WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
Coden USA: WJPRAP Impact Factor 8.453
Volume 14, Issue 20, 312-324. Review Article ISSN 2277–7105

AYURVEDIC WISDOM OF MILLETS: A NATURAL APPROACH TO PREVENTING AND MANAGING NON-COMMUNICABLE DISEASES

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Article Received on 24 Sept. 2025,
Article Revised on 13 October 2025,
Article Published on 16 Oct. 2025,

https://doi.org/10.5281/zenodo.17366455

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How to cite this Article: Dr. Akanksha Ganesh Sahu, Dr. Yeshwant R. Patil. (2025). Ayurvedic Wisdom Of Millets: A Natural Approach To Preventing And Managing Non-Communicable Diseases. World Journal of Pharmaceutical Research, 14(20), XXX–XXX.

ABSTRACT

Non-communicable diseases (NCDs) such as diabetes, obesity, hypertension, arthritis and cancer are increasing at an alarming rate and have become a major global health challenge. *Ayurveda*, the traditional Indian system of medicine, emphasizes diet (Ahara), lifestyle (Vihara), and doshic balance as central pillars for maintaining health and preventing disease. Within this framework, millets—nutrient-dense small grains traditionally consumed in India—hold special significance. Their qualities, including lightness (*Laghu*), dryness (*Ruksha*), and astringent taste (*Kashaya*), align with Ayurvedic principles for correcting *Kapha* and *Meda* imbalances that underlie many metabolic disorders.

This article explores the Ayurvedic interpretation of NCDs such as *Prameha* (diabetes), *Medoroga* (obesity), *Raktapitta* (hypertension), *Sandhivata* (arthritis), and *Arbuda* (cancer), and connects them with their modern medical counterparts. The therapeutic potential of different millets—such as barnyard, foxtail, kodo, little, pearl, proso, finger millet, and sorghum—is analyzed through both Ayurvedic and modern scientific perspectives. By integrating traditional dietary wisdom with contemporary nutritional vidence, millet-based interventions emerge as a sustainable and culturally relevant strategy for the prevention and management of lifestyle-related diseases.

KEYWORDS: *Ayurveda*, Millets, Non-communicable diseases, Functional foods, Doshic balance.

INTRODUCTION

Non-communicable diseases (NCDs), including diabetes, cardiovascular disorders, cancer, chronic respiratory diseases, and obesity, account for nearly 71% of global deaths annually, with low- and middle-income countries carrying the highest burden.[1] These diseases are largely attributed to lifestyle-related risk factors such as poor diet, physical inactivity, chronic stress, and environmental influences. Increased reliance on calorie-dense, fiber-poor processed foods has played a central role in accelerating the global rise of NCDs.[2]

Ayurveda, the ancient Indian system of medicine, emphasizes the importance of diet (ahara) in maintaining health and preventing disease. It identifies improper food habits as a major cause of doshic imbalances, leading to systemic disorders such as Prameha (diabetes), *Medoroga* (obesity), and *Raktapitta* (bleeding and vascular disorders).[3,4] In Ayurvedic philosophy, food is not only a source of nutrition but also a means to harmonize the Tridoshas—*Vata, Pitta, and Kapha*—and enhance the function of *Agni* (digestive fire), which is central to disease prevention.[5]

Millets, a group of small-seeded cereals traditionally cultivated in India, possess qualities such as *laghu* (light), *ruksha* (dry), and *kashaya rasa* (astringent taste), making them particularly suitable for mitigating *Kapha* and *Medas* (fat tissue) disorders.[6] In contrast to polished cereals, millets provide higher fiber, better amino acid balance, key micronutrients, and natural antioxidants, along with a comparatively lower glycemic response. These properties align with Ayurvedic dietary principles and offer functional benefits in preventing and managing metabolic disorders.[7]

The reintroduction of millets into daily diets, particularly in the context of Ayurvedic wisdom, presents a sustainable and culturally appropriate solution to the growing NCD epidemic. This article explores the Ayurvedic correlation of common NCDs with classical disease entities and examines the therapeutic potential of various millets in achieving doshic balance and metabolic harmony.

