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DIABETES: A LONG WAY TO GO IN INDIA

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ABSTRACT

Diabetes is a common, chronic, and costly disease that is threatening the health of generations for people in India and around the world. India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the "Diabetes capital of the world". India as the looming diabetic capital of the world, with number of patients affected by the disease expected to increase from three to 60 million by 2025 is reported by WHO. Support for biomedical research efforts that can lead to prevention, treatment, and possibly even cure for diabetes is an integral part of Federal efforts to improve public health and reduce the cost of health care in the Nation. India may be the world capital of the silent killer disease diabetes but many people in the country continue to silently suffer the disease without actually knowing it. Some 75% of the 415 million people with diabetes worldwide come from middle-income countries. Incidentally, India ranks second only to China, home to 92.3 million diabetics. In India due to the lack of information and knowledge about diabetes it is unable to deal with a situation or with life so that a numbers of diabetes education are quietly needed both in urban and rural India. The following review highlights how diabetes has expanded throughout India with its control, awareness & prevention.

Keywords: *Diabetes in India, Epidemic, Indian Diabetic Risk Score.*

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INTRODUCTION

Diabetes in India has a long history since ancient time. It has been mentioned that Lord Shiva has dictated a formulation for the treatment of *prameha* to his son Lord Ganesha. Diabetes can strike anyone, from any walk of life. Diabetes is a number of diseases that involve problems with the hormone insulin. Normally, the pancreas (an organ behind the stomach) releases insulin to help your body store and use the sugar and fat from the food you eat. Diabetes can occur when the pancreas produces very little or no insulin, or when the body does not respond appropriately to insulin. As yet, there is no cure. People with diabetes need to manage their disease to stay healthy. It is a complex set of metabolic disorders characterized by chronic hyperglycaemia and disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both. Sometimes people call diabetes "a touch of sugar" or "borderline diabetes." These terms suggest that someone doesn't really have diabetes or has a less serious case, but every case of diabetes is serious. The most common types of diabetes are type 1, type 2, and gestational diabetes.

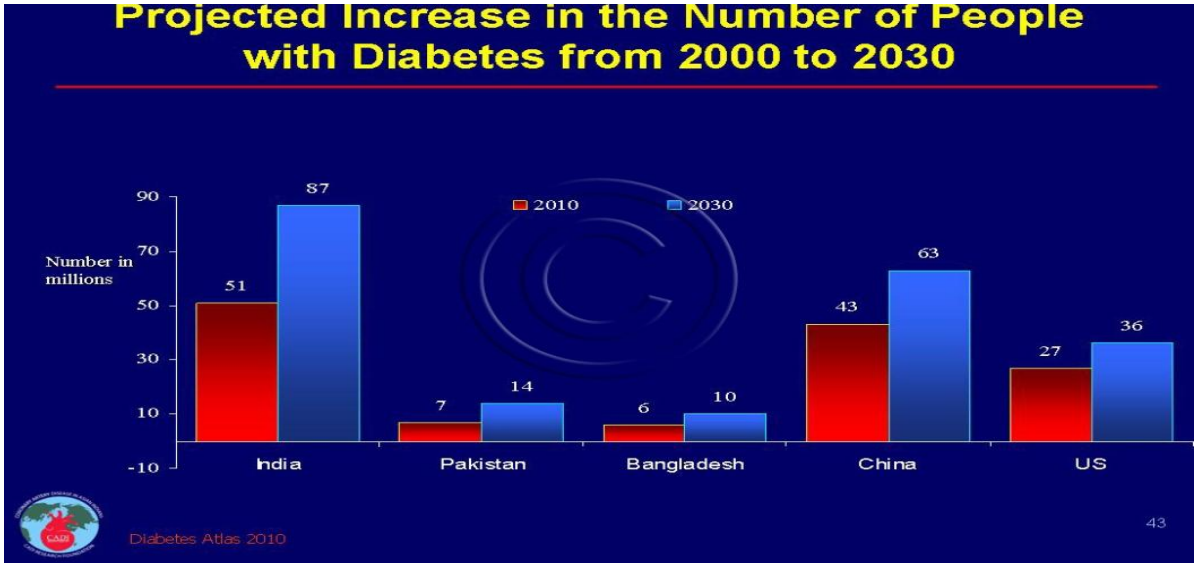
Type 1 diabetes was previously known as juvenile diabetes. If you have type 1diabetes, your body does not make insulin. Your immune system attacks and destroys the cells in your pancreas that make insulin. Insulin is a hormone that helps move sugar, or glucose, into your body tissues. Cells use it as fuel. Although most people *diagnosed* with *type 1 diabetes* are *usually children* or *young adults*. While Type 1 diabetes includes excessive excretion of urine, thirst, constant hunger, weight loss, vision changes and fatigue. People with type 1 diabetes need to take insulin every day to stay alive. Type 2 diabetes: also called adult onset diabetes. A chronic condition that affects the way the body processes blood sugar (glucose).With type 2diabetes, the body either doesn't produce enough insulin, or it resists insulin. The initial symptoms of this disease include constant hunger, a lack of energy, fatigue, weight loss, frequent urination, dry mouth, itchy skin and blurry vision but if this disease progress, the symptoms become more severe and potentially dangerous. If the blood sugar levels have been high for a long time, the symptoms can include yeast infections, slow-healing cuts or sores, dark patches on your skin, foot pain, feeling of numbness in extremities, or neuropathy. If there is lack of social support of then person with

