Project Title: Investigating the Role of Traditional Indian Diets in Diabetes Risk.

ABSTRACT

India is witnessing a swift increase in type 2 diabetes mellitus (T2D), highlighting the imperative to examine dietary patterns that influence glycemic responses. This review aimed to evaluate the relationship between traditional Indian dietary patterns and the risk of Type 2 Diabetes (T2D) by employing the concepts of glycemic index (GI) and glycemic load (GL), with a particular emphasis on dietary transitions towards modern, high-glycemic diets. A systematic literature review was conducted using peer-reviewed clinical trials, national nutrition surveys, and food composition databases to assess the glycemic index and glycemic load profiles of traditional and modern Indian diets. Studies indicate that traditional diets abundant in millets, pulses, legumes, and foods processed through fermentation or parboiling are associated with diminished postprandial glycemic responses and increased insulin sensitivity. On the other hand, eating more processed cereals, sugary drinks, and fried snacks is always linked to a higher dietary glycemic load and a higher risk of type 2 diabetes. The results show that the Indian diet is changing a lot. People are eating less of the protective, low-glycemic index staples and more of the highly processed, high-glycemic load foods. The review contends that reintegrating traditional low-GI foods into modern Indian diets is a culturally pertinent and biologically beneficial strategy for reducing T2D risk. Public health programs should focus on teaching people about GI- and GL-oriented nutrition, encourage people to eat whole grains like millets, and make rules that combine old ways of eating with new ways of eating.

Keywords

- Type 2 Diabetes Mellitus (T2DM)
- Traditional Indian Diets
- Millets and Coarse Grains
- Dietary Transition in India
- Insulin Resistance

Introduction

Type 2 diabetes (T2D) is one of the fastest-growing public health challenges worldwide, accounting for the majority of diabetes cases. According to the International Diabetes Federation (IDF), an estimated 589 million adults aged 20–79 years were living with diabetes globally in 2025, a figure projected to rise sharply in the coming decades. [1] In India, the burden is particularly severe, with about 89.8 million adults in the same age groups were affected as of 2024. This increase is alarming because it reflects not only the country's genetic susceptibility but also the rapid lifestyle and dietary transitions that have accompanied urbanization. [3] Among these factors, dietary patterns have emerged as the most critical modifiable determinant of risk, setting the stage for a closer examination of lifestyle and nutrition in the Indian context. [3]

Rapid lifestyle changes and genetic predisposition are the two principal factors influencing the rise of T2D in India, with the latter playing a substantial role. [3] Sedentary occupations and rapid urbanization have significantly reduced levels of daily physical activity, while motorized transport has further curtailed mobility. [4] At the same time, dietary practices have shifted away from coarse grains and traditional staples toward refined rice, wheat, processed foods, fried snacks, and sugar-sweetened beverages. [5] These changes have contributed to more frequent postprandial glucose spikes and long-term metabolic stress. [5] Additional risks are imposed by irregular sleep, elevated stress, and extended working hours, while cultural habits such as the addition of sugar to tea and routine fried snacks further exacerbate the burden. [3] Collectively, these trends diverge from World Health Organization dietary recommendations, underscoring diet as the most important modifiable determinant in addressing India's growing diabetes epidemic. [6]

Diet is the most important factor in the management of type 2 diabetes, as it represents the most modifiable lifestyle determinant. [3] The nutritional composition of contemporary Indian diets plays a decisive role in shaping both the risk and prevention of diabetes. [3] National surveys show that modern Indian diets are increasingly dominated by refined staples such as white rice and polished wheat flour, while the consumption of traditional coarse grains and millets has sharply declined. [4,5,7] These dietary patterns, along with widespread intake of potatoes, fried snacks, sweets, and the routine addition of sugar to tea, contribute to high glycemic loads, repeated blood glucose spikes, and insulin resistance. [4] At the same time, protective foods and practices remain embedded within Indian traditions. Millets, legumes, and pulses are long-standing plant proteins that slow glucose absorption, while spices, sprouting, and fermentation preparation methods enhance nutrient bioavailability and lower the glycemic impact of meals. [3] This coexistence of harmful and protective dietary elements highlights the paradox of Indian diets and underscores the need to leverage protective traditions for culturally appropriate diabetes prevention strategies. [3]

Scope

This review focuses on the relationship between traditional Indian dietary patterns and the risk of type 2 diabetes, with particular attention to populations that have a genetic predisposition. It examines both the risk-enhancing and protective components of Indian diets and considers their implications for culturally appropriate prevention strategies.