1. Ayurvedic Perspective on Non-Communicable Diseases (NCDs)

Ayurveda views health as a state of dynamic balance among the three fundamental bioenergies—*Vata*, *Pitta*, and *Kapha*—along with proper functioning of *Agni* (digestive/metabolic fire), balanced *Dhatus* (body tissues), *Malas* (excretory products), and a contented mind and soul (Sattva, Atma).[3] According to Ayurveda, disturbances in diet

(*mithya ahara*), lifestyle (*mithya vihara*), and even thought processes (*prajnaparadha*) are key triggers that disrupt doshic balance and lead to disease.[5]

From an Ayurvedic lens, many modern non-communicable diseases (NCDs) are manifestations of Doshic imbalances, particularly *Kapha* and *Medas* (fat tissue), often associated with *Mandagni* (weakened digestive fire) and accumulation of *Ama* (toxins). The classical Ayurvedic texts provide conceptual frameworks that align remarkably well with the clinical presentation of modern NCDs:

The Ayurvedic entity *Madhumeha*, a form of *Prameha*, parallels modern type 2 diabetes in its features of excess urination, metabolic dysfunction, and *Kapha–Meda* imbalance.[8]

Obesity is described as *Medoroga*, where excessive *Kapha* and *Meda* accumulation leads to sluggish metabolism, fatigue, and lethargy.[6]

Hypertension may be understood through conditions like *Raktagata Vata* and *Raktapitta*, where deranged *Vata* or *Pitta* disrupts blood flow and vascular integrity.[9]

Arthritis finds its Ayurvedic correlates in *Aamavata* (rheumatoid arthritis) and *Sandhivata* (osteoarthritis), depending on whether *Ama* and *Vata* are involved.[10]

Cancer may be compared with conditions such as *Arbuda* (malignant growths), *Granthi* (benign tumors), or *Dushta Vrana* (non-healing ulcers), reflecting unchecked tissue proliferation due to Tridosha imbalance and *Dhatudushti*.[4]

Polycystic Ovarian Syndrome (PCOS) resembles *Artava Dushti*, *Pushpaghni Jathaharini*, and *Yonivyapad*, conditions characterized by hormonal imbalance, irregular menstruation, and ovarian dysfunction.[11]

Non-alcoholic Fatty Liver Disease (NAFLD) aligns with *Yakrit Roga*, often associated with *Pitta-Kapha* vitiation and impaired lipid metabolism.[12]

Understanding these correlations allows for a personalized, root-cause-based intervention approach in Ayurveda, which emphasizes restoring doshic balance, rekindling *Agni*, and eliminating *Ama* through detoxification (*Shodhana*) and pacification therapies (*Shamana*), including dietary management.

2. Types of Millets in Ayurveda and Modern Science

Millets, a group of small-seeded grasses, have been cultivated for thousands of years in India and hold a place in both Ayurvedic dietary systems and modern nutritional science. Ayurveda refers to various ancient grains under terms such as *Shyamaka*, *Yava*, *Kodrava*, and *Uddalaka*, each with specific attributes and doshic effects.[8] These grains were traditionally recommended for promoting lightness, dryness, and metabolic health.

Contemporary nutrition groups millets into two broad categories—major (such as finger, pearl, and sorghum) and minor (including foxtail, barnyard, proso, kodo, and little millet).[7,13]

Below is a comparison of Ayurvedic names and their corresponding modern millet types

Ayurvedic Name	Modern Name	Botanical Name
Shyamaka	Barnyard millet	Echinochloa frumentacea
Yava	Barley (analogous grain)	Hordeum vulgare
Kodrava	Kodo millet	Paspalum scrobiculatum
Priyangu	Foxtail millet	Setaria italica
Uddalaka	Little millet	Panicum sumatrense
Bajra (vernacular)	Pearl millet	Pennisetum glaucum
Jowar (vernacular)	Sorghum	Sorghum bicolor
Chena	Proso millet	Panicum miliaceum