diabetes may experience a worst quality of life because the person constantly experience stress and pressure of time and lack of treatment program. In fact, 25 percent of people with diabetes suffer from recurring depression, nervousness, melancholy and eating disorder. Emotional distress produces overreaction, confusion, poor concentration and performance anxiety and usually results in sub-par performance and increase the risk of blood vessel diseases. Diabetes Epidemiology Study Group in India (DESI) investigators reported from several urban locations in India: age and gender-standardized prevalence of diabetes ranged from 9% in Mumbai to 12% Delhi, 12% Calcutta, 12% Bangalore, 14% Chennai and 17% in Hyderabad.

DIABETES EPIDEMIC IN INDIA

It is a major cause of blindness, kidney failure, cardiovascular disease, reductions in quality of life and premature death. In addition to causing much human suffering, it imparts major economic burdens, costing an estimated annual $174 billion in the India alone, and an increasing burden on medical care systems and resources everywhere.

India is facing a lot of burden of nutrition like under nutrition and over nutrition: it figures prominently both in the hunger map of the world as well as being the diabetes capital of the world. A country like India experiencing rapid socioeconomic progress and urbanization, In both urban and rural areas, India carries the highest burden of diabetes with escalating prevalence Diabetes has emerged as a major public health problem in the 21st century.



(Source: Diabetes Atlas 2010)

India pips all other states with the highest number of diabetes and hypertension cases as reported in the recent National Health Profile 2015 by Central Bureau of Health Intelligence under Ministry of Health and Family Welfare rarely comes as a shock to people in a state known for its sweet tooth. The fact that there is a long festival season that stretches from Shravanin July-August to Holi in March with Janmashtami, Dusshera, Diwali and Uttarayan in between, makes the problem even more acute. So far, over 12 lakhs have been screened, while another 35 lakhs have already been screened under the ongoing diabetes programme. "The data so far reveals that out of a total estimated population of 2 crore in India, nearly 9-10 per cent are suffering from diabetes," revealed a senior official of the health department. The number is expected to rise over the years. In India people get diabetes at very younger age and total 36% of all diabetics in India those who have younger than 45 years. If the duration of diabetes is beyond the limit of time then it leads to greater complications and will be danger for the national economy. The people with diabetes will develop debilitating complications such as blindness, kidney failure, or heart disease. In addition, some people will undergo foot, toe or leg amputations. All these complications from diabetes are devastating for the individual, the family, and the province's health system. The most disturbing trend is the shift in age of onset of diabetes to a younger age in the recent years. Due to lack of physical exercises, people with diabetes can experience anxiety and depression from living a restricted lifestyle. Due to lack of concentration because of diabetic, they may lose productivity due to work or school absences. Because of the development complications, they may see a decrease in their earning potential. As well, changing personal routines can affect other family members. Diabetes is a major public health concern because of the physical, social, economic and emotional burden of diseases.

