

Session: Rural Diabetes Care in India & Challenges

Topic: Caste, culture, and food taboos: impact on diabetes management



BY

DR BASAB GHOSH

Senior Diabetologist, Agartala, Tripura.

Dr Basab's Diabetes Care, Agartala, Tripura.

Regional Faculty, PHFI.

Prof M Viswanathan Gold Medalist,
from DRC, Chennai.

Distinction with Honor in Diploma in Diabetes, Annamalai University.

Caste, culture, and food taboos:

Prospective Urban Rural Epidemiology (PURE) study

- ▶ PURE study suggested that mortality and morbidity due to Non Communicable Diseases (NCD) is much higher in **low-income** and **middle-income** countries such as India, compared with wealthier nations.

Anjana, RM · Mohan, V · Rangarajan, S · et al. Contrasting associations between diabetes and cardiovascular mortality rates in low-, middle-, and high-income countries: cohort study data from 143,567 individuals in 21 countries in the PURE Study. *Diabetes Care*. 2020; 43:3094-3101

Caste, culture, and food taboos: Impact on diabetes management

- ▶ Several studies conducted over the last two decades have revealed the high total burden of diabetes, hypertension, and dyslipidaemia in India.



1. Tandon, N · Anjana, RM · Mohan, V · et al. The increasing burden of diabetes and variations among the states of India: the Global Burden of Disease Study 1990–2016. *Lancet Glob Health*. 2018; 6:e1352-e1362
2. Jung, L · De Neve, JW · Chen, S · et al. The interaction between district-level development and individual-level socioeconomic gradients of cardiovascular disease risk factors in India: a cross-sectional study of 2.4 million adults. *Soc Sci Med*. 2019; 239, 112514

Caste, culture, and food taboos: Impact on diabetes management

- ▶ Regions and states in India differ widely from each other in ethnic composition, dietary habits, and socioeconomic development, so **overall NCD estimates** for the country are likely **to mask** wide inter-regional and intraregional differences.



Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (**ICMR-INDIAB-17**). Anjana, Ranjit MohanMohan, Viswanathan et al. The Lancet Diabetes & Endocrinology, Volume 11, Issue 7, 474 - 489

The ICMR-INDIAB national cross-sectional study

ICMR-INDIAB-17

INDIA'S BURDEN OF NON-COMMUNICABLE DISEASES

NON-COMMUNICABLE DISEASES (NCDS)	NATIONAL PREVALENCE	ESTIMATED NUMBER OF PEOPLE IN INDIA, IN MILLIONS (BURDEN)	STATE WITH HIGHEST PREVALENCE	STATE WITH LOWEST PREVALENCE
DIABETES	11.4%	101	GOA (26.4%)	UTTAR PRADESH (4.8%)
PREDIABETES	15.3%	136	SIKKIM (31.3%)	MIZORAM (6.8%)
HYPERTENSION	35.5%	315	PUNJAB (51.8%)	MEGHALAYA (24.3%)
GENERALIZED OBESITY	28.6%	254	PUDUCHERRY (53.3%)	JHARKHAND (11.6%)
ABDOMINAL OBESITY	39.5%	351	PUDUCHERRY (61.2%)	JHARKHAND (18.4%)
HYPERCHOLESTEROLEMIA	24.0%	213	KERALA (50.3%)	JHARKHAND (4.6%)

SOURCE: MADRAS RESEARCH DIABETES FOUNDATION - INDIAN COUNCIL OF MEDICAL RESEARCH STUDY, 2023

ThePrint

Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (**ICMR-INDIAB-17**). Anjana, Ranjit MohanMohan, Viswanathan et al. The Lancet Diabetes & Endocrinology, Volume 11, Issue 7, 474 - 489

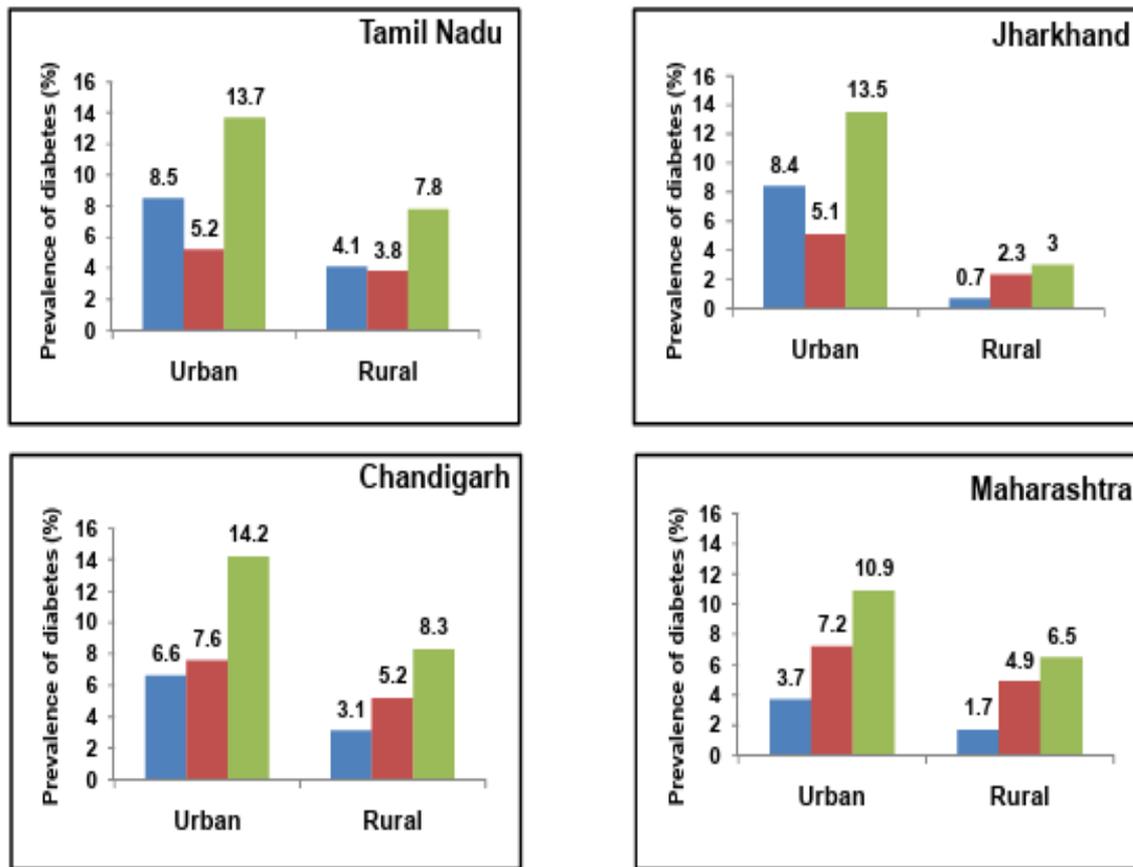
Prevalence of diabetes in rural vs. urban population

ICMR-INDIAB
Study Report

newly
diagnosed, &
overall

ICMR-INDIAB Study Report. Access at: https://www.icmr.gov.in/icmrobject/static/icmr/dist/images/pdf/reports/Executive_summary_INDIAB_Phase_I.pdf?utm

Figure 1: Prevalence* of diabetes (self-reported, newly diagnosed and overall) in the urban and rural population in all the 4 regions studied