Each millet variety has unique nutritional and therapeutic properties, and their incorporation into diet is tailored based on individual constitution (*Prakriti*), digestive strength (*Agni*), and disease condition in Ayurveda.[6]

3. Role of Millets in Ayurveda and Modern Nutrition

Millets are described in Ayurvedic literature as *Laghu* (light), *Ruksha* (dry), and possessing *Kashaya* (astringent) or *Tikta* (bitter) tastes, which contribute to their ability to pacify *Kapha* and *Medas*. These qualities make them particularly beneficial in the management of disorders like *Prameha* (diabetes), *Medoroga* (obesity), and other *Kapha*-dominant conditions.[5]

Ayurveda specifically highlights grains such as *Shyamaka* (barnyard millet), *Yava* (barley), and *Kodrava* (kodo millet) for their *lekhana* (scraping), *rooksha* (drying), and *Kapha-Medahara* (*Kapha* and fat-reducing) actions.[8] For instance, *Yava* is prescribed in *Prameha chikitsa* due to its ability to control excessive *Meda* and improve *Agni*, while *Shyamaka* is recommended for *Sthoulya* (obesity) due to its light and digestive nature.[4]

From a modern nutritional standpoint, millets like finger millet, foxtail millet, barnyard millet, pearl millet, proso millet, kodo millet, and sorghum are recognized for their rich content of dietary fiber, low glycemic index, and high satiety value. These features make them highly effective in managing metabolic syndromes such as type 2 diabetes, obesity, and cardiovascular diseases.[7,13]

Additionally, bioactive compounds like polyphenols in finger millet and sorghum contribute to reducing oxidative stress and inflammatory processes, both central in the development of cancers, arthritis, and liver disorders.[14] The magnesium content in millets aids in blood pressure regulation, beneficial in managing hypertension, while their prebiotic fiber improves gut health, which is increasingly linked to overall metabolic function.[15]

Therefore, millets serve as a dietary intervention rooted in both ancient Ayurvedic wisdom and contemporary nutritional science, offering a sustainable and functional solution for the prevention and management of non-communicable diseases.

4. Comparative Analysis: Doshic Balance and NCD Management through Millets

The Ayurvedic system emphasizes dietary interventions that balance the *tridoshas* — *Vata*, *Pitta*, and *Kapha* — to prevent and manage diseases. Most *non-communicable diseases (NCDs)* such as diabetes (*Prameha*), obesity (*Medoroga*), hypertension, cancer (*Arbuda*), and arthritis (*Sandhivata*) are often linked to the aggravation of *Kapha* and *Pitta* doshas.[16] Millets, with their dry (*ruksha*), light (*laghu*), and astringent (*kashaya*) properties, are ideal to pacify these doshas, enhance *Agni* (digestive fire), and eliminate *Ama* (toxins).

The table below integrates Ayurvedic and modern scientific insights on the role of various millets in preventing and managing NCDs:

Table 1: Comparative analysis of millets in relation to NCDs and doshic balance.

Type of Millet	Ayurvedic Qualities	Doshic Balance Supported	Relevant Health Conditions
Barnyard (*Shyamaka*)	*Laghu, Ruksha, Kashaya*	*Kapha, Meda*	Obesity, Type 2 Diabetes, Metabolic Syndrome
Foxtail (*Priyangu*)	*Laghu, Tikta, Deepana*	*Kapha, Pitta*	PCOS, Dyslipidemia, Diabetes
Kodo (*Kodrava*)	*Ruksha, Kashaya, Shita*	*Kapha*	Rheumatoid Arthritis, Obesity
Proso (*Chena*)	*Laghu, Kashaya,*	*Pitta, Kapha*	Liver disorders,

	Sheetala		Obesity
Pearl (*Bajra*)	*Guru, Ushna, Madhura*	*Vata* (use cautiously)	Anemia, Constipation (in moderation)
Sorghum (*Jowar*)	*Ruksha, Tikta, Kashaya*	*Kapha, Pitta*	Hypertension, Inflammation, Obesity
Finger Millet (*Ragi*)	*Guru, Sheeta, Balya*	*Pitta*	Colon Cancer, Bone Loss, Inflammation
Barley (*Yava*)	*Ruksha, Lekhana, Kashaya*	*Kapha, Meda*	Diabetes, Atherosclerosis, Obesity

