

Footprint of Millets on Type 2 Diabetic Mellitus: A short review

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Abstract

Diabetes is a chronic condition marked by high blood glucose (also known as blood sugar) levels. About 90% of cases of diabetes are type 2 diabetes, which is the most prevalent and is brought on by the body's inefficient use of insulin. Along with exercise, smoking, and obesity, the type of food consumed is important in the development of diabetes. In 420 million people, diabetes exists. A 2019 projection states those 2.2 million fatalities from diabetes and high blood sugar and 1.5 million deaths from diabetes itself. The prevalence of diabetes is rising everywhere in the world. The countries with the highest diabetes prevalence rates include India, China, and the USA. The highest growth, 143%, is anticipated for Africa between 2019 and 2045. It has been demonstrated that individuals from lower socioeconomic backgrounds experience higher rates of diabetes. This applies to both wealthy and countries with few resources. The cost of treating diabetes was expected to be \$ 760 billion in 2019. "Diabetes is a major contributor to kidney failure, heart attacks, strokes, blindness, and lower limb amputations." Millets have a lower GI than the main staples. Therefore, a plan to add millets to staples could manage and lower the risk of type 2 diabetes. Diversification of staples could have a significant influence because, in regions like Asia and Africa, they often make up 70% of the plate. Millets are a smart food that is not only "good for you" (having good to high levels of many essential nutrients like iron, zinc, calcium, and protein) but also "good for the planet" and "good for the farmer," that is, environmentally sustainable, climate-smart, and having a lower carbon footprint. In addition to having a small carbon footprint and the capacity to endure high temperatures with little water, millets (particularly sorghum) are recognised to be very nutrient-dense foods. Millets are well known for helping to treat diabetes because of their low Glycaemic Index (GI).

Keywords: Diabetes; Glycaemic index; Glycaemic response; Millets; Sorghum; Type 2 diabetes

1. Introduction

By 2045, it is predicted that there will be 700 million diabetics worldwide, up from 463 million in 2019." (1)". with type 2 diabetes making up roughly 90% of the total. mortality from diabetes account for 87% of mortality in low- and middle-income nations, where the variety of basic foods is less. It is significant to remember that, in addition to a sedentary lifestyle and obesity, a critical factor in diabetes is the type of food ingested. In developing nations, primary staples like refined rice, refined wheat, and maize account for up to 80% of total energy consumption. In the vast majority of developing nations, it is crucial to manage food security through diversifying food staples and promoting more nourishing and lower-glucose staples. "(2)". Businesses have long understood the importance of a Triple Bottom Line, which has inspired the development of innovative goods and significant financial commitments. The Smart Food Triple Bottom Line adapts it to the Food System by establishing."(3)". Solutions that work together to be good for you (nutritious and healthful), good for the environment (environmentally sustainable), and good for the farmer (resilient). It's a method for examining the worth of millets and sorghum as food staples. This is the first analysis comparing millets and sorghum to rice, wheat, and maize, the "Big 3" main staple foods in Asia and Africa, and focused on how they are "good for you" in terms of lowering diabetes. Polished rice is the only one of them that is naturally lacking."(4)". It is critical to investigate dietary solutions that combine nutrition and address significant health issues in light of the

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growing prevalence of lifestyle diseases like type 2 diabetes. Diversifying diets by replacing staples with the proper nutritional and healthful meals will significantly help to lessen the difficulties associated with numerous health conditions.

2. Blood Sugar Effects of Millet

Whole grains include millet. The bran and germ, which are its outer layers, are still present. To manufacture refined grains like white flour, food businesses remove these layers from grains. Whole grains don't boost your blood sugar as soon as refined carbohydrates do since it takes your body longer to digest them.”(5”).

There are different types of millet, including:

- Foxtail
- Pearl
- Finger
- Little

There isn't a lot of millet research. According to research so far, millet helps to maintain consistent blood sugar levels and reduces increases after meals. The foxtail variant was the focus of the majority of studies. According to one study, type 2 diabetics who followed a particular diet that included foxtail millet saw a reduction in their levels of insulin, cholesterol, and triglycerides. Changing from rice to foxtail millet for breakfast resulted in reduced blood sugar levels after the meal, according to another study. The evidence for the other varieties of millet is less certain. Because of this, scientists are unsure of how this kind of millet might impact humans. While the research for all forms of millet isn't conclusive, it does hint that this grain does elevate blood sugar levels higher. “(6”).

3. Can diabetic people eat millets?

Of course it is!

Millets are grains that are beneficial for people with diabetes since they are high in protein and help with insulin sensitivity. The hormone insulin is what the body utilises to turn carbs into energy. While eating millets occasionally won't make much of a difference, millets should be a regular component of your diet if you want to successfully manage your diabetes over the long run. Because of these elements, millets are a useful diet for regulating blood glucose levels.” (7”).

3.1. How to Prepare Millet

Visit your nearby natural foods store to look for millet. Along with quinoa and other whole grains, you may find it on the shelf. Additionally, you may buy it online. Because of its mild, nutty flavour, millet may be a versatile component to many different kinds of cuisines. To cook it, first toast it in a pan with a little bit of vegetable oil for about 3 minutes. Then, for every cup of millet, add 2 1/2 cups of boiling water, and simmer the mixture for 25 to 30 minutes, or until the grains are fluffy.