As per the health profile report, the number of diabetic persons in India stands at 161,578 which are 20.5 per cent of the total 787,435 population screened. Indians develop diabetes at least 10-15 years earlier compared to people of non-Indian origin. Now day's diabetes is a serious problem and this disease is manageable if individuals, communities, health care providers and policy makers use the information and tools to motivate and support behavioural change. The risk factors associated with type-2 diabetes, such as obesity and physical inactivity have become too common in our society due to increase the prevalence of expected diabetes. It is quite evident from that the diabetes has become a major health problem in India and high dependence of milk products and oily foods coupled with genetic factors are responsible for Diabetes. The current scenario of diabetes in India is likely to worsen in the coming decade. The

highest number of people with diabetes is between 40 and 59 years of age. High prevalence of obesity in Indian, adolescents may aggravate the situation. The number of deaths related to diabetes is not yet determined by which deaths are recorded. The complications are recorded as the cause of death, instead of diabetes people with diabetes often die from diabetic complications such as heart disease. Indians have a peculiar genetic composition and Asian Indian phenotype that predisposes them to have higher propensity to metabolic syndrome, diabetes mellitus and coronary artery disease. Indians characteristically have increased insulin resistance, greater abdominal adiposity (higher waist circumference despite lower body mass index), higher prevalence of impaired glucose tolerance, lower adiponectin and higher high sensitive C-reactive protein levels; contributing to a greater risk of developing disease at a relatively younger age. Additionally epidemiological transition, economic boom, physical inactivity, trendy dietary patterns and environmental factors also add to this risk. Indian healthcare professionals and patients in India face a number of challenges such as clinical inertia in achieving glycolic control, inadequate follow-up and lack of disease awareness. An inadequacy in Indian guidelines is also responsible for wide variation in treatment preferences across the country. The recent trend of rising diabetes among rural Indians and women is also alarming. Even though the prevalence of micro vascular complications of diabetes like retinopathy and nephropathy are comparatively lower in Indians, premature coronary artery disease is much higher in Indians compared to other ethnic groups. Given the lifelong costs associated with diabetes, many individuals and families are unable to cope with the economical, emotional and social burden of disease.