Objectives

- To assess the prevalence and dietary risk factors of type 2 diabetes in India.

- To evaluate the nutritional and glycemic properties of common traditional staples and their role in diabetes risk.

- To compare traditional dietary practices with World Health Organization dietary guidelines.

- To highlight protective dietary components and discuss feasible modifications that can support diabetes prevention in the Indian context.

Types of Diabetes and the Role of Glycemic Index

Diabetes mellitus represents a group of metabolic disorders characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The condition manifests in multiple forms that vary in etiology and pathophysiology but share a common consequence: impaired glucose regulation and long-term metabolic complications. Among these forms, type 2 diabetes mellitus (T2DM) has emerged as the most prevalent and impactful, warranting focused study in the Indian context.

Type 2 Diabetes Mellitus

Type 2 diabetes mellitus is characterized by insulin resistance combined with a relative deficiency in insulin secretion. In this condition, body cells fail to respond effectively to insulin, while the pancreas produces insufficient insulin to maintain normal glucose levels. Genetic susceptibility, sedentary behavior, obesity, and dietary patterns are key contributing factors. Chronic hyperglycemia associated with T2DM can lead to complications affecting multiple organ systems, including cardiovascular, renal, and ocular complications. Given its high prevalence and significant public health impact, this research primarily focuses on type 2 diabetes, examining its causes, risk factors, and management strategies.

Prediabetes

Prediabetes is a metabolic state in which blood glucose levels are elevated above the normal range but do not meet the criteria for T2DM. Individuals with prediabetes are at increased risk of progressing to type 2 diabetes and developing related complications. Early interventions, including lifestyle modifications and, when necessary, medical management, can effectively reduce the likelihood of progression.

Type 1 Diabetes Mellitus

Type 1 diabetes mellitus is an autoimmune condition in which the body's immune system attacks and destroys insulin-producing beta cells in the pancreas, resulting in absolute insulin deficiency. Lifelong insulin therapy is required to maintain glycemic control. Although it is most commonly diagnosed in children and young adults, type 1 diabetes can occur at any age.

Gestational Diabetes

Gestational diabetes is a form of glucose intolerance first recognized during pregnancy. While it often resolves after childbirth, individuals with gestational diabetes face a higher risk of developing type 2 diabetes later in life. [8]

Glycemic Index

Understanding the glycemic index (GI) is essential for analyzing how dietary transitions contribute to the increasing diabetes burden in India. The glycemic index is a quantitative measure that ranks carbohydrate-containing foods based on the speed at which they elevate blood glucose levels after consumption. It was developed to enhance understanding of glucose metabolism and to support the management of impaired glucose tolerance, particularly in diabetes. The GI concept builds upon the dietary fiber hypothesis proposed by Burkitt and Trowell, which suggested that foods digested and absorbed more slowly can provide metabolic benefits and reduce the risk of chronic diseases such as diabetes and coronary heart disease. In the Indian context, where traditional diets rich in coarse grains, legumes, and millets are increasingly replaced by refined carbohydrates, the glycemic index offers a valuable framework for assessing the impact of dietary changes on postprandial glucose levels and long-term metabolic stability.[9]