*Weighted prevalence

■ Self-reported ■ Newly diagnosed ■ Overall

ICMR-INDIAB Study Report

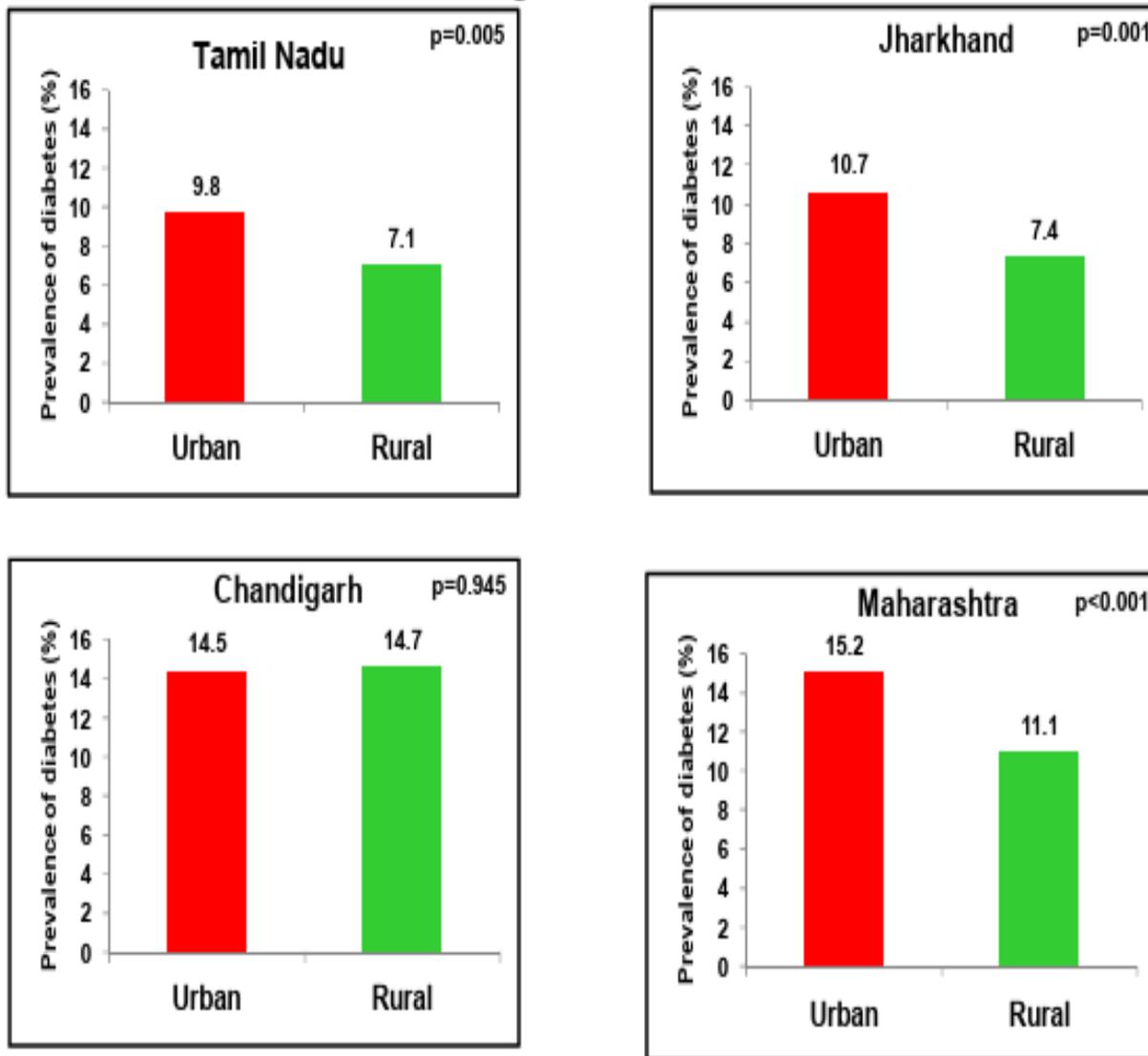
The rural-urban gap is reducing

Prediabetes cases in India

Prevalence in rural and urban population

ICMR-INDIAB Study Report. Access at: https://www.icmr.gov.in/icmrobject/state/icmr/dist/images/pdf/reports/Executive_summary_INDIAB_Phase_I.pdf?utm

Figure 2: Prevalence* of prediabetes in the urban and rural population in all the 4 regions studied



*Weighted prevalence

Weighted prevalence of diabetes and prediabetes in 15 states / Union territory of India - the ICMR INDIAB Study

States/UT	Prevalence of diabetes (%)			Prevalence of prediabetes (%)		
	Urban	Rural	Overall	Urban	Rural	Overall
Andhra Pradesh	12.6	6.3	8.4	11.1	9.6	10.1
Arunachal Pradesh	5.8	4.9	5.10	14.2	12.3	12.8
Assam	12.4	4.4	5.5	13.6	11.6	11.9
Bihar	10.5	3.5	4.3	15.5	9.3	10.0
Chandigarh	14.2	8.3	13.6	14.5	14.7	14.6
Gujarat	9.5	5.1	7.1	8.4	11.5	10.2
Jharkhand	13.5	3.0	5.3	10.7	7.4	8.1
Karnataka	11.1	5.6	7.7	14.1	10.2	11.7
Maharashtra	10.9	6.5	8.4	15.2	11.1	12.8
Manipur	7.1	4.4	5.1	7.2	7.5	7.5
Meghalaya	8.9	3.5	4.5	7.4	10.6	10.0
Mizoram	7.9	3.6	5.8	6.2	5.8	6.0
Punjab	12.0	8.7	10.0	8.6	7.9	8.2
Tamil Nadu	13.7	7.8	10.4	9.8	7.1	8.3
Tripura	15.5	7.2	9.4	16.2	14.2	14.7

Weighted prevalence of diabetes and prediabetes in 15 states / Union territory of India - the ICMR INDIAB Study

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Bihar	10.5	3.5	4.3	15.5	9.3	10.0
Chandigarh	14.2	8.3	13.6	14.5	14.7	14.6
Gujarat	9.5	5.1	7.1	8.4	11.5	10.2
Jharkhand	13.5	3.0	5.3	10.7	7.4	8.1
Karnataka	11.1	5.6	7.7	14.1	10.2	11.7
Maharashtra	10.9	6.5	8.4	15.2	11.1	12.8
Manipur	7.1	4.4	5.1	7.2	7.5	7.5
Meghalaya	8.9	3.5	4.5	7.4	10.6	10.0
Mizoram	7.9	3.6	5.8	6.2	5.8	6.0
Punjab	12.0	8.7	10.0	8.6	7.9	8.2
Tamil Nadu	13.7	7.8	10.4	9.8	7.1	8.3
Tripura	15.5	7.2	9.4	16.2	14.2	14.7

Caste, culture, and food taboos: Impact on diabetes management

**In rural India
prediabetes cases are
increasing in an
alarming situation.**



The Burden of Cost: High Treatment Costs

Annual Cost Range:

