Chapter-I

Introduction

1  INTRODUCTION:

1.1  Introduction to diabetes:

Diabetes mellitus is a group of metabolic disorders characterized by hyperglycemia. These metabolic disorders include alterations in the carbohydrate, fat and protein metabolisms associated with absolute or relative deficiencies in insulin secretion and / or insulin action. Insulin is the hormone produced in the β-cells of pancreas which enables the cells to absorb glucose from the blood and also helps in the utilization of the glucose in the cells by glycolysis, tricarboxylic acid cycle, hexose monophosphate shunt, glycogenesis etc. In diabetes body fails to produce insulin and excess glucose accumulates in the blood instead of being utilized or stored. The characteristic symptoms of diabetes are polyuria, polydipsia, polyphagia, pruritus and unexpected weight loss etc (ADA, 2007).

The World Health Organization (WHO) classification of diabetes and allied categories of glucose intolerance includes a number of clinical classes and two statistical risk classes. Among the different clinical classes, Type I (insulin dependent diabetes mellitus, IDDM) or Juvenile onset diabetes mellitus and Type II (non-insulin dependent diabetes mellitus, NIDDM) are the main groups. The other clinical classes include malnutrition related diabetes, gestational diabetes and impaired glucose tolerance. Statistical risk classes include a) previous abnormality of glucose tolerance and b) potential abnormality of glucose tolerance (Cohen and Goedert, 2004; Kim et al., 2008).
1.2 Prevalence of diabetes:

Diabetes is a major health problem, affecting approximately 150 million people worldwide and its incidence rate is expected to double during the next 20 years (Cohen and Goedert, 2004). The global prevalence of DM for all age groups was estimated to be 4.2% in 2000 and is projected to rise to 5.4% in 2025. The prevalence rates for type 2 diabetes in India are still increasing sharply with the number of sufferers predicted to rise from 19.4 million in 1995 to 57.2 million in 2025 (Wild et al., 2004) (Table 1, pg. 35). The incidence of IDDM is high in North European countries such as Finland (boys 36.9 and girls 31.6 per 100,000 per year), Sweden (24.2/22), Norway (23.3/20.7). Among the other racial groups such as blacks, native Americans and Asians, the disease is less common, whereas NIDDM is more prevalent in many parts of Asia and Pacific and in certain ethnic groups like Pima Indians, Norwegians, Mexicans and Americans (Fig. 1 and 2 pg. 37,38). Outside Europe the incidence of IDDM is less (about 6 per 100,000) among nonwhites compared to whites (about 29 per 100,000) (Wild et al., 2004; Kim et al., 2008). The IDDM epidemiology from many areas and populations in Asia, Africa and America are yet to be described. The tendency of clustering of IDDM within families was demonstrated. The risk of developing the disease by the siblings and children of IDDM patients is 5-10% compared with about 0.5% in general population. Reported concordance rates of IDDM in identical (monozygotic) twin pairs range between 25 and 60%. Though previously it had been found that boys have a slightly higher risk
of IDDM than girls, now it is accepted that both the genders carry similar risks (Ramachandran et al., 2001).

IDDM is less prevalent compared to NIDDM which constitutes about 95% of the diabetic population and there is a lack of data on the prevalence of IDDM in India. A survey made by Diabetes Research Centre, Chennai, India, has shown that the prevalence of IDDM in children below 15 years is 0.26 per 1000. The prevalence is comparable to the values reported from several other countries (Kim et al., 2008).

According to WHO Adhoc Diabetes Reporting Group from 75 communities in 32 countries, prevalence of diabetes and impaired glucose tolerance in adults (given in Table 2 pg.no 36) is higher in developed countries than in developing countries in 1995 and will remain so in 2025 (Lan et al., 1996) (Fig. 1 and 2 pg.no 37,38). However, the proportional increase will be greater in the developing countries. In developed countries, the increase in prevalence will be 27% (2025) from 6 to 7.6% (1995). In developing countries, the increase will be 48% (2025) from 3.3 to 4.9% (1995).

Using the data from demographic characteristics of each country it is estimated the figure to be approximately 135 million in 1995. By the end of 2000 it will rise to 175 million and by 2025 it will be 300 million, with the most cases being in India, China and USA in that order. The major part of this increase will occur in developing countries. There will be 42% increase from 51 to 72 million, in the developed countries and a 170% increase from 84 to 228 million, in the developing countries. By the end of
Chapter-I

Introduction

Year 2025, >75% of diabetics will reside in developing countries, as compared with 62% in 1995. Throughout the world, in 1995, there were more women than men with diabetes (73 vs. 62 million). The female excess is pronounced in the developed countries (31 vs. 20 million), but in developing countries, there are equal number of men and women with diabetes (42 million in each case) (ADA, 2007).

In India the prevalence of NIDDM was considered to be low till 1970 and during the year 1975, the first National Diabetes Survey found the familiar rural to urban increase was 1.5-2.1% above the age of 15 years (Kolterman et al., 1996). Results of major glucose challenge surveys in late 1980s undertaken by the Indian Medical Research Council, using the norms of World Health Organization across many locations in India, have shown much higher levels than those in 1975 (Engelgau et al., 1995). Epidemiological studies in India have shown high prevalence of diabetes affecting 5% of the population (Ramachandra et al., 2001). According to King et al (2001) in India the prevalence of diabetes in 1995 was 3.8% and this will raise to 4.0% in 2000 and 6% by the year 2025. And in the years 1995 and 2025 the number of diabetics is 19.4 million and 57.2 million respectively placing India in the 1st position (Table 1 pg.no 35). The incidence of diabetes is more in urban compared to rural as indicated by Ramachandran et al (2001). It was also significant to note that despite a striking urban rural difference in the prevalence of diabetes, the prevalence of impaired glucose tolerance was similar in urban and rural areas. The number of male diabetics is comparatively more than female diabetics in India.