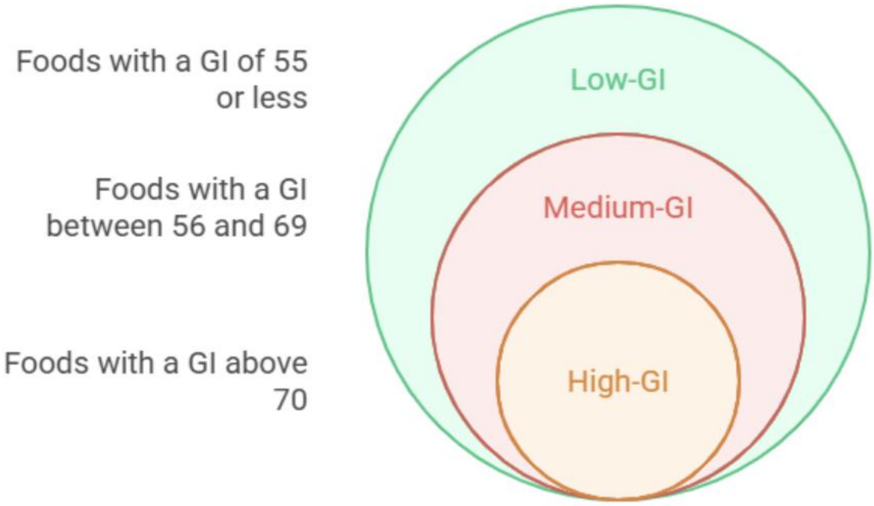

Fig. 1. Classification of Glycemic Index

Glycemic Load

The concept of glycemic load (GL) was later introduced by Salmeron et al. at Harvard University in 1997 to account for the contribution of not only the type of carbohydrate (i.e., glycemic index) but also the amount of available carbohydrates per serving to the overall glycemic response. The GL of a food is defined as the product of the GI value of the food and the amount of available carbohydrates in grams per serving of that food. It is important to note that serving size is variable based on dietary and cultural factors. Therefore, a food with a higher GL is expected to raise the serum glucose and insulin response per serving size to a greater extent than that of a food with a lower GL. A glycemic load value of 10 or less is considered low, 11–19 is considered medium, and 20 or more is considered high.[10]

Determinants of Glycemic Index and Glycemic Load in Indian Diets

1. Effect of Cooking on Starch Digestibility

Cooking alters starch structure through gelatinization, increasing enzymatic accessibility and thereby raising the glycemic index. Prolonged boiling, pressure cooking, and overcooking—common in modern Indian households—break down starch granules more completely than minimal cooking, resulting in faster glucose absorption and higher postprandial glycemic responses. [16,18]

2. Amylose–Amylopectin Ratio

The glycemic response of cereals is strongly influenced by starch composition. Foods rich in amylose digest slowly and exhibit lower GI values, whereas amylopectin-dominant grains digest rapidly and produce higher glucose excursions. Traditional Indian staples such as millets, pulses, and parboiled rice contain higher amylose and resistant starch content than polished white rice and refined wheat flour, contributing to their protective metabolic effects. [9,10,22]

3. Retrogradation and Cooling of Cooked Starches

Cooling cooked carbohydrate foods leads to starch retrogradation, a process in which gelatinized starch re-crystallizes into resistant starch that is less digestible. In Indian dietary contexts, the consumption of cooled or reheated rice, refrigerated idlis, or leftover rotis can therefore result in a lower glycemic response compared to freshly cooked equivalents. [15,10]

4. Role of Food Processing and Refinement

Mechanical processing such as polishing, milling, and refining removes the bran and germ layers of grains, reducing fiber, micronutrients, and resistant starch. This accelerates digestion and increases both GI and dietary GL. The widespread shift from whole grains and millets to polished rice and refined wheat flour has therefore significantly increased glycemic load in modern Indian diets. [10,23]

5. Portion Size and Glycemic Load

While GI reflects carbohydrate quality, glycemic load accounts for the quantity consumed. Large portion sizes of even moderate-GI foods—such as polished rice or refined wheat rotis—substantially elevate glycemic load, increasing cumulative postprandial glucose exposure over the day. This is particularly relevant in Indian diets, where cereals form the bulk of caloric intake. [9,12]

6. Mixed Meals and Macronutrient Interactions

In real-world eating patterns, carbohydrates are rarely consumed in isolation. The presence of protein, fat, and dietary fiber delays gastric emptying and glucose absorption, thereby lowering the effective glycemic response of a meal. Mixed meals typical of Indian cuisine—such as dal–roti, curd rice, or idli–sambar—significantly reduce postprandial glycemic excursions even when the cereal component alone has a high GI. [11,15]

