of diabetes will prove fatal. As we are in the middle of a global epidemic of this disease and projected increase in the prevalence of diabetes over the next two decades emphasizes the importance of implementing primary prevention, early detection and imparting educational preventive program (Amos et al., 1997). The preventive programs targeted towards general population showed greater benefits rather than targeting only high risk and diseased population (American Diabetic Association, 2000). Different studies have proved modifiable risk factors of type II diabetes includes; obesity and physical inactivity (Tuomilehto and Wolf, 1987; King and Dowd, 1990; Hamman, 1992; Zimmet, 1988; Stern, 1991; Ohlson et al., 1988; Manson et al., 1991). If we could detect and prevent these risk factors earlier, the onset of disease can be delayed and prevented. Knowledge about the disease plays a vital role in future development of disease and its early prevention and detection. Research studies have shown that wherever massive education regarding diabetes mellitus is provided to general population, it resulted in significant increase in knowledge about the disease. Other factors, such as obesity, which is characterized by a high body mass index (BMI); advanced age and family history of diabetes, are also associated with the higher incidence of diabetes in the HCV-infected population (Kruzynska et al., 1991; Monto et al., Petit et al., 2001). Diabetes is a slow killer with no known curable treatments. However, its complications can be reduced through proper awareness and timely treatment.

Three major complications are related to blindness, kidney damage and heart attack. It is important to keep the blood glucose levels of patients under strict control for avoiding the complications. One of the difficulties with tight control of glucose levels in the blood is that such attempts may lead to hypoglycemia that creates much severe complications than an increased level of blood glucose. Researchers now look for alternative methods for diabetes treatment. The goal of this paper is to give a general idea of the current status of diabetes research. The author believes that diabetes is one of the highly demanding research topics of the new century and wants
to encourage new researchers to take up the challenges. Type 1 diabetes mellitus has wide geographic variation in incidence and prevalence (Silink, 2002). Annual incidence varies from 0.61 cases per 100,000 population in China, to 41.4 cases per 100,000 population in Finland. Substantial variations are observed between nearby countries with differing lifestyles, such as Estonia and Finland, and between genetically similar populations, such as those in Iceland and Norway. Even more striking are the differences in incidence between mainland Italy (8.4 cases per 100,000 population) and the Island of Sardinia (36.9 cases per 100,000 population). These variations strongly support the importance of environmental factors in the development of type 1 diabetes mellitus. Most countries report that incidence rates have at least doubled or more in the last 20 years. Incidence appears to increase with distance from the equator (Silink 2002, Soltesz et al., 2007). Several studies found that coffee consumption is inversely associated with the risk of type 2 diabetes (Van and Feskens, 2002, Van and Hu, 2005; Tuomilehto et al., 2004; Salazar et al., 2004).

**TYPES**

**Prediabetes**

Prediabetes is a condition in which blood sugar levels are too high to be considered normal but not high enough to be labeled diabetes. People have prediabetes if their fasting blood sugar level is between 101 and 126 mg/dL or if their blood sugar level 2 h after a glucose tolerance test is between 140 and 200 mg/dL. Identifying people with prediabetes is important because the condition carries a higher risk for future diabetes as well as heart disease. Decreasing body weight by 5 to 10% through diet and exercise can significantly reduce the risk of developing future diabetes (Thong et al., 2002).

**Type 1 diabetes mellitus**

This results from the body's failure to produce insulin and presently requires the person to inject insulin (Also referred to as insulin-dependent diabetes mellitus, IDDM for short, and juvenile diabetes).

**Type 2 diabetes mellitus**

This results from insulin resistance, a condition in which cells fail to use insulin properly, sometimes combined with an absolute insulin deficiency. Formerly referred to as non-insulin-dependent diabetes mellitus, NIDDM for short, and adult-onset diabetes (Greer et al., 2001).

**Gestational diabetes**

Gestational diabetes (GDM) is defined as a carbohydrate intolerance that normally develops during the 24th through the 32nd week of pregnancy. This condition affects 2 to 5% of all pregnant women and is the most common disease affecting pregnancy (Harris, 1995.).