- The cost of diabetes care in India ranges from Rs 8,000 to Rs 46,000 per year

Distribution of direct costs in diabetes care

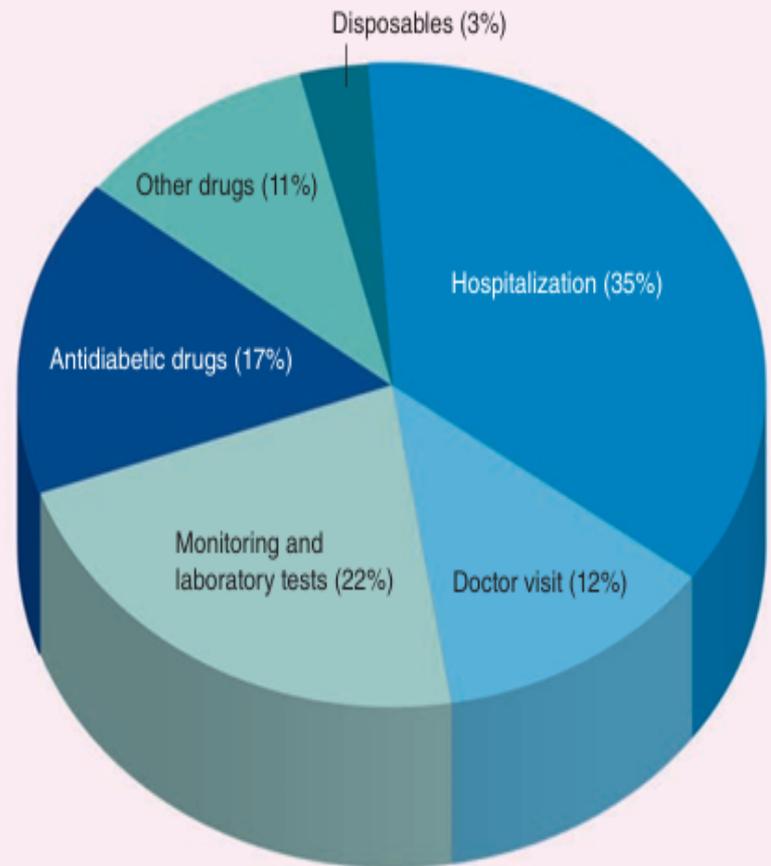
- ▶ ~ 30% for drugs
- ▶ ~ 20% for monitoring and laboratory tests
- ▶ ~ 15% for doctor visit
- ▶ ~ 35% for hospitalization

Impact on Treatment:

Financial constraints lead to delayed, irregular, or inadequate treatment in **rural areas**.

Maheshwari A, et al. Diabetes care in rural India – review. *J Diabetes Metab Disord Control*. 2025;12(1):42-47.

Distribution of direct costs in diabetes care



Viswanathan V, et al. *J Assoc Physicians India*. 2013;61 Suppl 1:12-4.

Traditional Practices In Tribal And Rural Communities



70% of rural population in India depends on traditional

Many tribal groups cultivate, use, and medicinal plants for self-care and treatment of inflammatory, antioxidant, and anti-diabetic properties are commonly used in traditional medicine provides locally accessible and affordable alternatives

Herbal remedies with anti-inflammatory, antioxidant, and anti-diabetic properties are commonly used in traditional medicine provides locally accessible and affordable alternatives

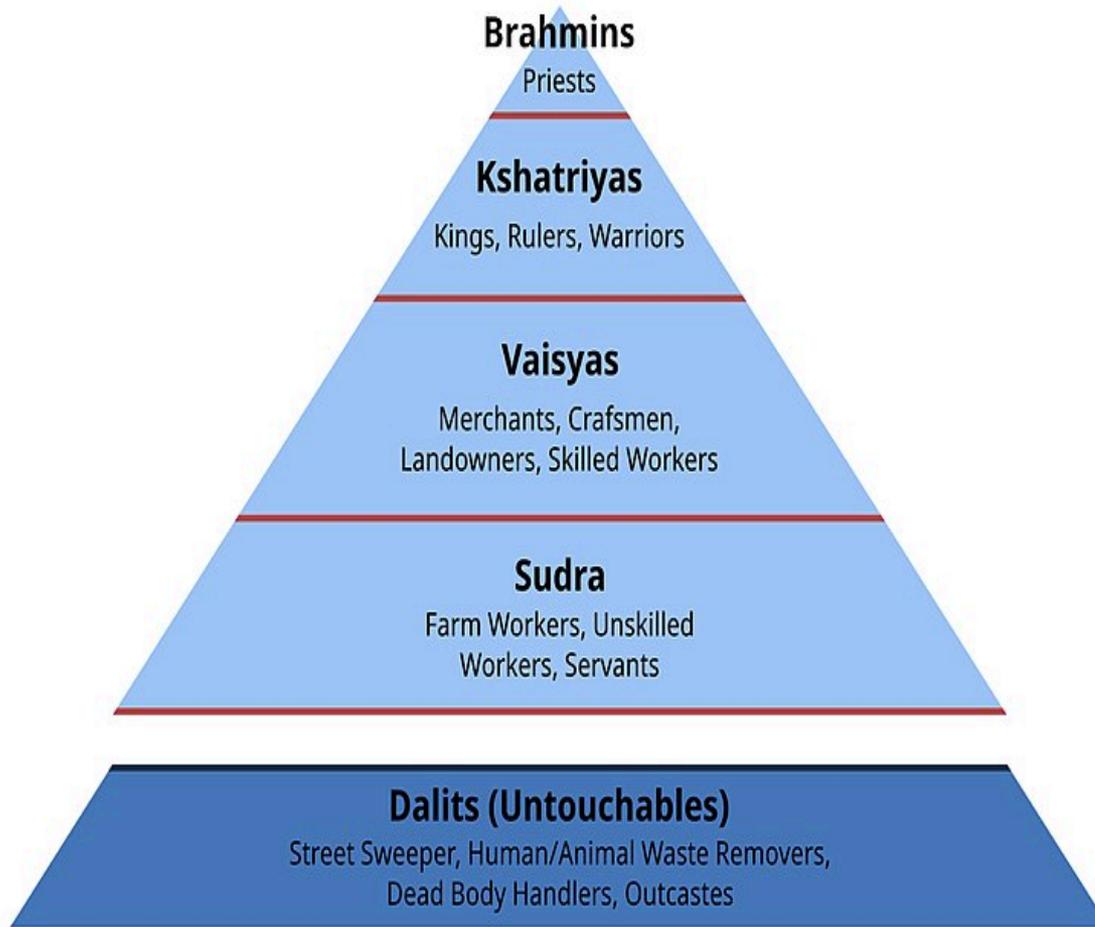
Traditional medicine provides locally accessible and affordable alternatives

locally accessible and affordable alternatives

alternatives

Dey A, et al. Int. J. Med. Plants. Res., 2 (1). 2013:198-203.