DIABETES CONTROL IN INDIANS

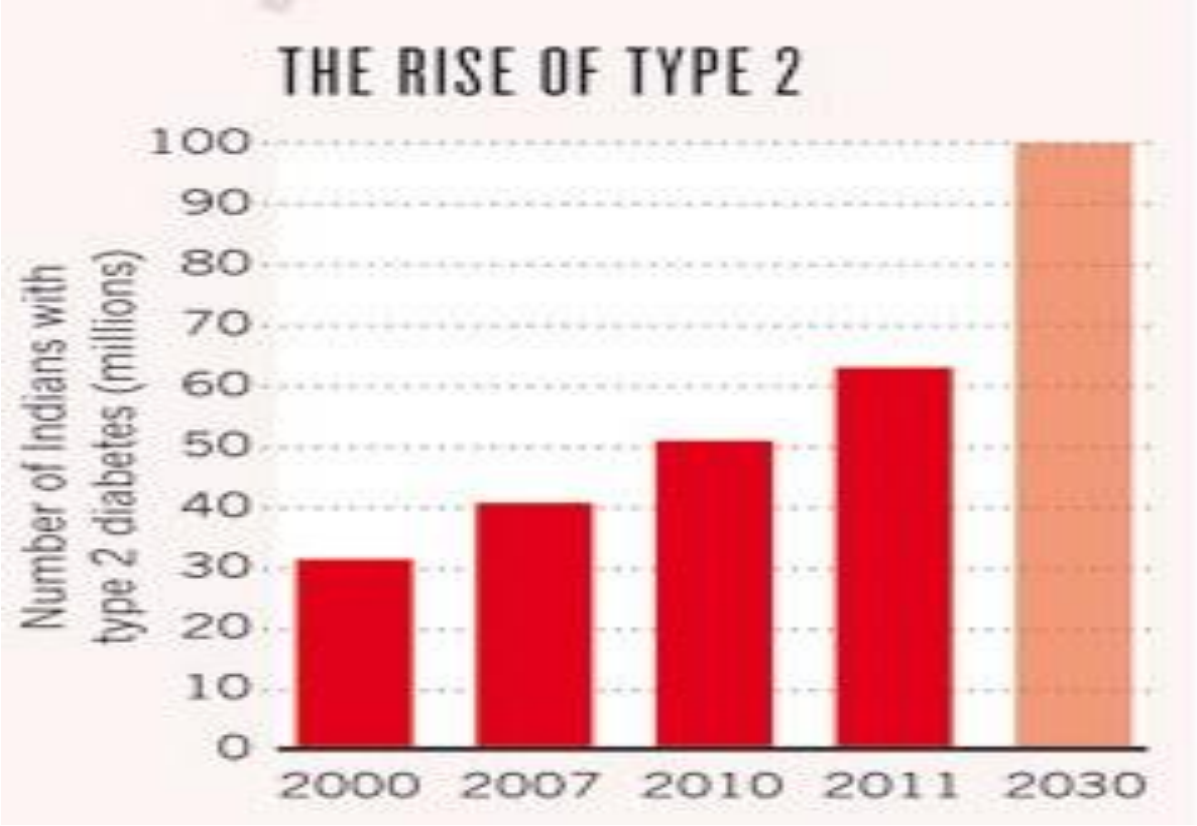
Now days, some government health care and private agency run a lot of awareness programme and educate the public about how to prevent from diabetes. However, some people remain unaware or unconvinced of the seriousness of this disease after educational programs for preventing complications, the proven effectiveness of lifestyle changes, and advances in treatment. A lot of research program is going on in the cure of diabetes, including new drug therapies and are often not communicated effectively. Type 2 diabetes is often not managed aggressively. Most people with diabetes are not motivated when diagnosed to change their lifestyles.

Early identification of at-risk individuals and appropriate lifestyle intervention would significantly help in preventing or postponing the onset of diabetes. Awareness, education, and empowerment of community could prevent a cluster of non-communicable disorders; an

exemplary effort in this direction is the Prevention Awareness Counselling and Evaluation (PACE) Diabetes programme underway in Chennai. As a matter of fact, CURES has already shown some degree of levelling of the predicted prevalence line, evidenced by the fact that the prevalence of diabetes in Chennai showed a rise of 39.8% between 1989-1995 16.3% between 1995-2000 and 6% between the years 2000-2004. Yet, a lot needs to be done. There is an imminent need for urgent contextual research and implementing inexpensive intervention with sincere efforts at regional and national levels to mitigate the potentially catastrophic increase in diabetes that is predicted for the upcoming years. These will require development of infrastructure, environmental and policy changes and ongoing funding of a multilevel, multidisciplinary approach and an experimental attitude at the state and local levels to allow public health researchers to evaluate the ingredients of successful innovations that constitute natural experiments in diabetes prevention. Health experts are alarmed because, although the onset of type 2 diabetes tends to affect people in the West in their 40s and 50s, the disease strikes Indians much younger. Indians as young as 25 are being diagnosed with the disease, a trend that threatens to seriously hamper the country's economic development.

The rise of type 2 diabetes in India's cities was to some extent expected. And in fact, until the 1980s, the urban prevalence of diabetes was at least double the rural prevalence. But the recent surge in diabetes has spilled out of the cities into the countryside. The spike in rural areas has been shocking, says Nikhil Tandon, an endocrinologist at the All India Institute of Medical Sciences in New Delhi (see 'India's diabetes boom'). "Villages in wealthier southern states like Tamil Nadu and Kerala are seeing prevalence hit double digits, which is enormous," he says. "If it was confined to affluent India, you could still put a lid on it, but now it's rising quickly all over the country." On chronic diseases overall, it will spend 580 billion rupees (US$11.6 billion) — six times what was allocated in the previous 5-year plan. Progress is slow, however. India's National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases and Stroke (NPCDS), launched in 2008, has made little headway in either strengthening infrastructure or implementing prevention plans, other than developing a website (healthyindia.org) to educate people about risk factors for chronic diseases such as diabetes.