**RESEARCH STUDY**

**Hyperuricemia in type 2 diabetes mellitus**

A study was done to evaluate the relationship between hyperuricemia and diabetes mellitus. It has been previously suggested that elevated serum uric acid is a feature of hyperinsulinemia and impaired glucose tolerance. This study was done to evaluate the relation between uric acid and metabolic parameters, creatinine clearance and albumin excretion rate in a cohort of type 2 diabetic patients. In type 2 diabetes, hyperuricemia seems to be associated with the insulin-resistant syndrome and with early onset or increased progression to overt nephropathy, while hypouricemia is associated with worse metabolic control, hyperfiltration and a late onset or decreased progression to overt nephropathy (Bo, 2001).

**Gout and the risk of type 2 diabetes**

Gout is strongly associated with obesity, hypertension, hyperlipidemia and diabetes. Because of genetic factors, gout tends to run in some families. A study was done to evaluate the independent relation between a history of gout and the future risk of type 2 diabetes among men with a high cardiovascular risk profile. As a conclusion, it was found that men with gout are at a higher future risk of type 2 diabetes independent of other known risk factors. These data expand on well-established, cross-sectional associations between hyperuricaemia, gout and the metabolic syndrome, and extend the link to the future risk of type 2 diabetes (Choi and Krishnan, 2008).

**DISCUSSION**

Diabetes is a chronic condition with numerous potential complications that considerably affect patients, healthcare providers, payers, and society. Only through the combined efforts of all these stakeholders can desired outcomes be achieved in patients with diabetes. Furthermore, local health and educational systems should focus more on the preventive aspects of the disease. Physical activity and more nutritious eating habits should be encouraged throughout childhood and adolescence in order to reduce the frequency of obesity and to
promote healthier lifestyles early and throughout adulthood. Areteaus and Jalinoos (Galen) were followers of Buqrat. Areteaus (81 to 138 AD) provided the first accurate description of the symptoms of diabetes. He was the first who use the term “diabetes” in connection with this ailment, which means “to run through” or “Siphon”. He described the disease as “diabetes is a dreadful affliction, not very frequently among men, being a melting down of the flesh and limbs into urine” (Pickup and William, 1997; Leopald, 1930; Henschen, 1969; Areteaus, 1856; 1856). Diabetes mellitus (DM) is a chronic metabolic disorder caused by an absolute or relative deficiency of insulin, an anabolic hormone. Insulin is produced by the beta cells of the islets of Langerhans located in the pancreas, and the absence, destruction, or other loss of these cells results in type 1 diabetes (insulin-dependent diabetes mellitus [IDDM]). Most children with diabetes have type 1 diabetes mellitus (T1DM) and a lifetime dependence on exogenous insulin. The metabolic syndrome is thought of as a precursor to type 2 diabetes. It is poorly defined and represents a heterogeneous collection of various propensities to diabetes. It has been suggested that lifestyle-intervention and treating metabolic manifestations of this pre-diabetic state can reduce the chance of progression to frank diabetes and the risk of complications (Hu et al., 2006; Tuomilehto, 2005; Ashcroft, 2006). Cardiovascular disease (CVD) is the major cause of morbidity and mortality in the diabetic population causing up to 80% of deaths in these patients. Diabetes mellitus is an independent risk factor for cardiovascular disease mortality, increasing this risk by 1.5 to 4.5 fold (Unwin et al., 2002; Wild et al., 2004). The prevalence of diabetes worldwide is estimated to increase to 4.4% of the population by the year 2030 (366 million individuals) from 2.8% in 2000 (171 million individuals). Today researchers are working on an insulin patch and inhaled insulin, genetic engineering is being used to manipulate cells so they secrete insulin. A sensor-computer-pump system that mimics the insulin response of the normal pancreas they secrete insulin. A sensor-computer-pump system is being developed to function as an “artificial pancreas”. Apart from these, various researches are still going on, to explore new aspects of diabetes and its management.

REFERENCES