

TYPE-2 DIABETES MELLITUS AND ITS PREVALENCE IN WESTERN COUNTRIES

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ABSTRACT

Hyperglycemia is a trait that is shared by a number of conditions, including diabetes mellitus. The care of diabetes in different parts of the globe is fraught with varied difficulties, such as the disease's steadily growing prevalence. The prevalence of type 2 diabetes is discovered to grow many fold, which is shown to be accountable for early morbidity and death in the population. This increase is found to occur at the same rapid pace as socioeconomic changes occur in both rural and urban regions. The disparity in the frequency of type 2 diabetes between urban and rural areas is driving urbanisation, and the change in lifestyle brought on by the acceptance of Western culture is becoming more prevalent. The incidence of type 2 diabetes in both urban and rural settings has been thoroughly reviewed in this research. To prevent type-2 diabetes and improve its treatment, the government must sponsor screenings and awareness programmes for the general public.

KEYWORDS: Diabetes, Type-2 Diabetes mellitus, Prevalence of type-2 diabetes, Rural areas, and Urban areas.

1. INTRODUCTION

The prevalence of diabetes mellitus type 2, also known as T2DM, is rising at a rate that is substantially faster than that of diabetes mellitus type 1, most likely as a consequence of the rise in obesity and the decline in the amount of time spent engaging in physical activity. Diabetes mellitus is estimated to affect at least 70 million people throughout the globe by the year 2025, according to projections made by the International Diabetes Federation (IDF). The incidence of Type 2 DM is rapidly climbing to new heights in India. The rise in incidence is probably due to an increase in the prevalence of obesity, a decline in levels of physical activity, the migration from rural to urban environments, and shifting dietary practises.

Diabetes is a chronic condition that inhibits the body's production of the hormone insulin, producing an abnormal metabolism of fats, proteins, and carbohydrates in addition to a high blood glucose level. Diabetes may be prevented by maintaining a healthy weight and exercising regularly (Kanaya et al. 2010). A persistently high level of blood sugar causes significant damage to the blood vessels, which in turn causes problems for the heart, kidneys, nerves, and eyes. The quality of life is diminished, and the danger of dying is raised as a result of these repercussions (WHO, Global health risk 2009). Type-2 diabetes, which is on the increase globally, is a disease that is

ravaging both developed and developing countries. According to World Health Organization estimates from 1980, there were 108 million individuals living with diabetes; by 2014, that number had more than quadrupled. (Castetbon et al. 2016). Almost 80% of persons who are affected by this reside in countries that are either developing or have a moderate income. India has the highest number of diabetics in the world, with 72 million people suffering from the condition, placing it in second place after China. From the beginning of the industrial revolution and the spread of urbanisation, there has been a rise in the prevalence of type 2 diabetes. Changes in lifestyle brought on by the adoption of western culture, behavioural patterns, and environmental factors such as physical inactivity, obesity, food, and ageing populations have been found to cause health changes that are responsible for the development of diabetes. These changes in health are accountable for the fact that more and more people are developing diabetes.

According to the World Health Organization, type-2 diabetes has not yet been diagnosed in 69.2 million persons (8.7%) over the globe (WHO Diabetes Fact Sheet 2016). The majority of people with type 2 diabetes have been sporadically in the pre-diabetic stage for a significant number of years, which raises the probability that diabetes that was previously undiscovered will be found. [Meme et al. 2015] used the term "abnormal glucose regulation" (AGR) to refer to this stage. It is really disturbing because type 2 diabetes develops in Indians at a much earlier age than in those in western countries (Ramachandran et al. 2010). With the purpose of reducing the morbidity and mortality rates of diabetes patients, early identification and screening of relevant risk factors are becoming more crucial.

2. EPIDEMIOLOGY

This study on disease transmission contributes to the investigation of diabetes mellitus (DM), and it has yielded vital information on a few features of this condition, such as its common history, commonness, frequency, severity, and mortality in a variety of people all over the globe. Identifying the origin of the virus and any viable preventive measures that may be established to halt or postpone the arrival of this sickness, which has reached plague-like proportions in both industrialised and developing countries, are two goals that need to be accomplished.

Unhappily, the results for individual diabetes patients have improved, but there has not been a similar increase in terms of the wellbeing of the broader population. Diabetes continues to become much more common in the general population and has grown dramatically. By the beginning of 2011, it was projected that 366 million people had type 2 diabetes, which accounted for 90% of all cases. There has been an increase in the number of people living in various countries who have type 2 diabetes since 80 percent of people who have diabetes reside in low- and middle-income countries. While type 2 diabetes is most often researched in adults, the incidence of the disease in children and young people has been considerably on the rise. T2DM is presently used to treat between 8 and 45 percent of every new occurrence of diabetes found in children and adolescents. Among the population of children and adolescents, type 2 diabetes is more prevalent in young women than in young men; overall, the condition is more prevalent in females than in males. The

onset of type 2 diabetes often occurs between the ages of 12 and 16; throughout this age range, insulin resistance develops physically, which coincides with adolescence. Because the beta-cell activity is poor in addition to other risk factors, type 2 diabetes can only develop at this point in time.