7. Traditional Processing Techniques

Traditional preparation methods such as fermentation, sprouting, and parboiling reduce glycemic impact by increasing fiber, enhancing protein availability, and preserving resistant starch. These techniques also improve micronutrient bioavailability and insulin sensitivity, offering metabolic advantages over modern high-heat and deep-frying practices. [19,20,21,22]

Relevance of Glycemic Index and Glycemic Load in the Management of Diabetes

The glycemic index (GI) and glycemic load (GL) play a pivotal role in the management of diabetes. The GI approach is widely employed to evaluate the clinical benefits of dietary interventions in both glycemic and lipid control. It serves as a valuable tool for assessing the effects of various carbohydrate-containing foods on blood glucose levels. Complementing this, glycemic load integrates both the quality and quantity of carbohydrates, providing a practical framework for regulating postprandial blood sugar. Consequently, GL is an essential consideration in dietary planning for individuals with diabetes, facilitating improved glycemic management and the prevention of related complications [11, 12].

Commonly consumed food staples across India are

Rice

Rice remains the primary staple across most regions of India, with each state cultivating distinct varieties that differ in taste, aroma, and cooking properties. Common varieties include basmati, black, brown, and red rice. Biryani, pulao, bhakri, and pongal are just a few of the traditional dishes that use rice as a base.

Wheat

Wheat is another versatile staple, widely cultivated across India. It is processed into different textures, including coarse flour, fine atta, and rawa. Wheat flour is used in preparing diverse dishes such as rotis, parathas, and halwa, making it a central component of daily meals.

Maize (Corn)

Maize is both a staple and a snack ingredient in several regions, particularly in Karnataka, Maharashtra, Madhya Pradesh, Rajasthan, and Punjab. Its adaptability to various cuisines ensures its continued relevance in regional diets.

Jowar (Sorghum)

Sorghum, a drought-resistant millet, is predominantly consumed in Karnataka and Maharashtra. It is commonly used to make rotis and bhakris, providing a nutrient-rich alternative to rice and wheat.

Bajra (Pearl Millet)

Bajra is a nutrient-dense millet widely consumed in Tamil Nadu, Rajasthan, and Gujarat. It serves as a base for traditional preparations such as dosas, rotlas, and rotis.

Ragi (Finger Millet)

Ragi, often considered a superfood, is extensively cultivated in South India, including Tamil Nadu, Karnataka, and Uttarakhand. It is incorporated into diverse dishes like rotis, dosas, porridge, and gruels, valued for its high nutritional content.

Lentils and Legumes

Legumes and lentils are fundamental to Indian cuisine, providing protein, fiber, and essential nutrients. Commonly consumed varieties include chickpeas, masoor dal (red lentils), mung beans, kidney beans, and urad dal (black gram). These ingredients contribute to both the flavor and nutritional quality of traditional meals.

Nutritional Composition of Common Indian Staples (per 100 g)

Serial No.	Food	Calories (kcal)	Protein (g)	Carbohydrates (g)	Fat (g)	Fiber (g)
1	Wheat Flour (Whole Wheat)	360	13.2	72	2.5	10.7
2	Daliya / Broken Wheat (uncooked)		12	75	1.5	18
3	Semolina	360	12	72	1	3.9
4	White Sugar	-	0	100	0	0
5	Sago / Sabudana	350	0.2	87	0.1	0.9
6	Potatoes (boiled)	87	2	20	0.1	2.2
7	Poha / Flattened Rice	350	6-7	76	1	2
8	Jaggery	383	0.4	98	0.1	0
9	Rice (White, uncooked)	360	7	80	0.6	1.3
10	Basmati Rice	345	7	78	0.5	1.2
11	Maize / Corn (uncooked)	365	9	74	4.7	7.3
12	Jowar (Sorghum)	339	11	72	3.3	6.7
13	Bajra (Pearl Millet)	361	12	68	5	11
14	Ragi (Finger Millet)	328	7.3	72	1.5	3.6
15	Chickpeas	364	19	61	6	17
16	Masoor Dal (Red Lentils)	353	25	60	1.1	11
17	Mung Beans	347	24	62	1.2	16
18	Kidney Beans	337	24	60	1.2	25
19	Urad Dal (Black Gram)	347	25	60	1.6	18

[7] Source: Indian Council of Medical Research – National Institute of Nutrition (ICMR–NIN), 2020. Diet and Nutritional Status of Population and Prevalence of Hypertension, Diabetes, Dyslipidemia, and Obesity in India. Hyderabad: ICMR–NIN.

