Worldwide burden of diabetes

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INTRODUCTION

The Lancet recently published a “superhuman” series of articles describing the Global Burden of Disease 2010 (GBD). Covering all causes of morbidity and mortality, all ages of groups and 197 countries, this landmark epidemiological treatise compares the global burden of disease in 2010 with that prevailing in 1990. This brief communication highlights the global burden of diabetes, with an emphasis on South Asia, using statistics from the GBD reports. These figures provide a complementary picture to that obtained from statistics of prevalence of diabetes, as published by the International Diabetes Federation (IDF). While the IDF data does emphasize the importance of diabetes as a global public health problem, it does not place in perspective the ranking of diabetes as compared to other diseases and illnesses.

MORTALITY

The GBD describes as 13.5% increase in all-cause mortality from 1990-2010 (4,65,11,200-5,27,69,700 deaths).

This increase is fuelled by steep rise in deaths due to noncommunicable disease (NCD). The globe has experienced a 30.0% increase in mortality due to NCD, from 2,65,60,300 deaths in 1990 to 3,45,39,900 in 2010. Diabetes mellitus (DM) is the biggest endocrine driver for GBD. It directly led to 12,81,300 deaths in 2010, a 92.7% rise over the 1990 figure of 6,65,000 for lost lives. This percentage rise is one of the steepest for any disease, with the notable exceptions of Human Immuno Deficiency virus (HIV), Alzheimer's disease, Parkinson’s disease, atrial arrhythmias, and peripheral vascular disease. While diabetes does not account for all NCD mortality, poorly controlled DM is certainly a strong contributor to deaths from other causes such as ischemic heart disease, cerebrovascular disease and chronic kidney disease (CKD).

CKD due to DM which caused 91,900 deaths in 1990, caused 1,78,300 mortalities in 2010 as 94.1% change. Other diseases closely linked with diabetes also reported high rises; 34.9% for ischemic disease (IHD) and 26.0% for cerebrovascular disease.

Diabetes, ranked fifteenth in the global list of causes of death in 1990, has risen to ninth position in 2010 (twelfth in men, sixth in women). CKD has jumped from twenty seventh to eighteenth rank over two decades, while IHD and stroke have maintained their top two slots. In South Asia, diabetes is the tenth most important cause of death (eleventh in men, eight in women).
Sequelae

GBD also measures the sequel of disease. Uncomplicated DM affects 3.30% of all individuals, with no gender variation. The prevalence of diabetes in 2010 was estimated to be 22,75,88,000, a bit less than the figure published by the IDF.[6] Diabetic neuropathy is present in 1.91% of all people (1.83% men. 2.00% of women) (4). Thus, diabetes affects the lives of people it affects in many ways.

Disability: Years of life lost

While mortality statistics paint an overall picture of the burden of disease, disability indicators are equally important. Years of life lost (YLL) years, of life lived with disability (YLD), and disability adjusted life years (DALY) are convenient methods of assessing disability due to various conditions, DALY’s are computed by taking sum of YLL and YLD.

Based on the YLL yardstick diabetes has risen from twenty-seventh to nineteenth place in the list of conditions causing maximum disability. During the same time frame (1990 to 2010), IHD has climbed from fourth to first step, stroke from fifth to third rank, and CKD from thirty-second to twenty-fourth place.[3]

In South Asia, diabetes comes in at nineteenth position in contribution to years of time lost. However diabetes is the second highest driver of YLL in Oceania and the eight highest in neighboring South Asia, IHD and cerebrovascular disease rank fourth and ninth in the list of causes of YLL, while CKD ranks twenty-fifth. A major dissonance is seen as compared to CKD ranks in South Asia, where this condition has fourteenth position. It must be noted here that diabetes is the commonest cause of YLL.

Among the causes of YLL, in males, diabetes finds a place at twenty-second rank for the globe, and eighteenth rank for South Asia. In the corresponding table for women, the positions are sixteenth and sixteenth.

As noticed for mortality, the relative importance of diabetes rises to fifth to seventh rank in the age groups above 55 years, for both genders, globally as well as in South Asia.[3]

Disability: Years lived with Disability

Another measure of disability burden is the number of years lived with disability. This figure has gone up for diabetes, by 67.2%, from 12 412 (per 100 000) in 1990 to 20 758 in 2010. Uncomplicated DM diabetic foot, and diabetic neuropathy have risen by 54.2%, 47.1% and 62.6% respectively. The most disturbing trends are noted for amputation due to DM (a 130.9% increase) and vision loss due to DM (a rise of 368.6%). A rise of 61.5% has been observed in chronic kidney disease due to DM as well.

Because of this jump, diabetes has risen in relative causation of disability, from tenth to ninth rank worldwide. To put this statistic in perspective, ischemic heart disease has gone up from twenty-fourth to twenty-first position as a cause of disability, measured by YLD, during the 1990-2010 period. In men, diabetes is at ranked ninth, whereas in women it takes the tenth place.

In South Asia, DM is the eleventh most important disease causing disability in individual (ranked 13 in men and 9 in women). IHD (rank 31), cerebrovascular disease (rank 61) and chronic kidney disease (rank 63) also contribute to disability in South Asia though at a relatively lower level. As observed for mortality and YLL, the YLD tables see a jump in the positioning of diabetic in older age groups (above 50 years), reaching fourth rank for some cohorts.[3]

Disability: Disability adjusted life years

Disability adjusted life years (DALYs) are computed as a sum of YLL and YLD. Thus they represent a more comprehensive marker of disability due to any disease. Diabetes is the fourteenth largest cause of DALYs worldwide, and the sixteenth highest in South Asia. South Asian men report a fifteenth and eighteenth position for diabetes-caused DALYs respectively, while their women peers experience diabetes to be the twelfth and eighteenth most important cause DALY. Once again, the relative importance of diabetes goes up after 55 years of age.[3,5]

Risk factors

Disease is preceded by risk factors. The major risk factors which lead to deaths and DALYs include aspects related directly or indirectly to DM.

High blood pressure is the most important risk factor for death in 2010 (up from fourth position in 1990), while high body mass index (BMI), high fasting plasma glucose (FPG), and high total cholesterol are at sixth, seventh and fifteenth ranks (as compared to tenth, ninth and fourteenth positions in 1990 respectively).[3]
Detailed analysis of FPG as a risk factor reveals that it is the sixth biggest risk factor across the world, and in South Asia, for both genders, FPG is the seventh main factor for men, both at a global level, and in South Asia. It is the eight and fourth most important factor for women globally and in South Asia respectively.

**CONCLUSION**

That diabetes is a pandemic of major public health importance cannot be disputed. The GBD data highlight this fact in multiple ways. Both directly and indirectly, DM and its complications or comorbid conditions figure high in the list of risk factors, and causes of death. Mere knowledge of these figures however, is not enough. We need to minimize the negative impact of diabetes in human health through early recognition, diagnosis and management of risk factors as well as of disease. We also need to realize that sustained intervention, at both an individual and public health level, will be necessary to achieve this.

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