

DIABETES

1. International **Diabetes** Federation.

Diabetes Atlas. 6th ed. Available at:
<http://www.idf.org/sites/default/files/attachments/SEA%20factsheet.pdf>

According to the **International Diabetes Federation** (IDF), there were an estimated 387 million individuals with diabetes worldwide in 2014, and this number is set to increase to **592 million** by the 2035.

Despite the large number of people with diabetes in southeast Asia, health care spending on the disease was estimated to be only **US\$6 billion**, accounting for <1% of the global total, with India estimated to have spent the largest proportion.

2. Zargar AH, Wani AI, Masoodi SR, et al. Mortality in diabetes mellitus data from a developing region of the world. *Diabetes Res Clin Pract* 1999;43:67e74.

The pooled prevalence of rural diabetes among Asian Indians have a small body size, which have been termed thin-fat Indian. Asian Indians have thinner limbs, which is suggestive of smaller muscle mass. However, despite their thinness, they are **centrally obese**, with a higher waist-to-hip ratio (WHR) and higher subscapular-to-triceps **skinfold ratio** than their British counterparts. Many studies show that Asian Indians have more body fat for any given **body mass index** (BMI) compared with whites and black Africans.

3. Banerji MA, Faridi N, Atluri R, et al. Body composition, visceral fat, leptin and insulin resistance in Asian Indian men. *J Clin endocrinol metab* 1999;84:137—44.

Asian Indians also have higher levels of central obesity (measured as waist circumference [WC], WHR, visceral fat, and posterior subcutaneous abdominal fat).

4. Deurenberg P, Deurenberg-Yap M, Guricci S. Asians are different from Caucasians and from each other in their body mass index/body fat per cent relationship. *Obes Rev* 2002;3: 141e6.

This is reflected in higher plasma nonesterified fatty acid (NEFA) and triacylglycerol (TG) concentrations, hyperinsulinemia with fasting as well as postglucose challenge states, and higher insulin resistance (IR)

5. McKeigue PM, Shah B, Marmot MG. Relation of central obesity and insulin resistance with high

In a 2007-2012 survey analysis, the prevalence of sarcopenia (low skeletal muscle mass) in India was 17.5% and sarcopenic obesity (high percent body fat with low skeletal muscle mass) 1.3%.

6. Tyrovolas S, Koyanagi A, Olaya B, et al. The role of muscle mass and body fat on disability among older adults: a cross-national analysis. *Exp Gerontol* 2015;69:27e35.

Mohan et al

7. Mohan V, Sandeep S, Deepa R, et al. Epidemiology of type 2 diabetes:

Indian scenario. Indian J Med Res
2007;125:217e30

“Asian Indian phenotype”: IR, increased abdominal obesity (higher WC despite lower BMI), **lower adiponectin**, and higher C-reactive protein levels. The diabetes burden in India results from various factors. Genetic predisposition combined with lifestyle changes and associated with urbanization and globalization, all together contribute to the rapid rise of diabetes in India .

8. Nakagami T, Qiao Q, Carstensen B, et al. The DECODE-DECODA Study Group. Age, body mass index and type 2 diabetes-associations modified by ethnicity. Diabetologia
2003;46:1063e70.

The diabetes burden in India results from various factors. Genetic predisposition combined with lifestyle changes and associated with urbanization and globalization, all together contribute to the rapid rise of diabetes in India. Ethnicity plays a role as well, and in one example, there are lower thresholds for the effect of BMI on age-adjusted type 2 diabetes (T2D) prevalence rates among Indians.

9. Mohan V, Mathur P, Deepa R, et al. Urban rural differences in prevalence of self reported diabetes in India-The WHO-ICMR Indian NCD risk factor surveillance. Diabetes Res Clin Pract 2008;80:159e68.