Glycemic Index (GI) Chart for Common Foods

Food	Glycemic Index (GI) - Typical Range
Wheat Flour (Whole Wheat)	~45
Daliya / Broken Wheat (cooked)	~41–48
Semolina (Suji)	~60–70
White Sugar (Sucrose)	~65
Sago / Sabudana	~70 (High)
Potatoes (Boiled)	~50–90 (Common ref: ~78)
Poha / Flattened Rice	~38–64
Jaggery	~80–85 (High)
Rice (White, cooked)	~48–92 (Common ref: ~64)
Basmati Rice	~50–70 (Common ref: ~55–60)
Maize / Corn (cooked)	~52
Jowar (Sorghum)	~50–60
Bajra (Pearl Millet)	~50–60 (Common ref: ~54)
Ragi (Finger Millet)	~54 to Very High (prep dependent)
Chickpeas (Boiled)	~28 (Low)
Masoor Dal (Red Lentils, Boiled)	~15–30
Mung Beans (Whole)	Low — Mung noodles ~45
Kidney Beans (Boiled)	~24–35 (Low)
Urad Dal (Black Gram)	~40–45 (Low–Moderate)

[14]*Source: ICMR–NIN Expert Committee (2024).*

1. Cooking Methods and Glycemic Index

The method of preparation—whether boiling, steaming, roasting, frying, or fermenting—can significantly alter the glycemic index (GI) of foods by changing starch structure, fiber integrity, and nutrient bioavailability.

Boiling and Steaming

Simple, moist-heat cooking methods such as boiling or steaming generally maintain lower GI values because they preserve resistant starch and limit fat absorption. For example, steamed rice or boiled lentils produce a more moderate glucose response than fried or pressure-cooked versions. [15,16]

Frying and Deep-Frying

Frying adds fat and can temporarily reduce the glycemic index by delaying gastric emptying; however, long-term consumption of fried foods contributes to insulin resistance and obesity. Common examples include pooris, pakoras, and bhujias, which are associated with high caloric density and poor lipid profiles. [17]

Pressure Cooking and Overcooking

Excessive cooking, such as repeated reheating or pressure cooking of rice, breaks down starch granules into simpler carbohydrates, increasing glycemic load. Overcooked rice and soft wheat rotis thus contribute to rapid postprandial glucose spikes. [18]

Fermentation and Sprouting

Traditional methods like fermenting (idli, dosa, and dhokla) and sprouting (mung sprouts and chana sprouts) lower the glycemic index by enhancing enzymatic activity, increasing fiber and protein content, and improving nutrient bioavailability. These processes also increase the content of beneficial bioactive compounds such as B vitamins and antioxidants. [19,20]

Roasting and Parboiling

Dry-heat techniques like roasting (bajra roti, jowar bhakri) or parboiling rice help retain resistant starch, which lowers glycemic response. Parboiled rice, common in South India, has a significantly lower GI (≈50–60) compared to white polished rice (≈70–90). [21]

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Regional Dietary Patterns in India

India's dietary landscape is remarkably diverse, shaped by geography, climate, and culture. In the North, people eat mostly wheat-based foods, with chapatis and parathas being the main ones. They also eat pulses and dairy Rice is the main food in the South, and it is often fermented, like in idli and dosa, which are made with rice–urad dal batter. In the East, rice and fish dominate, while the West features a mixture of wheat, rice, and traditional millets such as bajra and jowar. The Northeast diet centers on rice paired with meats, fish, and fermented vegetables. Despite these differences, most traditional Indian diets historically balanced cereals, pulses, and vegetables—offering nutritional completeness and metabolic stability. [14]