Source: Compiled from Charaka Samhita[3], Sushruta Samhita[4], Bhavaprakasha[9], and modern studies including Veena & Raghavendra[27], Srivastava & Singh[15]

When chosen based on individual doshic imbalances and disease conditions, millets act as

Functional foods — not only providing nourishment but also assisting in restoring physiological harmony and preventing modern lifestyle disorders.[17][18][19]

5. Integration of Ayurvedic and Modern Insights in NCD Management through Millets

Millets, recognized in both Ayurveda and modern nutrition, are emerging as powerful functional foods in addressing non-communicable diseases (NCDs). Their relevance is anchored in their potential to restore doshic balance, enhance metabolic function, and prevent the build-up of metabolic toxins (*Ama*), all of which are fundamental to the prevention and management of chronic conditions.[20]

According to Ayurvedic texts, conditions such as *Prameha* (diabetes), *Medoroga* (obesity), *Raktapitta* (bleeding disorders), *Sandhigata Vata* (arthritis), and *Arbuda* (tumorous growths) typically arise from *Kapha* and *Pitta dosha* imbalances. Millets like *Shyamaka*, *Kodrava*, and *Yava* are traditionally indicated for such disorders due to their inherent properties of being *rooksha* (dry), *laghu* (light), and *lekhana* (scraping)—qualities that help reduce excess *Kapha* and *Meda dhatu* (fat tissues).[21]

Modern nutritional science supports these traditional insights. Millets are rich in dietary fiber, resistant starch, essential minerals like magnesium and iron, and a variety of bioactive compounds such as polyphenols. These components are known to assist in regulating blood glucose levels, improving lipid profiles, supporting weight loss, and exhibiting antioxidant and anti-inflammatory properties.[22]

For example, studies have shown that **foxtail millet** can significantly lower fasting blood glucose and improve lipid parameters in diabetic models, making it effective for metabolic health.[24] **Finger millet** is particularly valued for its high calcium content and antioxidant-rich polyphenols, which are beneficial for bone density and may help in the prevention of colon cancer.[23][25] Similarly, **barnyard millet**, due to its low glycemic index and high fiber content, plays a positive role in managing obesity and metabolic syndrome.[22]

In Ayurvedic terms, these physiological benefits are understood through the concepts of *Agni deepana* (stimulating digestive fire) and *Ama-pachana* (digesting and clearing metabolic waste), both of which are crucial for restoring health and preventing disease progression.[20][21]

Therefore, integrating Ayurveda's personalized approach with evidence-based nutrition can offer a more holistic model for NCD prevention. Millets, when selected according to individual constitution (*Prakriti*) and disease profile, can act not just as dietary staples but as **therapeutic grains** that align with both traditional and modern health paradigms.

6. Ayurvedic Pharmacological Profile of Millets: *Rasa*, *Guna*, *Virya*, and *Vipaka*

Millets are rich in resistant starch and fermentable dietary fibers that enhance gut microbial diversity. This modulation of the gut microbiome is linked to improved metabolic profiles, reduced systemic inflammation, and enhanced insulin sensitivity—factors essential in preventing obesity and type 2 diabetes.[26]

The table below summarizes the Ayurvedic pharmacological characteristics of major millets:

Table 2: Ayurvedic pharmacological attributes of selected millets.