India's national programme on diabetes might be at a nascent stage, says Tandon, but he nevertheless finds it "Reassuring" that in 100 districts, the government will be targeting

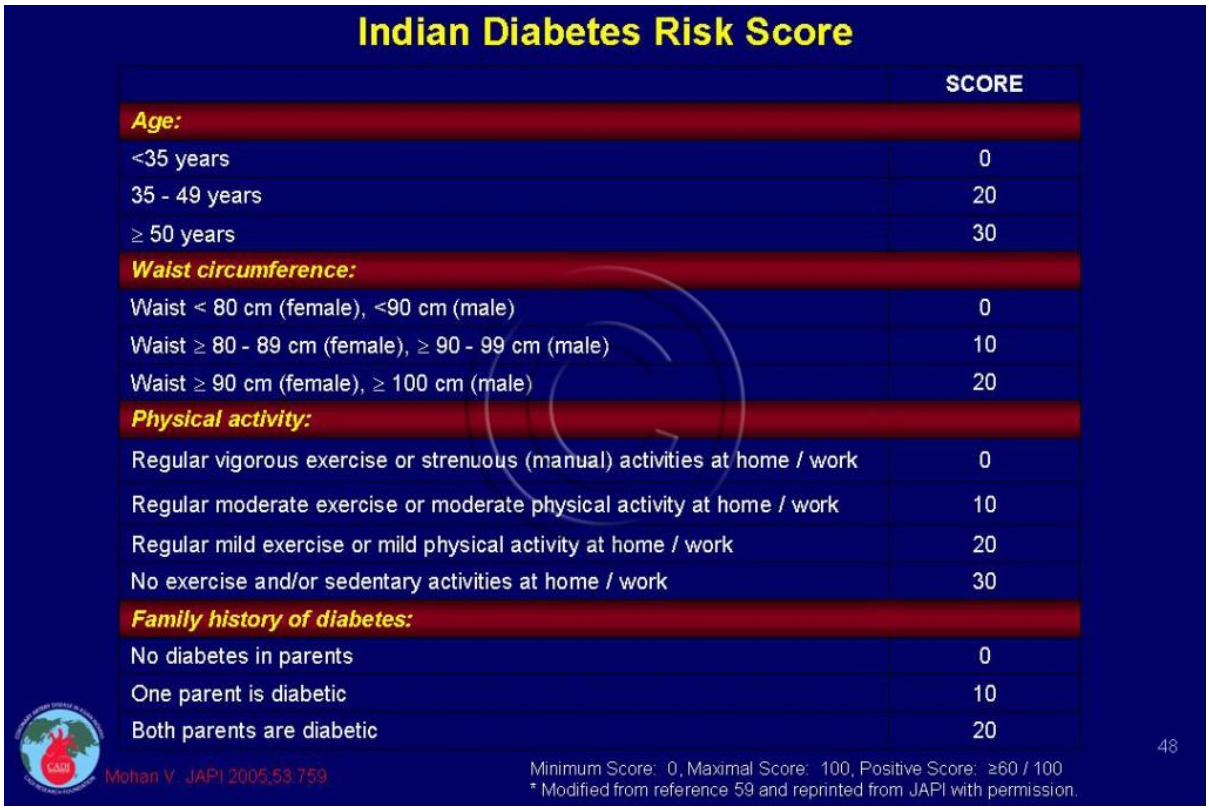


(Sources: Atlas 2010.)

programmes at schoolchildren to help reduce diabetes and other health risks in later life. The department of health is also rolling out a much-needed nationwide prevalence study, he says, which should help provide a cohesive picture — most data, currently available are from fragmented regional studies, predominantly in cities. However, for India to effectively fight the epidemic of diabetes, it will require more than government programmes. Indian society's nonchalant attitude towards the disease must change as well. According to the Diabetes Atlas 2010, India had 51 million diabetics in 2010 compared to 7 million in Pakistan, 6 million in Bangladesh, 27 million in the US and 43 million in China.