About half of the people in the world have diabetes that has not been diagnosed. While restorative medication may lessen the complexity of the problem, it is necessary to distinguish diabetes early in its progression. The chance of acquiring type 2 diabetes rises with age, being overweight, and not exercising enough. Due to the rapid increase in population, it is anticipated that this figure would reach roughly 552 million by the year 2030. Diabetes mellitus may occur in any area of the world; however, it is far more prevalent (especially type 2) in more industrialised countries, where the vast majority of diabetic people acquire the disease between the ages of 45 and 64.

3. DIAGNOSIS

The Fasting Plasma Glucose (FPG) or the 2-Hour Plasma Glucose (2-h PG) value following a 75g oral glucose resistance test (OGTT) 4.6 are the plasma glucose criteria used to diagnose diabetes. A recent International Expert Committee that includes representatives from the American Diabetic Association (ADA), the European Association for the Study of Diabetes (EASD), and the International Diabetes Federation (IDF) added the A1C (limit > 6.5%) as a third option to study diabetes. An FPG value > 7.0 mmol/L (126 mg/dL), a 2-h post-load glucose fixation > 11.1 mmol/L (200 mg/dL) after an OGTT, or diabetes symptoms and an easygoing plasma glucose focus > 11.1 mmol/L (200 mg/dL) were recommended by the WHO, ADA, and IDF. If any of these criteria are satisfied, it is crucial to confirm with further testing the following day in order to strengthen the analysis. For individuals with unambiguous hyperglycemia, defined as greater than 11.1mmol/L (200mg/dL) with persistent hyperglycemia-related symptoms, further testing is not necessary (Table 1).

Table 1: Criterion for the diagnosis of diabetes

HbA1c \geq 6.5% (48 mmol/mol)
or
FPG \geq 7.0 mmol/L (126 mg/dL)
or
2-h Plasma glucose \geq 11.1 mmol/L (200 mg/dL) during an OGTT
or
Symptoms of hyperglycemia and casual plasma glucose \geq 11.1 mmol/L (200 mg/dL)

4. MATERIALS AND METHODS

The research inquiry used both a cross-sectional and a spellbinding explanatory methodology in its data collection and analysis. The population that can be quantified as having diabetes has made mention of Diabetes Centers. The specialists looked at a survey that contained statistical questions about the patient's age, sex, level of education deficit, and sickness data remembering assessments and recorded tests for the patient's file ALONG WITH the patient's weight list, pulse, haemoglobin A1c, the type of treatment (routine, pill, or insulin), the reason, and the type of difficulty as indicated by patients' files. Those who have type 1 diabetes or who lack appropriate understanding will not be allowed to participate in the experiment. The clinical and research facility review as well as the final diagnosis made by doctors emphasised the difficulty and nature of the diagnosis of diabetes, which was based on the standard FPG level over 126mg/dL.

5. GLOBAL PREVALENCE OF TYPE-2 DIABETES MELLITUS

As a consequence of increasing urbanisation, population growth, an ageing population, growing obesity rates, and physical inactivity, the incidence of type 2 diabetes has reached epidemic proportions over the world. IDF Diabetes Atlas, 5th Edition, 2011 (IDF Diabetes Atlas. 8th ed. 2017). It is anticipated that by the year 2045, this number will have increased to 642 million, and at the same time, the prevalence rate will have increased by 48%. There is a considerable difference in the prevalence of diabetes between rural and urban areas, with rural areas having 146 million people living with diabetes in 2017 and a predicted rise of 156 million by 2045. In 2017, there were 279 million people diagnosed with diabetes in urban areas; by 2045, that figure is expected to climb to 473 million. With 1.5 million fatalities in 2012 and 1.6 million in 2016, type 2 diabetes is expected to rank as the seventh leading cause of death worldwide in 2016. (Global Reports on Diabetes 2016) [Global Diabetes Reports] The International Diabetes Federation estimates that diabetes will be the root cause of 4.0 million deaths worldwide in 2017.

At least \$548 billion was spent on diabetes-related medical care in 2013, and at least \$673 billion was spent on diabetes-related medical care in 2015, respectively representing 11% and 12% of the total yearly spending on universal health care (IDF Diabetes Atlas. 7th ed. 2015). In 2017, the cost of providing medical care throughout the world was estimated to be 727 billion, and it was anticipated that this figure would increase to 776 billion by 2045. (IDF Diabetes Atlas, 8th ed. 2017, and Cho et al. 2018). These estimates reflect the rate of expansion in both industrialised nations and developing nations. This is due to the fact that both types of nations adhere to a culture of urbanisation and changes in lifestyle, including an increase in sedentary behaviour and physical inactivity as well as the consumption of foods that are high in energy but low in nutrients. According to this epidemiology, diabetes is an alarming health problem and is recognised as a public health priority among rural and urban people around the world, just as it is in the urban and rural areas of low- and middle-income countries.