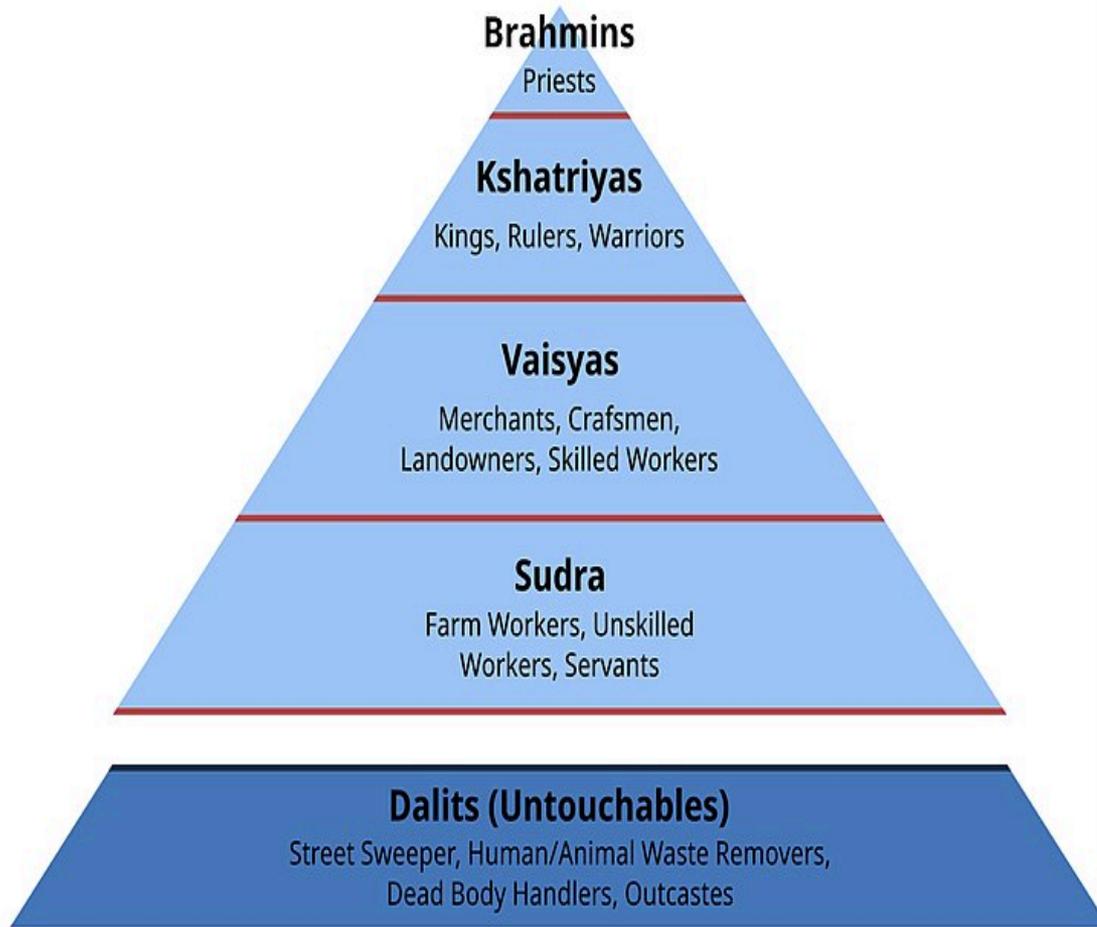
Indian Caste System



➤ India has a traditional, hierarchical **caste system** composed of four main Varnas: Brahmins (priests, teachers), Kshatriyas (warriors, rulers), Vaishyas (traders, farmers), and Shudras (laborers).

➤ Below these Varnas, there is a fifth group, the Dalits, historically known as "Untouchables" and considered outside the Varna system.

Indian Caste System



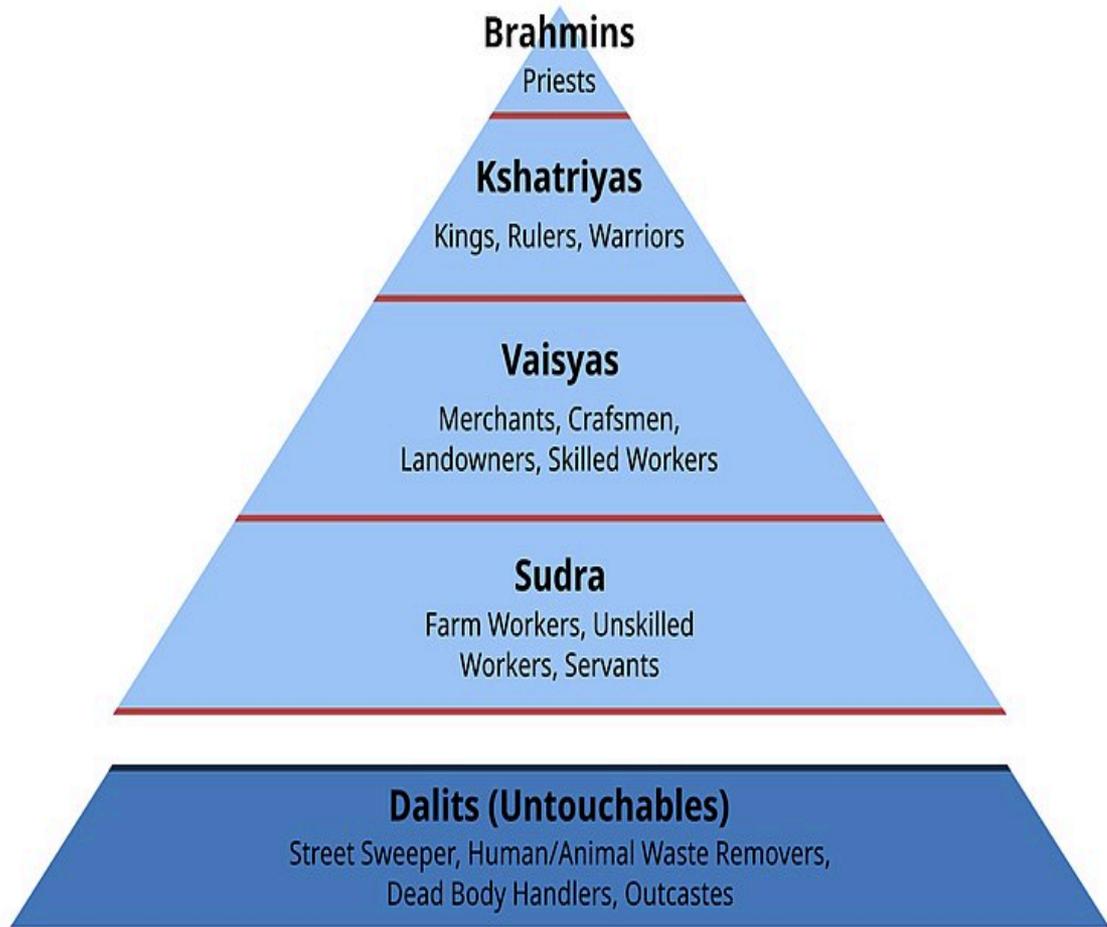
➤ Beyond the Varnas, alongside Dalits, there are countless Jatis (endogamous groups) and

➤ other designations, such Scheduled Tribes (Adivasis) and Other Backward Classes (OBC), which reflect specific occupations and regional variations.

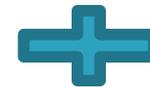


Adivasis & OBC

Indian Caste System



Opportunities,
Advancement and
Access to ownership of
resources



Adivasis
& OBC

High
in
higher cast



Low
in
lower cast

David Mosse. Caste and development: Contemporary perspectives on a structure of discrimination and advantage, World Development, Volume 110, 2018, Pages 422-436

Development of Scheduled Castes in India – A Review

A study by Darshan Singh presents data on health and other indicators of socio-economic change and highlighted the gap:

In 2001	National average	Scheduled Castes
Literacy rates	63%	55%
Childhood vaccination	44%	40%
Access to drinking water within household or near the household	83%	80%
In 2005, poverty level	27%	39%

Singh, Darshan (2009). "Development of Scheduled Castes in India – A Review" (PDF). Journal of Rural Development. 28 (4): 529–542

Caste, culture, and food taboos: Impact on diabetes management

However gradually situation is improving...

- ▶ The life expectancy of various caste groups in modern India has been raised; but the International Institute for Population Sciences report suggests that **poverty, not caste**, is the bigger differentiation in life expectancy in modern India.



Mohanty and Ram (November 2010). "Life Expectancy at Birth Among Social and Economic Groups in India" (PDF).
International Institute for Population Sciences.
Archived from the original (PDF) on 21 August 2020. Retrieved 14 January 2012.

Caste, culture, and food taboos: Impact on diabetes management

▶ The life expectancy of various

Effective development projects require an intersectional strategy that addresses both **caste and poverty**.

expectancy in modern India.