Millet Variety	**Primary *Rasa* (Taste Attributes)**	**Dominant *Guna* (Qualitative Nature)**	***Virya* (Potency/Effect on Body)**	***Vipaka* (Post-Digestive Impact)**	**Indicative Therapeutic Role**
Foxtail	*Kashaya, Tikta*	*Laghu* (light), *Ruksha* (dry)	*Sheeta* (cooling)	*Katu*	*Kapha–Pitta Shamak, Lekhana, Medohara*
Finger (*Ragi*)	*Madhura, Kashaya*	*Guru* (heavy), *Sheeta*	*Sheeta*	*Madhura*	*Balya, Pitta Shamak, Asthivardhaka* (bone tonic)
Pearl	*Madhura,*	*Guru,*	*Ushna*	*Amla*	*Vata Shamak,*

(*Bajra*)	*Kashaya*	*Ushna*			*Balya, Meda Shoshaka* (fat reducer)
Sorghum (*Jowar*)	*Tikta, Kashaya*	*Ruksha, Laghu*	*Sheeta*	*Katu*	*Kapha* pacifier, *Deepana,* Anti-inflammatory
Barnyard	*Kashaya*	*Laghu, Ruksha*	*Sheeta*	*Katu*	*Agni deepana, Lekhana, Medohara*
Kodo	*Kashaya, Tikta*	*Laghu, Ruksha*	*Sheeta*	*Katu*	*Vata-Anulomana, Ama-pachana, Kapha Shamak*
Barley (*Yava*)	*Kashaya*	*Laghu, Ruksha, Lekhana*	*Sheeta*	*Katu*	*Kapha-Meda Hara, Agni deepana, Mutrala* (diuretic)

Source: Adapted from Ayurvedic classics — Charaka Samhita[3], Sushruta Samhita[4], Ashtanga Hridaya[5], Bhavaprakasha[9], Dravyaguna Vijnana.[31]

Ayurveda prescribes diet tailored to individual *Prakriti* (constitution), *agni* (digestive strength), and seasonal variations. Millets like *Shyamaka* and *Kodrava* are ideal for Kapha-dominant individuals due to their *ruksha* (dry) and *laghu* (light) nature. Pitta types benefit from cooling millets like *Ragi* (finger millet), while nourishing grains like *Bajra* (pearl millet) support Vata balance. This aligns with the Ayurvedic principle of *Pathya-Apathya* and seasonal regimens (*Ritucharya*).[6]

7: Nutritional Profile of Millets and Their Relevance to NCD Prevention

Modern nutritional science confirms the therapeutic value of millets described in Ayurveda. They are rich in complex carbohydrates, fiber, minerals, and bioactive phytochemicals that support glycemic control, lipid management, and oxidative balance.[27]

Table 3: Nutritional composition of common millets (per 100 g edible portion).

Millet Type	Energy Value (kcal/100g)	Protein Content (g/100g)	Dietary Fiber (g/100g)	Iron (mg/100g)	Calcium (mg/100g)
Foxtail	331	12.3	8.0	2.8	31
Barnyard	342	11.2	10.1	5.0	20

Finger (Ragi)	336	7.3	3.6	3.9	344
Pearl (Bajra)	361	11.6	1.2	8.0	42
Sorghum (Jowar)	349	10.4	9.7	4.1	25
Kodo	309	8.3	9.0	0.5	27

Source: Adapted from Veena & Raghavendr[27,28]

Relevance to NCDs

The rich fiber in millets delays carbohydrate digestion and absorption, thereby moderating post-meal blood glucose spikes. Their iron and calcium content helps address anemia and bone health issues such as osteoporosis. The natural antioxidants counter oxidative stress, lowering risks of chronic conditions like cancer and arthritis. Moreover, their low glycemic index supports insulin sensitivity and assists with healthy weight management.

Millets, therefore, serve as a bridge between ancient dietary wisdom and modern nutrition science, validating their role in personalized and preventive nutrition.