India (As a Case Study) accounts for 49% of the worldwide burden of diabetes, with an estimated 72 million cases in 2017, and by 2025, that figure is anticipated to nearly triple to 134 million. Almost 1.1% million individuals every year in India lose their lives to complications caused by diabetes-related illnesses. An increase in the incidence of diabetes mellitus is a consequence of modern lifestyle changes, dietary changes, and a trend toward processed foods, especially those high in sugar and fat. The faster growth in prevalence that occurs in both urban and rural contexts is shown in table 2, which can be seen below. In more rural areas, the prevalence of type 2 diabetes is lower and varies depending on the location. The research was out in the states of Jharkhand and West Bengal found that the frequency of the disease in rural areas was 2.95% and 3.0%, respectively (Bariket al. 2016; Anjana et al. 2011). It has been noted that the prevalence of type 2 diabetes is greater in the rural hilly parts of Arunachal Pradesh and Manipur at a rate of 19.8% and 16.6%, respectively (Zaman et al. 2014; Shah et al. 2013). The ICMR-INDIA B survey found that prevalence rates were lower in rural areas of economically challenged states than they were in urban areas. In Chandigarh, Tamil Nadu, and Maharashtra, respectively, the prevalence of type 2 diabetes was 8.3%, 7.8%, and 6.5%. The occurrence of this disease is seen in just 3% of states with low economies, such as Jharkhand (Anjana et al. 2011).

Type-2 diabetes is growing increasingly prevalent in cities, as shown by the statistics. The lowest frequency was found to be 3.34 percent in urban regions of West Bengal, according to prevalence research conducted in urban regions of West Bengal (Barik et al. 2016); this is in contrast to the exceptionally high prevalence of 23.2% and 24.0% recorded from urban areas of Amritsar and Delhi, respectively (Singh et al. 2016; Goswami et al. 2016). Studies show that the prevalence of type 2 diabetes has climbed to 24.0% in the same metropolitan districts where it was just 18.0% four years earlier (Goswami et al. 2016; Singh et al. 2012). Another study that was carried out in the metropolitan areas of Chandigarh shows that type 2 diabetes has increased over the last three years, going from 13.6% to %. (Anjana et al. 2011; Walia et al. 2014).

The general incidence of diabetes is higher in urban areas than in rural ones. Yet, countries with more developed economies have reported a higher frequency of occurrence. There has been a discernible rise in the incidence in rural areas as well. This trend is worrisome when one considers that more than 70 percent of India's population still lives in rural areas (Chandramouli et al. 2011).

Table 2: Prevalence of T2DM in India (A Case Study)

Year	Author	Place	Urban Prevalence (%)	Rural Prevalence (%)
2011	Nayak <i>et al</i>	Gujarat	13.8	NA
2011	Vaz <i>et al</i>	Goa	NA	10.3
2011	ICMR INDIA B (Anjana <i>et al</i>)	Chandigarh	13.6	8.3
2011	ICMR INDIA B	Tamilnadu	13.7	7.8
2011	ICMR INDIA B	Maharashtra	10.9	6.5
2011	ICMR INDIA B	Jharkhand	13.5	3.0
2012	Prasad <i>et al</i>	Orissa	15.7	NA
2012	Rajput <i>et al</i>	Haryana	NA	13.3
2012	Singh <i>et al</i>	Delhi	18.0	NA
2013	Shah <i>et al</i>	Manipur	NA	16.6
2013	Kumar <i>et al</i>	Westbengal	15.0	NA
2014	Walia <i>et al</i>	Chandigarh	16.4	NA
2014	Zamanet <i>al</i>	Arunachalpradesh	NA	19.8
2014	Shrivastava <i>et al</i>	Pondicherry	NA	8.03
2015	Desappa <i>et al</i>	Banglore	12.33	NA
2016	Goswami <i>et al</i>	South Delhi	24.0	NA
2016	Singh <i>et al</i>	Amritsar	23.2	NA
2016	Barik <i>et al</i>	West Bengal	3.34	2.95
2016	Little <i>et al</i>	Tamil Nadu	NA	10.8
2016	Nirmala <i>et al</i>	Andhrapradesh	15.1	NA
2017	Tripathy <i>et al</i>	Punjab	9.4	7.6
2017	P.S <i>et al</i>	Uttar Pradesh	NA	8.3
2017	Deepthi <i>et al</i>	Karnataka	NA	10.5
2018	Kapil <i>et al</i>	Uttarakhand	NA	14.6
2018	Poornima <i>et al</i>	Karnataka	NA	9.5

6. CONCLUSION

Particularly in low- and middle-income nations, the high prevalence of type 2 diabetes has had substantial social, economical, and developmental ramifications. The prevalence of type 2 diabetes is high in both rural and urban populations, which places a considerable burden on healthcare costs for the individual, their family, and society as a whole. The allocation of society to deal with the increasing prevalence of type-2 diabetes depends on an accurate evaluation of the existing and future costs of diabetes. It is very necessary for the government to initiate policies and education campaigns in order to slow the rate of population growth in both rural and urban regions.

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