Differences in Staple Grains, Pulses, Dairy, and Meats

Distinct regional preferences reveal how local agriculture drives nutrient profiles. The North favors wheat and rich dairy, leading to higher carbohydrate and fat intake but improved protein quality through cereal–pulse pairings. The South's rice-pulse combinations form complete proteins, with fermentation enhancing nutrient absorption. The East's focus on rice and fish provides lean protein and omega-3 fats, though dairy consumption is modest. Western India sustains coarse grains like bajra and jowar with substantial pulse and dairy use, whereas the Northeast emphasizes rice with meat and fermented vegetables, with minimal dairy. These variations show regional adaptation to resources but also highlight the nutrition transition—rising refined carbohydrate use and excessive fats—that increases diabetes risk. [14]

Regional Foods Protective Against Diabetes

Several traditional foods demonstrate protective metabolic effects. Ragi (finger millet) from South India and bajra (pearl millet) or jowar (sorghum) from Western regions have a low glycemic index and high fiber content, improving glucose tolerance and insulin sensitivity. [22] In contrast, heavy reliance on polished white rice, now common in many parts of India, correlates with higher type 2 diabetes prevalence. [23]. Traditional practices such as using parboiled or brown rice, fermented batters, and curd-based meals, as well as maintaining regular pulse consumption, collectively lower postprandial glycemic response. [14] Reviving these time-tested dietary patterns—rich in millets, pulses, and minimally processed grains—offers a culturally grounded strategy to reduce India's growing diabetes burden.

Evidence Linking Traditional Diets to Diabetes Risk

A look at the latest research (in India and around the world)

A significant amount of research establishes a connection between dietary intake—particularly the kind and processing of carbohydrates—and the propensity for developing type 2 diabetes (T2D). Studies from throughout the world suggest that meals high in glycemic index (GI) and glycemic load (GL) cause blood levels of insulin and glucose to rise more quickly, which can raise the risk of diabetes over time [(9,10,11,12).]

In India, national surveys and population studies have shown the same pattern. The prevalence of T2D has increased dramatically due to the replacement of traditional mainstays like millets and coarse grains with polished rice and refined wheat. There has been an increase in fried and processed meals, sweetened drinks, and snacking habits following this dietary transition [(2,4,5,7)]

National surveillance data from the ICMR–INDIAB study and the ICMR–NIN national nutrition survey further demonstrate marked regional and urban–rural differences in diabetes prevalence across India. Southern states report higher prevalence, which has been associated with greater consumption of polished white rice and refined cereals, whereas rural populations that retain traditional dietary patterns based on coarse grains and millets exhibit comparatively lower metabolic risk. [3,5,7,23]

Research in food science also shows that traditional cooking and preparation methods, such as fermentation, sprouting, parboiling, and the frequent use of millets, can lower the glycemic effect of meals and may be beneficial for metabolic health [(21, 15,19,20,22).]

Foods with a higher GI and a higher risk of diabetes

Meta-analyses show that those who eat a lot of white rice are more likely to get T2D, especially in Asian countries where rice is eaten many times a day .[23] Foods with a high GI cause blood sugar levels to rise quickly, insulin levels to rise, and, over time, stress on pancreatic beta cells .[9,12] The revised international GI tables corroborate that polished rice and refined wheat flour are categorized within the medium-to-high GI range [10], hence validating these findings.

Low-GI and Millet-Based Diets as a Way to Stay Safe

Ragi (finger millet), bajra (pearl millet), and jowar (sorghum) are all types of millets that are high in fiber and resistant starch. These nutrients slow down the absorption of glucose and help keep blood sugar levels stable. A recent systematic review and meta-analysis indicated that adding millets to the diet makes fasting glucose and insulin sensitivity better, which means that millets can help prevent and treat diabetes . [22] Based on this information, the Dietary Guidelines for Indians 2024 suggest swapping out some refined cereals for millets and pulses to lessen the overall GL of the diet. [14]