The Indian Council of Medical Research (ICMR) study conducted in the 1970s reported a prevalence of 2.3% in urban areas; this

number has risen to 12%-19% in the 2000s. Correspondingly, in rural areas, prevalence rates have increased from around 1% to 4%-10% and even 13.2% in one study with the exception of Kerala (a coastal state in south India) where rural prevalence rates have caught up with or even overtaken urban prevalence rates.

10. Mohan V, Deepa M, Deepa R, et al. Secular trends in the prevalence of diabetes and glucose tolerance in urban South India-the Chennai Urban Rural Epidemiology Study (CURES- 17). *Diabetologia* 2006;49:1175e8.

The probable explanation for this exception is that in Kerala there is indeed no clear urban/rural demarcation and the whole of Kerala can now be considered to be urbanized. Data on diabetes complications have been published by several authors . CURES (Chennai Urban Rural Epidemiology Study.

11. Mohan V, Shanthirani CS, Deepa M, et al. Mortality rates due to diabetes in a selected urban south Indian population e The Chennai Urban Population Study (CUPS-16). *J Assoc Physicians India* 2006;54:113e7.

CUPS (Chennai Urban Population Study. provide the first population-based data from India on virtually all complications of diabetes. CURES was a population-based study involving 26,001 participants aged \geq 20 years based on a representative population of Chennai. The overall prevalence of diabetic retinopathy based on 4-field stereo color retinal photography was 17.6%.

12. Rema M, Premkumar S, Anitha B, et al. Prevalence of diabetic retinopathy in urban India: the Chennai Urban Rural Epidemiology Study (CURES) Eye Study-1. *Invest Ophthalmol Vis Sci* 2005;46:2328e33.

In other studies, the prevalence of retinopathy among Indians with diabetes ranged from 7.3% to 34.1%.

BETWEEN 13 TO 16 MORE ABSTRACT

13. Rema M, Deepa R, Mohan V. Prevalence of retinopathy at diagnosis among type 2 diabetic patients attending a diabetic centre in South India. *Br J Ophthalmol* 2000;84:1058e60.

Diabetic retinopathy is the most frequent cause of new cases of blindness among adults aged 20–74 years. During the first two decades of disease, nearly all patients with type 1 diabetes and >60% of patients with type 2 diabetes have retinopathy.

14. Rema M, Ponnaiya M, Mohan V. Prevalence of retinopathy in non insulin dependent diabetes mellitus in southern India. *Diabetes Res Clin Pract* 1996;24:29e36.

Diabetic retinopathy (DR) has long been recognized as a microvasculopathy, but retinal diabetic neuropathy (RDN), characterized by inner retinal **neurodegeneration**, also occurs in people with diabetes mellitus (DM). We report that in 45 people with DM and no to minimal DR there was significant, progressive loss of the nerve fiber layer (NFL) (0.25 $\mu\text{m}/\text{y}$) and the ganglion cell (GC)/inner plexiform layer (0.29 $\mu\text{m}/\text{y}$) on optical coherence tomography analysis (OCT) over a 4-y period, independent of glycated hemoglobin, age, and sex.

15. Dandona L, Dandona R, Naduvilath TJ, et al. Population based assessment of diabetic retinopathy in an urban population in southern India.

Br J Ophthalmol 1999;83:937e40.

16. Ramachandran A, Snehalatha C, Satyavani K, Latha E, Sasikala R, Vijay V. Prevalence of vascular complications and their risk factors in type 2 diabetes. J Assoc Physicians India 1999;47:1152e6.

The prevalence of overt **nephropathy** was 2.2%, whereas that of **microalbuminuria** was 26.9%. and proteinuria 19.7%. Peripheral neuropathy based on biothesiometry was seen in **26.1%**, which is comparable with other studies. The prevalence rate for hypertension among Indians with diabetes was **38%** in one study.

18. Pradeepa R, Rema M, Vignesh J, et al. Prevalence and risk factors for diabetic neuropathy in an urban south Indian population: the Chennai Urban Rural Epidemiology Study (CURES-55). Diabet Med 2008;25:407e12.

WHICH IS COMPARABLE TO OTHER STUDIES.