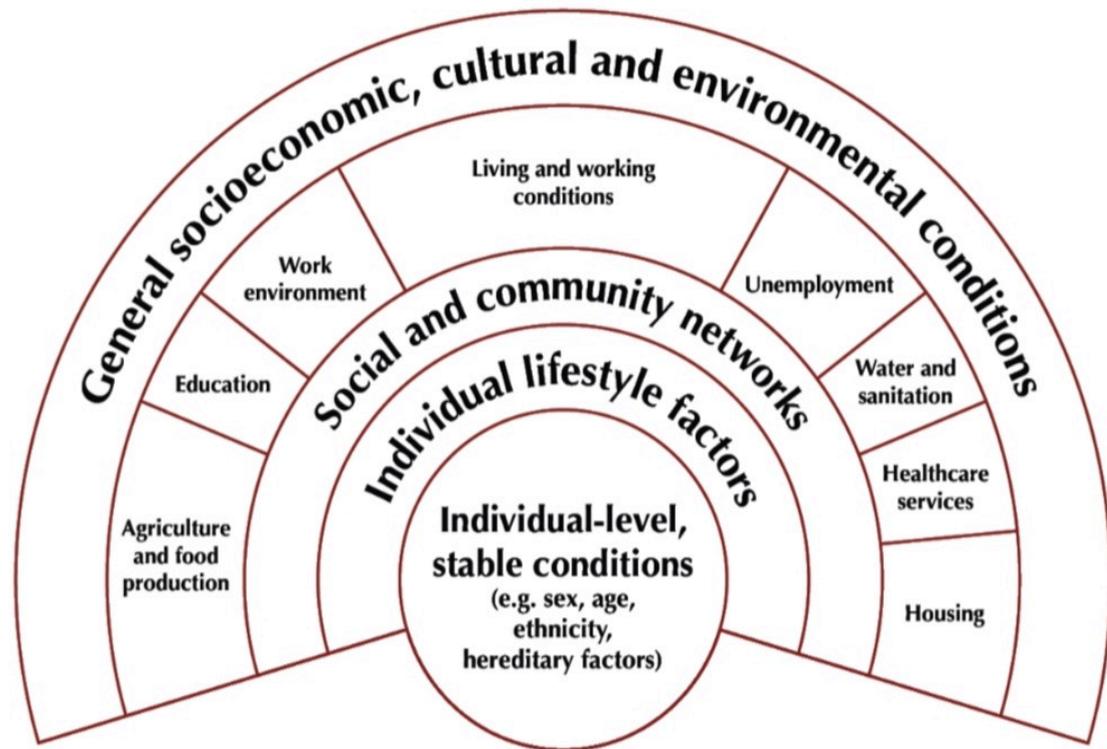


Mohanty and Ram (November 2010). "Life Expectancy at Birth Among Social and Economic Groups in India" (PDF). International Institute for Population Sciences. Archived from the original (PDF) on 21 August 2020. Retrieved 14 January 2012.

Caste, culture, and food taboos: Impact on diabetes management

Health inequities and ethnic inequalities

➤ The most widely used example is the **1991 Dahlgren-Whitehead rainbow model of health**, which depicts the relationship between an individual, their environment and health.



Dahlgren-Whitehead rainbow model of health, 1991

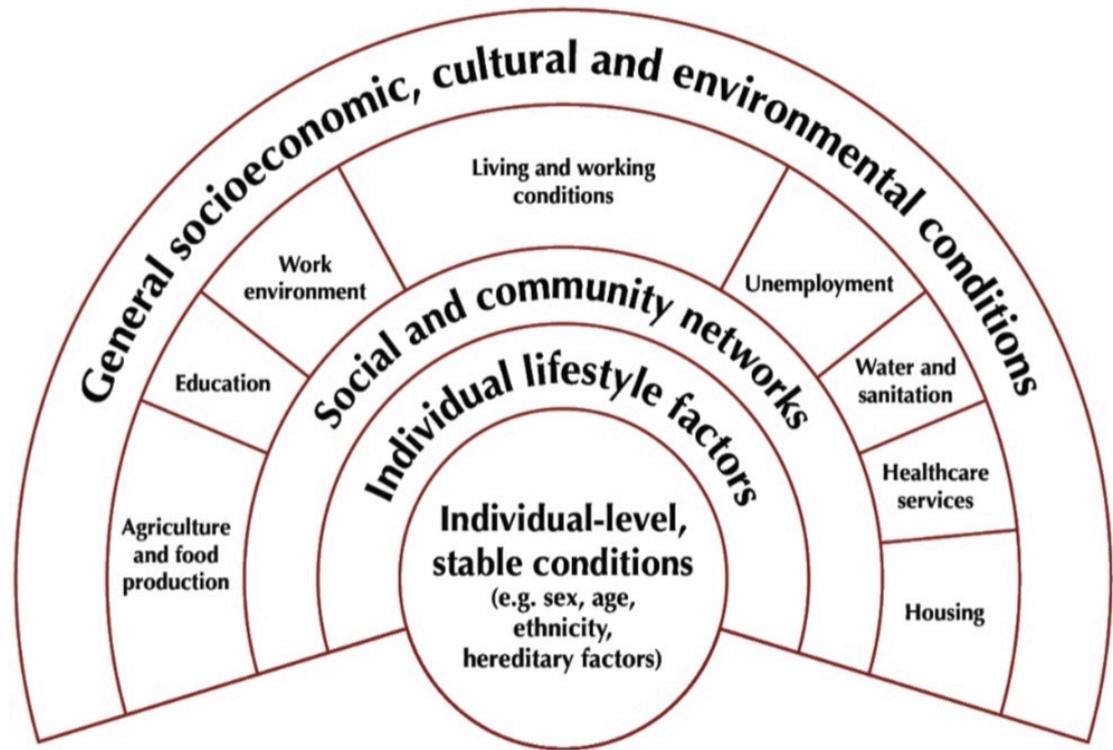
1. Bhopal R (2009) Medicine and public health in a multiethnic world. *J Public Health (Oxf)* **31**: 315–21
2. Dahlgren G, Whitehead M (1991) Policies and strategies to promote social equity in health. Institute for Futures Studies, Stockholm, Sweden. Available at: <https://bit.ly/3GQR2k1> (accessed 17.04.23)

Caste, culture, and food taboos: Impact on diabetes management

Health inequities and ethnic inequalities

➤ Ethnic inequalities are multifactorial, including migration, culture, lifestyle, genetics, access to healthcare and socioeconomic status.

➤ The WHO has reported that the social determinants of health (SDoH) account for 30–55% of health outcomes.



Dahlgren-Whitehead rainbow model of health, 1991

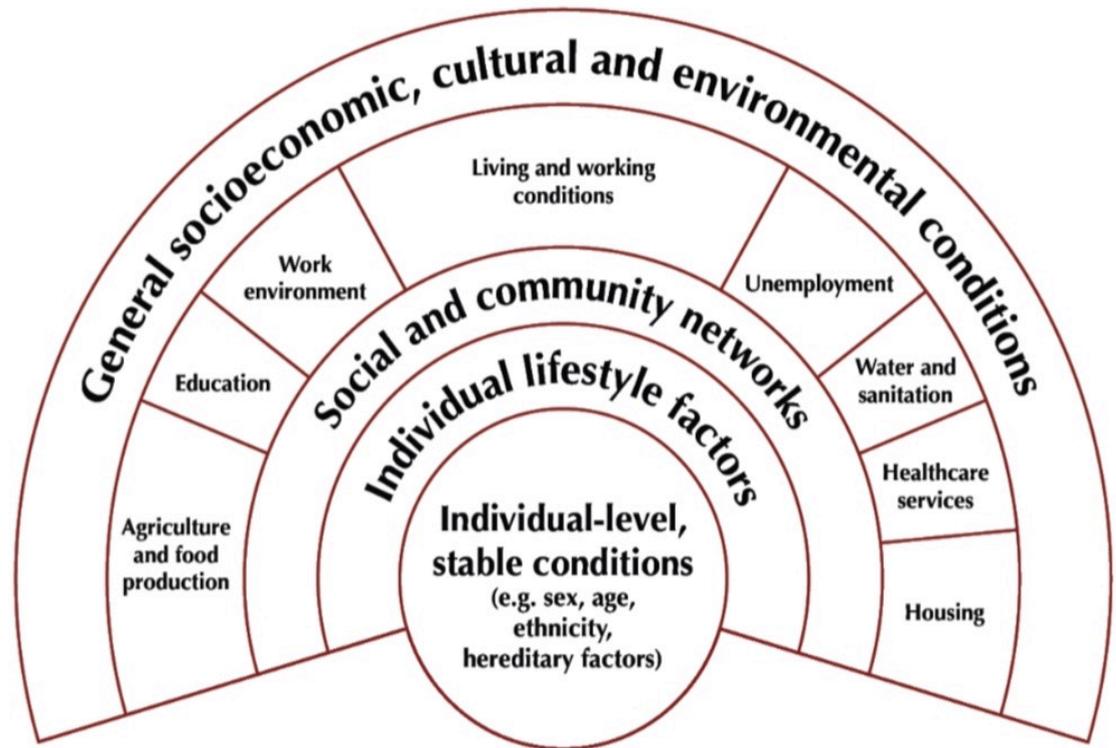
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Caste, culture, and food taboos: Impact on diabetes management