THE INDIAN DIABETES RISK SCORE (IDRS)

Indian Diabetic Risk Score is the strongest predictor of the diabetes among Indians. Subjects with an IDRS of less than 30 was categorized as low risk, 30-50 as medium risk and those with ≥ 60 as high risk for diabetes. Higher IDRS is also associated with higher risk of metabolic syndrome and CVD risk even among people without diabetes.



(Sources: Mohan V, JAPI 2005; 53:759 **)**

Limiting the blood sugar testing to those with an IDRS score of 50 and above could identify more than 90% of Indians with diabetes. The Indian Diabetes Risk Score (IDRS) showed the strongest (5-fold risk) association with incident diabetes─ higher than obesity or hypertension. Obesity and abdominal obesity conferred a 2-fold risk of diabetes, whereas hypertension conferred a 3-fold risk of diabetes.

IDRS was developed using four simple parameters namely (1) age, (2) abdominal obesity, (3) family history of diabetes, and (4) physical activity. A maximum score of 100 is given for these categories combined as shown in the above figure. In the poor country like India, it is highly cost

effective way of testing of diabetes. IDRS also helps to distinguish type 2 from non-type 2 diabetes mellitus.

DIABETES: URBAN POPULATIONS

India is facing an epidemic of diabetes; with a higher prevalence in urban India─ approximately double that of rural India. The prevalence of diabetes is not only high but increasing steadily in urban India. A 6-fold higher prevalence of diabetes is in the urban population as compared to rural (12% vs. 2%) that has been reported from South India. Sedentary lifestyle appears to be an important determinant for the higher prevalence of diabetes in an urbanizing population. The self reported prevalence of diabetes is much lower─3% in rural India and 7% in urban India. This large discrepancy between measured and self reported diabetes suggest a high burden of undiagnosed diabetes. Urban residence, abdominal obesity and physical inactivity are the risk factors associated with diabetes in most of the studies. Rich people who have multiple servants, (to do all the physical activity) have the highest rates of diabetes. The epidemic of diabetes is now spreading to the middle- and lower-income groups in India. Obesity is common among urban children and adults and is inversely related to physical activity and directly related to socioeconomic status. The urban poor in the developing world has a lower prevalence of diabetes than the urban poor in developed societies. However, the farmer have higher rates of complications of diabetes.

DIABETES: RURAL POPULATIONS

In early years there was a very low prevalence of diabetes in rural populations. However, two recent studies, from Maharashtra and Andhra Pradesh report very high prevalence rates similar to those in urban Indian populations. A striking correlation exists between body mass index (BMI) and diabetes. Rural-urban disparities in the prevalence of diabetes observed in previous studies could be due to the low prevalence of obesity in rural subjects compared to urban subjects. BMI on average is 3 to 5 units lower in rural areas compared to urban areas in India. In one major study, prevalence of obesity (BMI>25) was 3 times higher and diabetes was 2 times higher in urban India compared to rural India. Prevalence of diabetes, obesity, metabolic syndrome, and other cardiovascular disease (CVD) risk factors except smoking is higher in middle income groups than the low income groups regardless of where they live. It appears that regional and

national heterogeneity in diabetes prevalence is rooted in more recent (environmental) events rather than genetic factors.

DIABETES: PREVENTION

Primary prevention of diabetes is effective and urgently needed in India to curb the rising burden of diabetes. Now days the Indian Government has initiated a national program for the management and prevention of diabetes and related metabolic disorders. Three-year results from the India's-Diabetes Prevention Program (DPP) suggest that both metformin and lifestyle are cost-effective for preventing diabetes among those with pre-diabetes in Indians. Lifestyle intervention has been found to be a highly effective, safe, and cost-effective method for the prevention of diabetes in high-risk persons, the benefit of which can extend for many years. Interventions using drugs are less preferred because the drugs effects tend to dissipate after their use is stopped and no medication is totally free of cost and side effect. 150 min/wk of physical activity, such as walking, along with a weight loss of 5-7%, reduces the risk of progressing from impaired glucose tolerance to diabetes by 58%.