The Indian Diet is Changing as Cities Grow

India's eating habits have changed since cities are growing so quickly. City dwellers today depend increasingly on refined cereals, edible oils, fried snacks, and packaged foods. This is because they work sedentary jobs and rely on public transportation. 4 The extensive ICMR–INDIAB study demonstrated that the prevalence of diabetes differs among states, constantly increasing with urbanization and lifestyle modifications. [5] Reports from both the United States and other countries agree with these results and recommend for big changes toward healthy, cheap diets . [2,7]

Ways of cooking that affect how your blood sugar reacts

Traditional cooking methods can change the glycemic effect of a food a lot. For example, parboiling rice lowers its GI compared to polished white rice .[21]Fermentation, utilized in dishes like idli and dosa, along with the sprouting of legumes, both augment fiber and protein levels while regulating glycemic response .[15,19,20]Deep-frying, on the other hand, may slow down digestion for a short time, but it can lead to insulin resistance and obesity over time .[16] Cooking method matters even for root vegetables like sweet potatoes. Boiling, baking, or frying can all change the GI value. [16]

Discussion

Analyzing the Strengths and Weaknesses of Traditional Diets and the Impact of Modernization

India's Type 2 Diabetes (T2D) rates are rising quickly, so we need to take a deeper look at the country's food culture. This presents a significant paradox: the coexistence of protective, time-tested food traditions and modern, risk-enhancing dietary ingredients. Traditional diets historically provided metabolic stability due to key strengths, chiefly derived from the incorporation of low-Glycemic Index (GI) staples. Millets (Jowar, Bajra, and Ragi), legumes, and pulses are foods that are strong in fiber and plant protein. These foods slow down the absorption of glucose and cause a more moderate glycemic response. Also, traditional cooking methods like fermenting (e.g., idli and dosa batters), sprouting (legumes), and parboiling rice have been shown to lower the GI, boost enzyme activity, and make nutrients more available. For example, parboiled rice has a much lower GI (50-60) than white polished rice (70-90).

The main cause of the T2D epidemic is the weaknesses of contemporary Indian diets. The core problem is that people are quickly moving away from traditional coarse grains and toward refined staples like polished white rice and refined wheat flour, both of which are in the medium-to-high GI range. This alteration, together with the fact that many people eat a lot of high-GI foods like potatoes, sweets, and, most importantly, fried snacks, leads to a drastically high Glycemic Load (GL), which causes blood sugar levels to rise and fall repeatedly and makes it hard for the body to use insulin over time. In addition, while ancient diets may have been beneficial, modern cultural behaviors like adding sugar to tea every day and eating too many deep-fried snacks (which cause insulin resistance and obesity over time) make the diabetes problem even worse. This change in diet, which includes a lot more poor-quality carbohydrates, fats, and refined sugars, aligns exactly with the "thin-fat phenotype" seen in many South Asians, making the population metabolically susceptible to the consequences of this modern dietary pattern.

Role of Modernization, Reduced Physical Activity, and Public Health Implications

The role of modernization and urbanization is key to comprehending the growing diabetes epidemic, since they have caused detrimental changes in how people live at the same time. The large ICMR-INDIAB study showed that diabetes rates keep going up as cities grow and people change their lifestyles. The change to city living has been followed by a shift to sedentary jobs and a reliance on motorized transportation, which has greatly decreased daily physical activity and mobility. These decreases in energy use, along with the rising consumption of high-caloric, low-fiber processed meals, deep-fried snacks, and sugar-sweetened beverages, make the body more likely to develop T2D. This combination of an elevated dietary GL and low levels of physical exercise is the main force accelerating T2D incidence.

From a public health perspective, these findings emphasize that the T2D epidemic is not unavoidable but rather a rational outcome of policy and lifestyle decisions. The dependence on refined grains for a significant share of daily calorie intake underscores a critical failure in the alignment of agriculture and food policies with nutritional wisdom. This paper fills this gap by showing how important the Glycemic Index (GI) and Glycemic Load (GL) are for planning meals. A high GL speeds up the development of T2D by putting stress on beta cells over time. As a result, a "nutritional re-transition" must be the main emphasis of public health strategy. This intervention is difficult because of cultural and economic issues. Policies must make traditional, healthful foods both easy to get and appealing to compete with cheaper, extensively marketed processed alternatives.