19. Mohan V, Deepa R, Rani SS, et al. Prevalence of coronary artery disease

and its relationship to lipids in a selected population in south India: the Chennai Urban Population Study (CUPS No. 5). *J Am Coll Cardiol* 2001;38:682e7.

In the CUPS study, coronary artery disease (CAD) was seen in 21.4% of patients with diabetes, 14.9% of patients with impaired glucose tolerance, and 9.1% of patients with normal glucose tolerance.

20. Premalatha G, Shanthirani CS, Deepa R, et al. Prevalence and risk factors of peripheral vascular disease in a selected south Indian population the Chennai Urban Population Study (CUPS). *Diabetes Care* 2000;23:1295e300.

Patients with diabetes also had increased subclinical atherosclerosis as measured by intimal medial thickness at every age point, compared with those without diabetes.

21. Mohan V, Ravikumar R, Shanthirani S, et al. Intimal medial thickness of the carotid artery in south Indian diabetic and non diabetic subjects: the Chennai Urban Population Study (CUPS). *Diabetologia* 2000;43:494e9.

THE PREVALENCE RATE OF hypertension among Indians with diabetes was 38% in one study.

22. Ramachandran A, Snehalatha C, Kapur A, et al. Diabetes Epidemiology Study Group in India (DESI). High prevalence of diabetes and impaired glucose tolerance in India: National Urban Diabetes Survey. *Diabetologia* 2001;44:1094e101.

Based on a figure of about 40 million people with diabetes in India, there would be at least 7 million with retinopathy, 0.8 million with nephropathy, 10.4 million with neuropathy, 8.5 million with CAD, and 2.5 million with PVD. and it is possible that in rural areas, the prevalence of complications is much higher because of poorer control of diabetes and lack of access to health care. Another population based study the National Urban Diabetes Survey (NUDS) was conducted in 6 large cities from different regions of India in 2001.

23. [Sadikot SM, Nigam A, Das S, et al. Diabetes India. The burden of diabetes and impaired fasting glucose in India using the ADA1997 criteria: prevalence of diabetes in India study \(PODIS\). Diabetes Res Clin Pract 2004;66:293e330.](#)

This study did not sample rural areas. PODIS (Prevalence Of Diabetes in India Study) was carried out in 49 urban and 59 rural centers in different parts of India to determine urban/rural differences in T2D.

24. [Sadikot SM, Nigam A, Das S, et al. The burden of diabetes and impaired glucose tolerance in India using the WHO 1999 criteria: prevalence of diabetes in India study \(PODIS\). Diabetes Res Clin Pract 2004;66:301e7](#)

When American Diabetes Association criteria were used, the prevalence of diabetes was 4.7% in urban and 1.9% in rural areas, whereas the prevalence according to World Health

Organization criteria was 5.9% in urban and 2.7% in rural areas.

25. Joshi SR, Das AK, Vijay VJ, Mohan V. Challenges in diabetes care in India: sheer numbers, lack of awareness and inadequate control. *J Assoc Physicians India* 2008;56: 443e50.

Individuals known to have diabetes represent the tip of the iceberg, as an equal or even larger number of patients have undiagnosed diabetes. Unfortunately, >50% of people with diabetes in India remain Undiagnosed.

26. Engelgau MM, Narayan KMV, Herman WH. Screening for type 2 diabetes. *Diabetes Care* 2000;23: 1563e80.

1. The disease represents an important health problem that imposes a significant burden on the population.
2. The natural history of the disease is understood.
3. There is a recognizable preclinical (asymptomatic) stage during which the disease can be diagnosed.
4. Treatment after early detection yields benefits superior to those obtained when treatment is delayed.
5. Acceptable and reliable tests are available that can detect the preclinical stage of disease.

27. Mohan V, Goldhaber-Fiebert JD, Radha V, et al. Screening with OGTT alone or in combination with the Indian diabetes risk score or genotyping of TCF7L2 to detect undiagnosed type 2 diabetes in Asian Indians. *Indian J Med Res* 2011;133:

294e9.