Optimal levels of five modifiable risk factors (normal weight, no smoking, regular physical activity, low-risk dietary score and moderate alcohol consumption) are each associated with 16% to 37% lower risk of developing diabetes. Men and women with all of the examined factors in the low-risk category had a 72% and 84% lower odd for developing diabetes, respectively. The dietary score was calculated based on the intake of polyunsaturated and saturated fats, fibre, and the glycolic index of various foods.

DIABETES: KNOWLEDGE AND AWARENESS

In India there is a dearth about the Awareness and knowledge regarding diabetes. In a study of 26,000 adults in Chennai, the largest city in Southern India, nearly 25% of the population was unaware of a condition called diabetes. Only 22% of the whole population and 41% of the known diabetic subjects were aware that diabetes could be prevented. Awareness about the role of overweight and physical inactivity in producing diabetes was very low, with only 12% of study subjects reporting these as risk factors for diabetes. Only 19% of whole population and 41% of diabetic subjects knew that diabetes could cause complications. Although a study was

conducted in Chennai, the information is probably applicable to all of India. There is urgent need to educate people about diabetes programs in both urban and rural India.

DIABETES COST AND POVERTY

Diabetes and poverty are indistinguishably entwined: diabetes can cause poverty and this can cause diabetes. Due to poverty diabetes is increasingly common among the poor and marginalized now days in India. Treatment and diagnosis of diabetes is very costly due to the less income among poor people because of this it push vulnerable people and families deeper into the poverty cycle. In developing countries if diabetes develops among people the government will not be able to provide effective care to control it and it leads to premature death. Due to spending money on cure of diabetes it affected a number of (either)population or families because of the substantial proportion of household income. The economic burden of treating diabetes and its complications for the families is considerable and has doubled from 1998 to 2005 with many diabetic subjects spending 25-35% of their annual income for diabetes management. For example, in rural India, the annual income is Rs 36,000 ($818) and the total median expenditure on diabetes care is Rs 10,000 ($227) in rural India. The expenditure on diabetes care in urban India was Rs 36,000 ($818) whereas the income is Rs 100,000 ($2,273). Due to the treatment duration of diabetes, presence of complications, hospitalization, surgery, insulin therapy, and urban setting, the cost is increased. if the people can make a small change in their life style, we can significantly improve the health of India's population and reduce the burden of diabetes. Now days the main reason of poverty among poor population is diabetes and it leads to poverty in many cases as the cost of the medical care is very high relative to income and the medicines are not covered by insurance which is also very rare. Integrating diabetes care into primary healthcare and ensuring universal coverage for basic health interventions should therefore be given top priority.

CONCLUSION

In India diabetes is a major concern public health problem with increasing numbers of people with diabetes and disease-related complications. Day by day the health care, human, and social costs of diabetes are shattering, and the projections for improvement are not favourable. India

clearly needs to take action on diabetes rapid increase as a public health concern. The commitment from the individual, community, health district, and provincial and government agencies must be seriously involved in this action. For best results, these strategies need to address the broad determinants of health, especially socio-economic status, education, physical environment, employment and working conditions. By increasing physical activity, maintaining weight, and eating healthy diet, we all need to work towards improving our lifestyles, as we enter the New Year. These behaviour modifications can improve our chances of delaying the onset of diabetes and disease related complications. Developing awareness on the symptoms of diabetes can lead to early diagnosis and prevent complications. Communities need to take action and provide the resources for encouraging behavioural change. For the prevention of diabetes, Health care providers need to assess risks, screen appropriately, and educate the public time to time. Boards of health need to provide leadership in the move towards the prevention of diabetes and governments need to implement policies that foster healthy lifestyles. Transforming the current knowledge into prevention a program throughout the community and the country is major challenge.

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