Health inequities and ethnic inequalities

➤ These **social determinants of health (SDoH)** are the non-medical conditions where people are born, grow, live, work, and age, income, housing stability, and access to education.

➤ Those have a significant, often greater, influence on health than genetics or healthcare access alone.



Dahlgren-Whitehead rainbow model of health, 1991

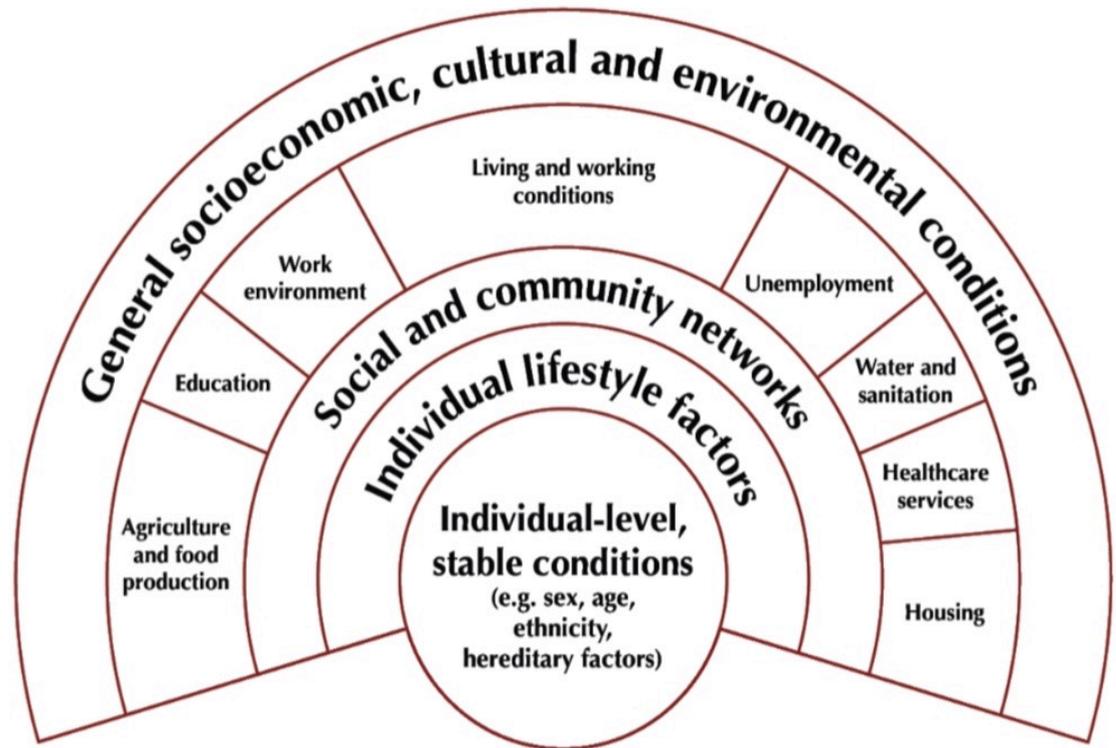
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Caste, culture, and food taboos: Impact on diabetes management

Health inequities and ethnic inequalities

➤ Addressing these factors is crucial for improving health and reducing health inequities globally.

➤ In primary care, we should try to incorporate aspects of this model in service delivery.



Dahlgren-Whitehead rainbow model of health, 1991

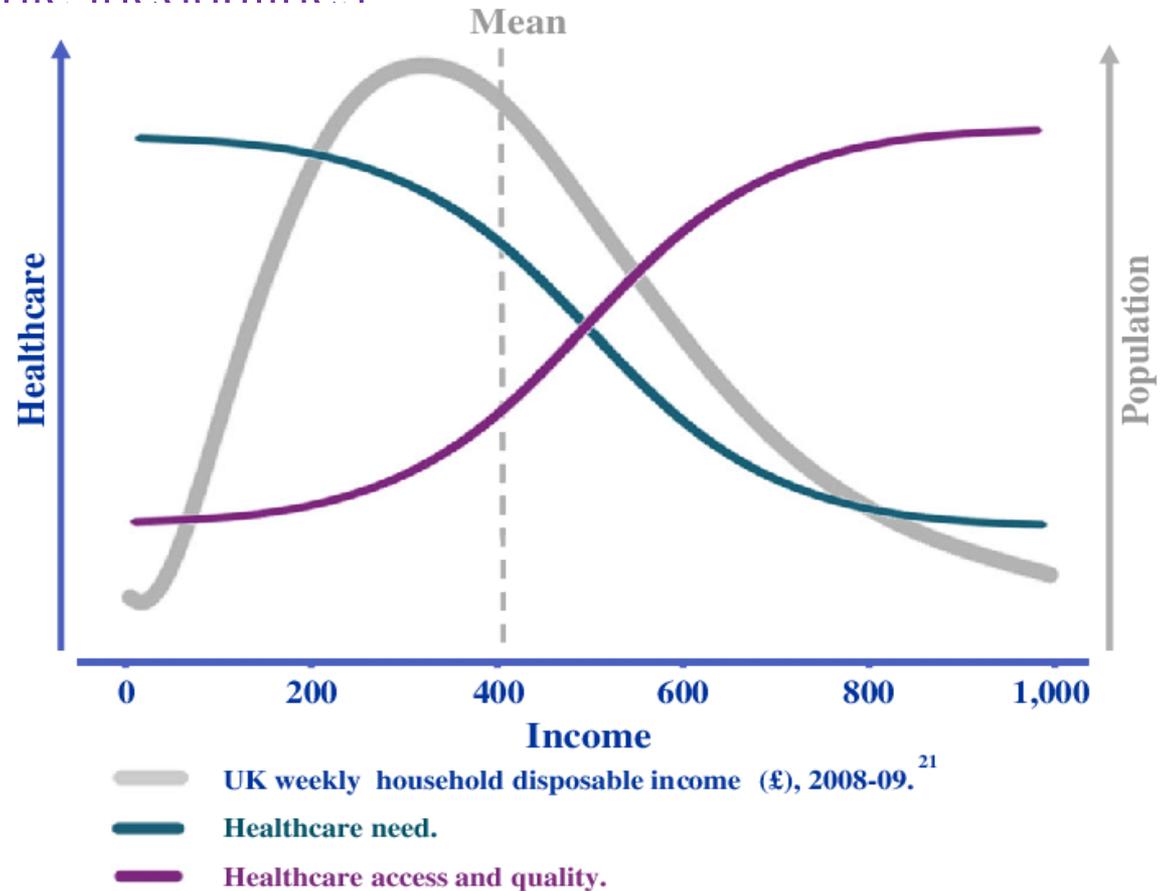
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Caste, culture, and food taboos: Impact on diabetes management

Health inequities and ethnic inequalities

➤ The **inverse care law**, formulated by physician Julian Tudor Hart in **1971**, states that the availability of good medical care varies inversely with the need for it in the population it serves.