The connection between low-GI, fiber-rich diets and better metabolic health is a clear reason to make nutrition policy changes. The promotion of millets—such as Ragi, Bajra, and Jowar—must be elevated to a national strategy, shifting them from regional staples to national priorities. Research specifically supports the inclusion of millets in the diet, since it enhances fasting glucose levels and insulin sensitivity. This is what the Dietary Guidelines for Indians 2024 say: to lower the overall dietary GL, you should replace some refined grains with millets and pulses. Dietary recommendations for diabetes prevention in India should focus on a few key things: eating more low-GI whole grains and pulses, using protective traditional cooking methods (fermentation and parboiling), and most importantly, cutting back on polished rice, refined flours, added sugar, and deep-fried foods.

Lastly, the role of awareness programs is crucial for making policy changes at the household level. These programs need to teach people not only what to eat but also how the way they cook affects their metabolic health. By teaching people about GI and GL and showing them how mild cooking methods (like boiling and steaming) are better for blood sugar than high-heat procedures (like frying and roasting), awareness campaigns can help people make smart decisions. To reduce the number of people with diabetes in India, successful public health intervention needs a collaborative, multi-pronged approach that uses traditional knowledge, changes existing food policy, and keeps people informed.

Conclusion

The study was done to look at the increasing prevalence of Type 2 Diabetes (T2D) in India, which is often called the "diabetes capital of the world." It did this by seriously looking at the role of traditional Indian diets. The main goal of the study was to use the Glycemic Index (GI) and Glycemic Load (GL) to measure the quality and quantity of carbohydrate intake to figure out a paradox of India's diet: the fact that protective, time-tested staples are eaten alongside modern consumption patterns that increase risk. The findings corroborate the primary hypothesis: a detrimental shift in diet strongly contributes to India's T2D epidemic. A close look at traditional staples showed that millets (Ragi, Bajra, and Jowar), pulses, and legumes have low glycemic index (GI) values and a lot of fiber. Traditional cooking methods like fermentation (for idli and dosa) Research also demonstrates that parboiling rice reduces the glycemic impact of meals by preserving resistant starch and increasing the availability of nutrients. This has historically been a strong defense against metabolic disorders. However, the evidence clearly shows that the rise in diabetes cases is linked to the quick loss of these protective variables in favor of high-GL, refined carbohydrates like polished white rice and refined wheat flour. This is made worse by the fact that people eat a lot of deep-fried snacks and added sugar and don't move around much because they live in cities. This change has caused blood sugar levels to rise after meals, insulin resistance to become permanent, and the prevalence of T2D to rise faster in every part of India. Based on these results, the most important thing for public health right now is a planned "nutritional re-transition." This paper strongly supports a change in national policy that has many parts: First, to make millets a national dietary priority instead of just a regional staple by heavily promoting them, since they have been shown to lower fasting glucose and increase insulin sensitivity. Secondly, it is crucial to provide unambiguous, evidence-based dietary guidance that emphasizes substituting high-GL staples with whole grains and employing safe cooking practices. Finally, big awareness campaigns need to be established to teach household members not only what to eat but also how the way they cook affects their metabolic health. It could be done to stop the T2D epidemic in India by using the knowledge that is already in India's food traditions and combining it with modern glycemic science.

Future Prospects

Future research and public health campaigns must prioritize the generation of

context-specific evidence to mitigate India's escalating diabetes burden. It is important to establish a regional glycemic index and glycemic load database for Indian cuisine, especially traditional millet- and pulse-based recipes, that takes into account local ingredients and cooking methods. At the same time, we need reliable scientific studies to look at how traditional cooking methods like fermentation and parboiling affect metabolism and how they relate to modern high-heat and fried cooking methods. Policy-oriented research should look at ways to make millet more popular by lowering prices, giving out subsidies, and making it easier to find millet-based goods. At the same time, culturally appropriate nutrition education needs to turn GI and GL ideas into useful dietary advice for families. Finally, long-term research studies are necessary to clarify the impact of continuous dietary shifts in urban and peri-urban India on diabetes risk and associated metabolic consequences. Bold the heading

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