The Indian Diabetes Risk Score (IDRS) is more effective and significantly less expensive for screening for undiagnosed patients with T2D compared with genotyping TCF7L2 single nucleotide polymorphisms, the strongest genetic marker for T2D currently available. Using IDRS screening before an oral glucose tolerance test reduces costs while still detecting a substantial portion of individuals newly diagnosed with diabetes.

28. Deepa M, Bhansali A, Anjana RM, et al. Knowledge and awareness of diabetes in urban and rural India: the Indian Council of Medical Research India Diabetes Study (Phase I): Indian Council of Medical Research India Diabetes 4. *Indian J Endocrinol Metab* 2014;18:379e85.

diabetes in India awareness levels are low. Awareness and knowledge about diabetes was assessed among the general population 43.2% of the overall study population had even heard about a condition called diabetes Among the general and diabetic population, 56.3% and 63.4%, respectively, were aware that diabetes could be prevented.

the self-reported diabetic population (72.7%) than the general population (51.5%).

29. Deepa M, Deepa R, Shanthirani CS, et al. Awareness and knowledge of diabetes in Chennai the Chennai Urban Rural Epidemiology Study [CURES-9]. *J Assoc Physicians India* 2005;53:283e7.

CURES reported that nearly 25% of the population

was unaware of a condition called diabetes. 40.6% were aware that diabetes could lead to some organ damage. inactivity as risk factors for diabetes. More alarming was the fact that even among known people with diabetes, only **40.6%** were aware that diabetes.

30. Raheja BS, Kapur A, Bhoraskar A, et al. DiabCare AsiaIndia Study diabetes care in India current status. J Assoc Physicians India 2001;49:717-22.

In 1998, the **DiabcareAsia** study was carried out to investigate the relationship between diabetes control, management, and late complications in a subset of an urban Indian diabetes population treated at 26 tertiary diabetes care centers.

31. Acharya KG, Shah KN, Solanki ND, et al. Evaluation of antidiabetic prescriptions, cost and adherence to treatment guidelines: a prospective, cross-sectional study at a tertiary care teaching hospital. J Basic Clin Pharm 2013;4:82-7.

A subsequent 2013 study, showed that the majority (83.6%) of prescriptions for patients with diabetes adhered with guideline (2005 ICMR) recommendations.

32. Indian Council for Medical Research. Guidelines for management of type-2 diabetes. Available at: http://icmr.nic.in/guidelines_diabetes/section7.pdf.

management-:

A proactive approach to treating T2D is recommended: Therapy should be individualized with early consideration of combination therapy and ongoing **reinforcement** of lifestyle modification messages. Indeed, the conservative stepwise approach to T2D management involves lifestyle modification, followed by treatment with a single oral antidiabetic agent, often up-titrated to maximal recommended doses before combination therapy is introduced. Of note,

Guidelines-:

2005 ICMR guidelines for pharmacologic treatment of diabetes recommends metformin for higher BMI (≥ 25 kg/m²), but second-line for BMI 18.6 to 24.9 kg/m², and not at all in those patients who are underweight (≤ 18.5 kg/m²). The major pharmaceutical classes that may be combined with metformin include sulfonylureas (SU), thiazolidinedione (TZD), dipeptidyl-peptidase-4 inhibitor (DPP4-i), insulin, and glucagon-like peptide-1 (GLP-1) receptor agonists.

33. [Sharma SK, Seshiah V, Sahay BK, et al. Baseline characteristics of the IMPROVE control study population: a study to evaluate the effectiveness of a standardized healthcare professionals training program. Indian J Endocrinol Metab 2012;16\(suppl 2\): S471e3.](#)

A similar large study, referred to as The **IMPROVE Control India (ICI)** study, involved 451 clinicians and 8 metropolitan cities of India.