➤ This means that the people who need healthcare the most i.e. often the most disadvantaged and unhealthy populations, likely to receive less care.



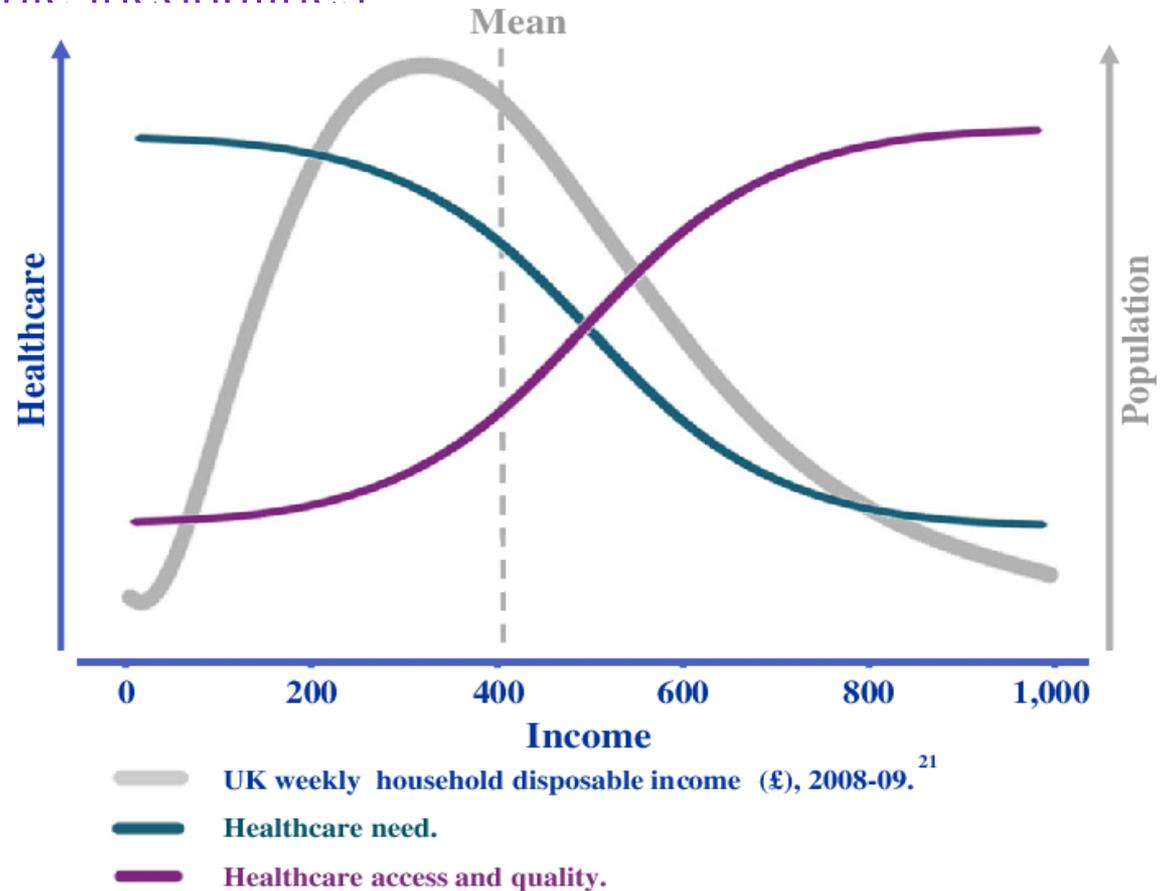
Schematic representation of the inverse care law

Tudor Hart J (1971) The inverse care law. *Lancet* 1: 405-12

Caste, culture, and food taboos: Impact on diabetes management

Health inequities and ethnic inequalities

- The **inverse care law** holds true even today.
- Complex patients with DM will require the support of specialists, so **easier access** to specialist nurses and consultants and their integration into care are important.



Schematic representation of the inverse care law

Caste, culture, and food taboos: Impact on diabetes management

Food is a deeply political topic.

Food plays an important role in producing cultural identities, particularly the assertions of superior cultures.



Guru, G. 2019. "Food as a Metaphor for Cultural Hierarchies."
In *Knowledges Born in the Struggle: Constructing the Epistemologies of the Global South*,
edited by B. de S. Santos, and M. P. Meneses, 146–161. London: Routledge.

Dirty food: racism and casteism in India

This article traces how food cultures in India reiterate social hierarchies and caste logics of cleanliness and purity in everyday racism.

Food prepared with ingredients from the homelands in **Northeast India**, such as fermented bamboo shoot, soybeans, herbs, and plants, is perceived as polluting the upper caste spaces in other metropolitan cities.

Beliefs around nutrition and dietary habits

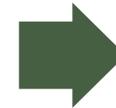
Cultural and religious influence

- Oil and sugar are integral to the Indian diet.



Festivals and rituals

- India's festivals emphasize sweets and high-fat foods.



Barriers to diabetes care

- Sociocultural beliefs hamper adherence to dietary

Fasting and Challenges in Managing Glycemia

Many day-long and week-long fasts are observed in India by different religions.

Fasting, without taking adequate safe guards, may predispose persons on glucose-lowering medication to hypoglycemia.

Over-indulgence in high-fat, high-carbohydrate, calorie-rich foods after completion of the fasting period, may cause peaks of hyperglycemia and worsen glycemic variability.

Dietary guidelines for Indians – 2024 – ICMR recommends

- **Carbohydrates** - 50-55% of daily calories, prioritizing complex carbs from whole grains, fruits, and vegetables.
- **Protein** - 10-15%, and
- **Fats** - 20-30%, with added oils and fats limited to approximately 25-30 grams per day.

ICMR-NIN Expert Committee, Dietary Guidelines for Indians-2024.

Dietary guidelines for Indians - 2024

Dietary Guidelines for Indians, 2024, recommends

- **Limit Added Sugars:** Keep added sugar intake below 5-10% of total daily calories.

Sugar consumption, especially added sugars, is under attack. Various government and health authorities have suggested new sugar recommendations and guidelines as low as 5% of total calories from free sugars (#).

- **Limit Salt:** Salt consumption reduce to 5 grams (about 1 teaspoon) per day, including both visible and invisible salt.

ICMR-NIN Expert Committee, Dietary Guidelines for Indians-2024.

Erickson J, Slavin J. Total, added, and free sugars: are restrictive guidelines science-based or achievable? *Nutrients*. 2015 Apr 15;7(4):2866-78.

India's Diet-Diabetes Link: ICMR Study Reveals Alarming Trends

- ▶ A striking finding reveals that Indians get 62% of daily calories from carbohydrates. This percentage is one of the highest globally.
- ▶ Region wise carb intake, East 64.8%, NE 62.5%, South 62.5%, North 61.5%, Central 61%, West 59.6%.
- ▶ Much of this carbohydrate intake comes from low-quality sources, like white rice, refined grains, and added sugars.
- ▶ Alarmingly, 21 states surpass recommendations for added sugar intake, which should ideally be 5% of daily calories.

Anjana, R.M., Sudha, V., Abirami, K. et al. Dietary profiles and associated metabolic risk factors in India from the ICMR-INDIAB survey-21. Nat Med (2025).
Published: 30 September 2025

India's Diet-Diabetes Link: ICMR Study Reveals Alarming Trends

- ▶ Total fat intake generally falls within national guidelines, up to 30% of daily energy.
- ▶ However, in most states saturated fat consumption often exceeds recommended thresholds of <10% of daily calories. Highest intake is in North India (11.2%).
- ▶ Healthier fats, such as MUFA and PUFA, show low consumption across all regions.