You can incorporate millet into your meals in a number of different ways. One can:

- For breakfast, make it into porridge.
- White or wheat flour can be replaced with millet flour.”(8”).

3.2. Which diabetes benefits from millets?

- Foxtail millet's impact on type 2 diabetics was investigated in studies. According to one study, switching from rice to foxtail millet for breakfast helped people feel less hungry after eating.
- Millets' high fibre content and antioxidants help diabetics digest food more easily and progressively minimise insulin spikes. Most significantly, grains are the main source of complex carbs, which promote satiety and prevent blood sugar increases by increasing feeling of fullness.
- Due to millets' low glycemic load, the body also takes longer to metabolise and break them down. They require less insulin because they are taken into the bloodstream more gradually.”(9”).

3.3. Let's learn about the glucose index (GI)

The glycemic index (GI) rates foods according to how quickly they digest carbohydrates and how that affects blood sugar levels. The GI calculates how quickly food's carbohydrates are broken down into glucose and how much a particular food raises blood sugar levels. Depending on the type of carbs taken, the blood glucose response to different foods' carbohydrates varies. When planning meals, the glycemic index of foods can help you fine-tune your carb counts to better control your blood sugar levels.”(10)”.

3.3.1. Millet Glycemic Index

While low GI foods are digested slowly to provide a continuous glucose release without resulting in abrupt jumps in blood sugar levels, high GI foods immediately cause a rise in blood sugar levels.

- Low GI (< 55)
- Medium GI (55–70)
- Barnyard millets and kodo
- Millets such as jowar, foxtail, tiny, finger, and pearl
- Orange, pear, and apple
- Mango, papaya, and pineapple (depending on ripeness)

Millets with low to intermediate GI foods can aid in the treatment and prevention of type 2 diabetes, as well as the reduction of its consequences. Concentrate on eating a balanced diet that has moderate or low glycemic food portions. Use the food diary method, write down the items high in carbohydrates you frequently consume, and try to replace those foods with reduced.”(11)”.

3.4. How Can Millet Be Included In A Daily Meal?

You can prepare dishes using millet in a variety of ways.

- Make it into porridge and serve it for breakfast.
- Replace millets in your meals instead of rice, wheat, and sooji.
- To make cooked millet more nourishing and full, combine it with grilled veggies or a fresh salad.
- Prepare various millet dosas with various chutney accompaniments.
- Replace pasta made with maida with multigrain pasta and millet noodles.

3.5. How much should i eat?

Because millets are high in insoluble fiber, which gives stools bulk, it's important to focus on portion control and drink enough of water. The quantity of millet to be ingested is determined by a person's calorie needs, intestinal health sensitivity, and blood sugar level. Consult a dietitian to receive a personalized meal.”(12)”.

4. The best millets for diabetes are listed below.

- Foxtail millet: According to a study, type 2 diabetics who followed a particular diet enhanced with foxtail millet experienced a reduction in their blood sugar, cholesterol, and triglyceride levels. Another study discovered that when foxtail millet was substituted for rice, blood sugar levels decreased.
- Blood sugar is raised more gradually and steadily with finger millet than it is with abrupt surges. Low-GI, high-fibre foods help you lose weight while also lowering cholesterol and blood sugar fluctuations. These factors will help diabetic patients.
- Barnyard millet: A recent study suggested that diabetics may benefit from using barnyard millet in their diet. After the 28-day dietary intervention research, it had a favourable effect on blood glucose and serum lipid levels in both diabetic and non-diabetic individuals.”(13)”.

4.1. Diabetes friendly recipes

The following recipes will introduce you to millet if you've never tried it before;

4.2. Foxtail millet pongal

Ingredients: 1 cup of foxtail millet Half a cup of split moong dal, two green chills, two teaspoons of crushed pepper and cumin seeds, and a few curry leaves

1 teaspoon oil, salt to taste serves two people.

4.2.1. Procedure for Preparation:

- 1 cup of millet and 1/2 cup of split yellow moong dal should be measured.
- Soak the millet and dal for 10 minutes in water. 4 cups of water should be added to the mixture.
- Prepare for 5 whistles in a pressure cooker (13 to 15 minutes on medium heat).
- Next, add cumin seeds, green chilies, curry leaves, crushed pepper, and a teaspoon of oil to the cooked millet and stir-fry. Add salt as necessary.

4.3. Pearl millet idli

Ingredients:

- 1 cup pearl millet
- 1/4 cup of urad dal
- Rice flakes: 2 tablespoons
- Salt
- Contains: 10 idlis

4.3.1. Procedure for Preparation:

- Soak the rice flakes and urad dal in water for a half-hour in one bowl and the pearl millet for four hours in another.
- Next, crush them individually and combine them with the required amount of salt in a container.
- Fermentation will last for roughly 6-7 hours. Once the batter has fermented, ladle it onto the plates and steam them for ten minutes.
- Serve pearl millet idlis with coriander/tomato chutney."14."

5. Conclusion

Milletts have changed from being the "grain of the poor main" to being a "nutritious grain" as a result of their improved nutritional characteristics. They can be used in place of traditional grains and aid in maintaining. The tested millets offer excellent promise for dietary management and diabetes prevention. In addition to having ramifications for policy, it has repercussions for nutrient-sensitive agricultural interventions using millets and sorghum as well as for the promotion of the advantages of millets and sorghum for glycemic management.

Compliance with ethical standards

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