The main objectives of the study were to shed light on doctors' and patients' knowledge, expectations, and attitudes regarding glucose control, and to understand the barriers to achieving good glucose control among patients and HCPs.

even among patients whose A1C values were measured, 53% were not given glycemic targets as treatment of choice in patients with A1C > 10% to 11% or with symptoms of hyperglycemia.

34. [Phung OJ, Sobieraj DM, Engel SS, et al. Early combination therapy for the treatment of type 2 diabetes mellitus: systematic review and meta-analysis. Diabetes Obes Metab 2014;16:410e7.](#)

Few studies have investigated the effect of metformin-based early combination therapy. A systematic review and meta-analysis of 15 randomized controlled trials (RCTs; N = 6693) in patients with mean baseline A1C of 7.2% to 9.9% and mean diabetes duration of 1.6 to 4.1 years, with median followup of 6 months.

35. [Joshi SR, Bhansali A, Bajaj S, et al. Results from a dietary survey in an Indian T2DM population: a STARCH study. BMJ Open 2014;4:e005138.](#)

a prescription for **healthy eating, regular exercise, stress management,**

and avoidance of tobacco. The aim of dietary management is to achieve and maintain ideal body weight, euglycemia, and desirable lipid profile.

postpone complications related to diabetes; and provide **optimal nutrition during pregnancy, lactation,**

growth, old age, and associated conditions (eg, hypertension and catabolic illnesses).

37. [Misra A, Sharma R, Gulati S, et al. Consensus dietary guidelines for healthy living and prevention of obesity, the metabolic syndrome, diabetes, and related disorders in Asian Indians. Diabetes Technol Ther 2011;13:683e94.](#)

Dietary transition and a sedentary lifestyle have led to an increase in obesity and diet-related noncommunicable diseases (T2D, cardiovascular disease, etc.) predominantly in urban, but also in rural areas.

according to person's **ethnicity, cultural and family background, personal preferences, and associated comorbid conditions.**

38. [Misra A, Nigam P, Hills AP, et al. Consensus physical activity guidelines for Asian Indians. Diabetes Technol Ther 2012;14:83e98.](#)

Exercise is a powerful method to improve **longterm glycemic control** Regular

exercise has been shown to improve **blood glucose control, reduce cardiovascular risk factors, contribute to weight loss**, and improve well-being.

With increased physical activity, the selection of pre- and post-exercise meal and/or snacks becomes critical. People with diabetes must wear appropriate footwear for exercise.

39. [The Diabetes Prevention Program](#)

Research Group. The Diabetes Prevention Program. *Diabetes Care* 2002;25:2165e71.

Evidence from the Diabetes Prevention Program and the Finnish Diabetes Prevention Study.

40. Lindstorm J, Louheranta A, Mannelin M, et al. The Finnish Diabetes Prevention Study. *Diabetes Care* 2003;26:3230e6.

Evidence from the Diabetes Prevention Program and the Finnish Diabetes Prevention Study.

41. Cuff DJ, Meneilly GS, Martin A, et al. Effective exercise modality to reduce insulin resistance in women with type 2 diabetes. *Diabetes Care* 2003;26:2977e82.

Conducted in patients with **prediabetes** shows that **appropriate lifestyle modification**, including physical activity, can lead to reduced incidence of T2D by almost **58%**. Studies have shown that resistance training and **aerobic exercise** are effective in improving the **metabolic** .

42. Ishii T, Yamakita T, Sato T, et al. Resistance training improves insulin sensitivity in NIDDM subjects without altering maximal oxygen uptake. *Diabetes Care* 1998;21:1353e5.

In particular,

supervised resistance training (maximum of 10 repetitions for >3 days per week) has been shown to lead to significant improvement in **insulin sensitivity and values of A1C lipids**, and **truncal** and peripheral subcutaneous **adipose tissue** in Asian Indians with T2D.

43. Misra A, Alappan NK, Vikram N. Effect of supervised progressive resistance-exercise training protocol on insulin sensitivity, glycemia, lipids, and body composition in Asian Indians with type 2 diabetes. *Diabetes Care* 2008;31:1282e7.