Anjana, R.M., Sudha, V., Abirami, K. et al. [Dietary profiles and associated metabolic risk factors in India from the ICMR-INDIAB survey-21](#). Nat Med (2025).
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India's Diet-Diabetes Link: ICMR Study Reveals Alarming Trends

- ▶ Furthermore, protein intake is suboptimal, averaging only 11.9% of daily calories nationwide.
- ▶ The Northeast region shows the highest protein intake at 13.6%.
- ▶ In India most protein comes from plant-based (8.9%) from sources like cereals, pulses, and legumes.
- ▶ Dairy protein (2%) and animal proteins (1%) contribute minimally of total calories.

Anjana, R.M., Sudha, V., Abirami, K. et al. [Dietary profiles and associated metabolic risk factors in India from the ICMR-INDIAB survey-21](#). Nat Med (2025).
Published: 30 September 2025

India's Diet-Diabetes Link: ICMR Study Reveals Alarming Trends

- ▶ India's rapidly changing food habits significantly contribute to rising rates of diabetes and obesity in rural areas.

Anjana, R.M., Sudha, V., Abirami, K. et al. [Dietary profiles and associated metabolic risk factors in India from the ICMR-INDIAB survey-21](#). Nat Med (2025).
Published: 30 September 2025

Food Stress and Diabetes-Related Psychosocial Outcomes in American Indian Communities: A Mixed Methods Approach

Objective

Explore the relationship between **diabetes-related psychosocial outcomes** and **food stress** in American Indian communities.

Results

Food stress in the forms of

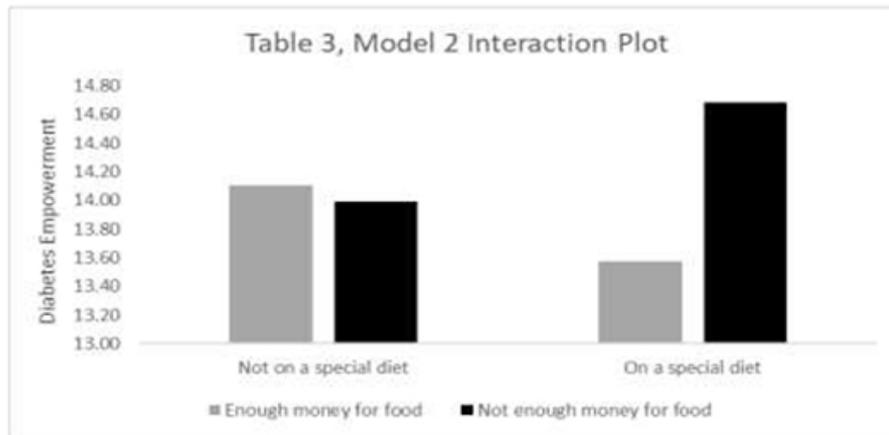
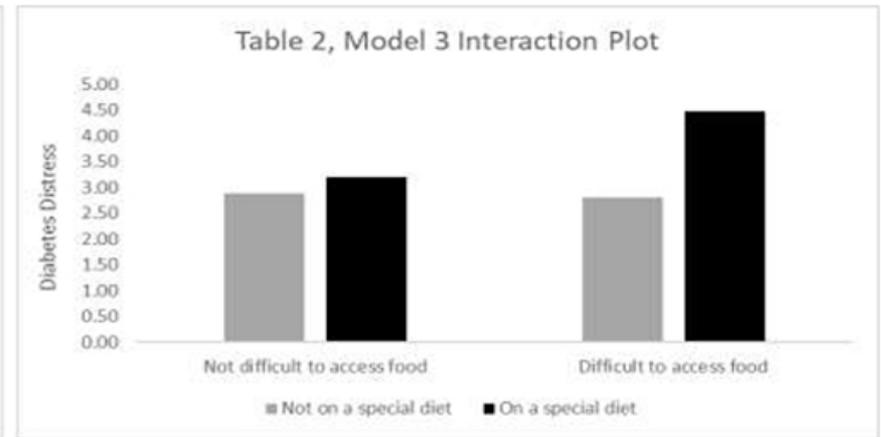
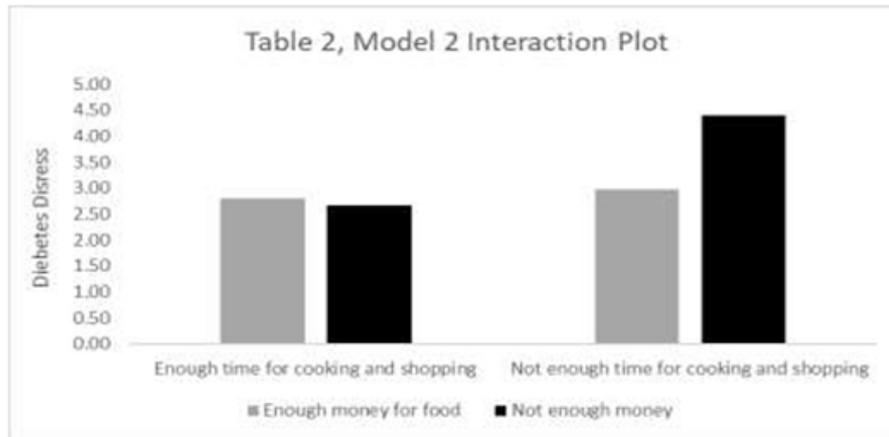
- (1) not having enough money for food and not having enough time for cooking or shopping ($P = 0.08$) and
- (2) inadequate food access being on a special diet ($P = 0.032$) were associated with increased diabetes distress.
- (3) Lower diabetes empowerment was associated with not having enough money for food being on a special diet ($P = 0.030$)

Tara L. Maudonle, Kevalin M.W. Aulandez, Victoria M. Keefe, Frances R. Whitfield, Melissa L. Walls, Dane S. Hautala, Food Stress and Diabetes-Related Psychosocial Outcomes in American Indian Communities: A Mixed Methods Approach, *Journal of Nutrition Education and Behavior*,

Food Stress and Diabetes-Related Psychosocial Outcomes in American Indian Communities: A Mixed Methods Approach

Results

Food stress in the forms of



Food Stress and Diabetes-Related Psychosocial Outcomes in American Indian Communities: A Mixed Methods Approach

Conclusions and Implications

These findings emphasize the importance of improving community food environments and addressing **individual food access** for diabetes management and prevention.

Tara L. Maudrie, Kevalin M.W. Aulandez, Victoria M. O'Keefe, Frances R. Whitfield, Melissa L. Walls, Dane S. Hautala, Food Stress and Diabetes-Related Psychosocial Outcomes in American Indian Communities: A Mixed Methods Approach, *Journal of Nutrition Education and Behavior*, Volume 54, Issue 12, 2022, Pages 1051-1065,

Caste, culture, and food taboos: impact on diabetes management

Take home message

- ▶ Regions and states in India differ widely from each other in ethnic composition, dietary habits, and socioeconomic development.
- ▶ Likely poverty, not caste, is the bigger differentiation in life expectancy in modern India, however effective development projects require an intersectional strategy that addresses both caste and poverty.
- ▶ In rural India prediabetes cases are increasing in an alarming situation.
- ▶ Financial constraints lead to delayed, irregular, or inadequate treatment in rural areas.
- ▶ In India patients living with diabetes are diverse and, therefore, one cannot have a “one-size-fits-all” approach to diabetes counseling and education.
- ▶ Improving community food environments and addressing individual food access for diabetes management and prevention would be always beneficial.

THANK YOU



Please visit Tripura