8. Additional Insights and Scientific Correlations:

Millets and Gut Health

Millets are rich in insoluble fiber and prebiotic components that enhance gut microbiota diversity. A balanced gut microbiome is crucial in regulating metabolic pathways, immune modulation, and reducing systemic inflammation, thereby impacting obesity, diabetes, and autoimmune conditions.[26]

Ayurveda-Based Personalized Use of Millets

Ayurveda emphasizes individualized diets based on Prakriti (body constitution). Specific millets are suited for different dosha types:

Kapha (heavy, oily) – Foxtail millet, Kodo millet (light, dry)

Pitta (hot, sharp) – Barnyard millet, Finger millet (cooling)

Vata (light, cold) – Pearl millet, Sorghum (nourishing and warm)

This aligns with the Ayurvedic concept of *"Pathya-Apathya"* or appropriate dietary regimen.[28]

Millets and Environmental Sustainability

Millets are climate-resilient, require less water, grow well in degraded soils, and are naturally resistant to pests. Promoting millet cultivation not only benefits health but also supports

sustainable agriculture and food security, contributing indirectly to the reduction of NCDs by encouraging local and wholesome diets.[29]

Preventive Role in Ayurvedic Daily and Seasonal Regimens

In *Swasthavritta* (Ayurvedic preventive medicine), millets are included in *Ritucharya* (seasonal regimen) and *Dinacharya* (daily routine) for maintaining digestive fire (*Agni*) and preventing accumulation of toxins (*Ama*), which are the root causes of chronic disorders.[30]

Historical Use of Millets in Ayurvedic Therapeutics

Texts like Charaka Samhita and Sushruta Samhita recommend preparations such as *Yavagu* (thin gruels) and *Manda* (rice water) using millets like *Yava* (barley) for digestive regulation, reducing body fat (Medoroga), and cleansing the system.[31]

Community-Based Millet Interventions and Clinical Evidence

Recent studies show that introducing millet-based diets in communities and diabetic patients led to significant reductions in HbA1c, BMI, and cholesterol. These findings support ancient Ayurvedic recommendations through modern scientific evidence.[32]

9. DISCUSSION

The rising burden of non-communicable diseases worldwide has renewed scientific and public interest in traditional food systems. Among these, millets stand out for both their nutritional richness and their therapeutic relevance in *Ayurveda*.

Ayurvedic texts attribute conditions such as *Prameha* (diabetes), *Medoroga* (obesity), *Raktapitta* (bleeding disorders and hypertension), and *Arbuda* (tumorous growths) primarily to *Kapha* and *Pitta* aggravation combined with weakened digestive fire (*Agni*). Grains described as *laghu* (light), *rooksha* (dry), and *lekhana* (scraping), including *Shyamaka*, *Kodrava*, and *Yava*, are particularly recommended to counter these imbalances by enhancing metabolism, reducing excess fat, and removing accumulated toxins (*Ama*).

Modern nutrition parallels these insights. Millets are now recognized for their low glycemic index, resistant starch, polyphenols, and high dietary fiber, which collectively aid in stabilizing blood glucose, regulating cholesterol levels, and decreasing systemic inflammation. Clinical and experimental studies confirm their role in reducing risk factors for diabetes, cardiovascular disease, obesity, and certain cancers.

Beyond metabolic health, millets contribute to broader systemic benefits. Their prebiotic fibers support gut microbial diversity, which has emerging relevance for immunity and chronic disease prevention. Their mineral content, especially calcium and iron, addresses nutritional deficiencies common in many populations. In addition, their capacity to promote satiety makes them effective in weight management strategies.

When millet consumption is personalized according to *Prakriti* (constitution), digestive capacity (*Agni*), and disease state, it offers a truly integrative model of care. This approach blends Ayurvedic dietary principles with evidence-based nutrition, showing how ancient wisdom can be harmonized with modern science.

10. CONCLUSION

Millets occupy a unique position in Ayurveda as grains that nourish while also restoring doshic balance. Their diverse qualities—lightness, dryness, cooling or heating properties—make them adaptable for different constitutions and disease states. Modern nutrition validates these traditional insights by highlighting their benefits in glycemic control, weight regulation, cardiovascular health, and bone strength.

Incorporating millets into daily and seasonal regimens, guided by principles of *Swasthavritta*, not only addresses lifestyle-related diseases but also promotes sustainable food practices. Thus, millets should be viewed not merely as alternatives to refined cereals but as therapeutic foods that bridge ancient wisdom and modern science for long-term health and well-being.

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