Additional physical activity >60 minutes per day would be helpful in maintaining a good glycemic profile for patients with T2D. It has been reported that **children and adolescents**.

44. Silverstein J, Klingensmith G, Copeland K, et al. Care of children and adolescents with type 1 diabetes: a statement of the American Diabetes Association. *Diabetes Care* 2005;28:186e212.

It has been reported that children and adolescents with T1D should complete a minimum of **30 to 60**.

45. Thangasami SR, Chandani AL, Thangasami S. Emphasis of yoga in the management of diabetes. *J Diabetes Metab* 2015;6:10.

Yoga is a promotes **hysical and mental health**.

A yoga-based lifestyle modification program can reduce blood glucose, A1C TGs, total **cholesterol and very low-density Lipoprotein**.

46. Youngwanichsetha S, Phumdoung Inqkathawornwong T. The effects of mindfulness eating and yoga exercise on blood sugar levels of pregnant women with gestational diabetes mellitus. Appl Nurs Res 2014;27:227e30.

Mindful eating

and yoga have health benefits on **glycemic** control in pregnant women with gestational diabetes in some studies. enhanced the **antioxidant defense** mechanism in humen.

47. The DCCT Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin dependent diabetes mellitus. N Engl J Med 1993;329:977e86.

the overall direct and indirect costs escalate with disastrous health and **economic consequences** to the individual, his or her family, and society, particularly due to the onset of the **micro- and macrovascular** complications of the disease. Published data from several **epidemiologic**, experimental human .

48. Ohkubo Y, Hideki K, Araki E, et al. Intensive insulin therapy prevents the progression of diabetic microvascular complications in Japanese patients with non-insulin dependent diabetes mellitus. A randomized prospective 6-year study. *Diabetes Res Clin Pract* 1995;28:103e17.

the **Kumamoto study**.

49. UK Prospective Diabetes Study Group. Intensive blood glucose control with SU and insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 1998;352:837e53.

T2D pathophysiology has developed and newer oral and injectable **antidiabetes** drugs with improved delivery systems to improve diabetes control have and **judicious** use of therapeutic options, including insulin therapy, for optimizing diabetes management should be encouraged.

50) KEY FINDINGS FOR DIABETES CARE FOR INDIA.
THERE ARE 2 POINTS-:

1. 387 million people were estimated to be suffering from diabetes worldwide in 2014; this number is set to increase to 592 million by 2035.
2. Adults in India alone account for 86% of Southeast Asia's adult population of 883 million. India accounts for the majority of the children with T1D, which has important consequences not only for the total region but also for worldwide estimates.

#ELECTROHOMOEOPATHY TREATMENT FOR DIABETES

TREATMENT ARE GIVEN -:

In acute case, Scrofoloso (1) or S6, Canseroso (1) Or C2 Or C6 and Ferifugo (1) should be given after every hour. If the disease chronic, higher dilutions should be given. Angiotico (1) before and S10 after meal and D1 thrice a day. Linfatico (1) twice a day. Ten drops of Blue electricity in the morning and ten drops of White electricity in the afternoon in one spoon of water. Red and Yellow electricity or Blue electricity or Green electricity (in blood prone) at place no.17,18 and back bone Yellow and White electricity on kidneys and abdomen should be applied. In chronic cases, patient should be given bath once or twice a week with C5, S5 and F2. Green vegetables should be taken. Beet , carrot, turnip, potato, should be avoided. Use sweetener instead of sugar .Bread should be taken in less quantity and avoid rice, meat, eggs, fish, cheese, etc. Ghee, butter, cream, fresh curd may be taken. Almond, Pista, etc. may be used roasted and with salt. All the sweet things should be avoided.

Polyuria TREATMENT-:

Scrofoloso (2) or S6 and C1 , C6 and c17 & febrifugo (2) should be given. Compress place no-:24 of Red electricity on place no.23 and massage of Linf2 or S5 ointment. Linfatico (1) should be taken before the meal.

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