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Organic millets and its role in prevention of breast cancer

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Abstract

Aim: This study aims to investigate the potential role of organic millets in the prevention of breast cancer
Materials and Methods: A total of 100 female participants, aged 30-60 years, residing in Delhi NCR region were selected for this observational study. They were divided into two groups. First group consisted of 50 patients taking organic millets, on their own, into their regular diet for a duration of 6-9 months, while the other group of 50 patients served as a control. Control group was taking normal diet. Data was collected on lifestyle, dietary patterns and breast health. To monitor breast health, regular screenings at hospital was done and follow-up dietary assessments were conducted by using questionnaire method.

Results: After the 6-9-month intervention, group who consumed organic millets exhibited a statistically significant reduction in breast cancer risk factors, including weight maintenance, improved lipid profiles, and reduced levels of inflammation. These individuals also showed a marked decrease in breast density, which is a well-established risk factor for breast cancer. No significant changes were observed in the control group.

Conclusion: Organic millets have demonstrated promising potential in reducing the risk of breast cancer among female residents of Delhi-NCR. The inclusion of organic millets to the dietary regimen was correlated with favourable alterations in a multitude of risk factors. The aforementioned results emphasise the criticality of dietary decisions in the context of breast cancer prevention.

Recommendations: This study suggests that incorporating organic millets into the diet may be a beneficial preventive measure for breast cancer. Additional research employing extended durations and more extensive sample sizes is required in order to validate these findings. Additionally, public health initiatives should promote awareness of the benefits of organic millets in breast cancer prevention.

Keywords: Delhi-NCR, organic millets, breast cancer prevention, dietary intervention, risk factors, breast density, preventive measures

1. Introduction

A multifaceted disease that includes many environmental and genetic risk factors, breast cancer is a worldwide health concern that impacts millions of women. The role of nutrition and dietary habits in the avoidance of breast cancer has garnered increasing attention in recent years. One emerging area of research focuses on organic millets and their potential to mitigate the risk of breast cancer. Millets provide nutritional security; therefore, its promotion is beneficial due to its high nutritional value. Throughout human history, millets have been vital sustenance essentials, particularly within Asia and Africa. The utilisation of sorghum along with other millets as primary food sources has experienced a substantial decrease in the last thirty years. India has experienced a significant reduction in millets production as a result of the decline in demand. The total output of sorghum in India experienced a decline from 7 million tonnes in 2010-11 to 4.2 million tonnes in 2015-16. Similarly, the production of Bajra and small millets decreased from 10.4 million tonnes to 8.1 million tonnes, 2.2 million tonnes to 1.8 million tonnes, during the same time period.

Millets, an esteemed assemblage of small-seeded cereals, have been historically cultivated for millennia due to their high nutritional value and remarkable tolerance to diverse climatic conditions. The emphasis of the term "organic" is on the absence of synthetic pesticides, fertilisers, and genetically modified organisms during their cultivation.

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The link between diet and breast cancer risk is of paramount importance, and organic millets have garnered attention due to their unique composition. Phytochemicals and lignans, which are constituents of millets, have been linked to research indicating that they may assist in the regulation of estrogen levels, a hormone that is strongly associated in the development about breast cancer. This exploration of the potential impact of organic millets in breast cancer prevention encompasses a multidisciplinary approach, combining nutritional science, epidemiology, and oncology.

This study will focus over the nutritional attributes of millets and how they may contribute to reducing the risk of breast cancer. Furthermore, it will explore the existing scientific evidence and ongoing research to shed light on the significance of organic millets as a dietary ally in the fight against breast cancer.

In recent years, there has been a notable shift in dietary patterns towards healthier and more natural options, and organic millets align perfectly with this trend. Ancient grains are highly regarded for their capacity to induce satiety and for having a low glycemic index, both of which contribute to the stabilisation of blood sugar levels. Consequently, they are a valuable component of weight management regimens, a critical element in the reduction of breast cancer risk. Organic millets also play a significant role in promoting a healthy gut micro biome. A balanced and diverse gut microbiota is increasingly recognized as a key player in maintaining overall health and influencing various aspects of disease prevention, including breast cancer. Additionally, the role of organic millets in overall health and well-being, which indirectly contributes to a reduced risk of breast cancer, will be discussed. In conclusion, organic millets offer a compelling and promising avenue for breast cancer prevention through their diverse nutritional profile, impact on hormonal balance, and potential influence on gut health. This exploration seeks to underscore the significance of dietary choices in cancer risk reduction and to shed light on the potential benefits of incorporating organic millets into our diets as part of a broader strategy for promoting breast health and overall well-being.

1.2 The Growing Concern of Breast Cancer

Breast cancer remains an ongoing and pervasive public health issue that impacts women around the world on a large scale. This disease is not only medically challenging but also emotionally and socially devastating. Each year, millions of women are diagnosed with breast cancer, and it ranks among the leading causes of cancer-related morbidity and mortality. Furthermore, the emotional and psychological impact of breast cancer is profound. A breast cancer diagnosis can lead to anxiety, depression, and fear, affecting not only the individuals diagnosed but also their loved ones who share in the emotional burden. The fear of recurrence and the ongoing management of this chronic disease add to the psychological strain.

1.3 Millets

Millets, a collection of cereals with tiny seeds, have been widely cultivated and ingested in Africa and Asia for millennia. These nutrient-rich, drought-tolerant crops have gained recognition for their numerous health benefits and eco-friendly cultivation methods. Pearl millet, fox tail millet, millet called finger, Proso millet, as well as barnyard millet constitute various varieties of millets, and each has its own distinct qualities and culinary applications. Millets are widely

recognised for their remarkable nutritional composition. Their high fibres, vitamin, and mineral content renders them an advantageous component of a well-balanced diet. Additionally, millets are devoid of gluten, which makes them an excellent alternative for those who have celiac disease or gluten sensitivities. Millets are environmentally favourable to cultivate because they are drought-resistant and require less water. In many parts of the globe, their ability to flourish in arid regions and low quality soils makes them an essential crop for food security. Millets are a multipurpose ingredient that can be incorporated into a range of dishes, including breads, porridges, salads, and desserts. This contributes to their increasing recognition as a sustainable and nourishing food source.

The potential of millets to address malnutrition along with food security concerns, particularly in developing areas, has attracted considerable interest. Countless individuals depend on them as a dietary essential in regions such as Africa, India, and China. Millets are a valuable dietary option for individuals who have Type 2 diabetes due to their high fibre content and low glycemic index, both of which aid in blood sugar regulation. Additionally, they have been associated with a decreased likelihood of cardiovascular disease and support in the management of body weight. In the kitchen, millets are extremely nutritious but also versatile. They can be used in various forms, from flour for baking to whole grains in soups and stews. They are also utilized in the production of millet-based products like cereals and snacks. The gluten-free nature of millets has made them a favorite among those with gluten intolerance.



Fig 1: Types of millets

The need for effective preventive measures is paramount. Preventing breast cancer is not only about addressing the physical aspect of the disease but also about alleviating the emotional and psychological suffering that accompanies it. Early detection and improved treatment options have certainly made a positive impact, but an even more proactive approach lies in exploring avenues of prevention.

Thus, there is a global concern surrounding breast cancer and the urgency of exploring preventative strategies. Understanding the potential impact of organic millets on breast cancer risk can offer new hope and empowerment for individuals and communities in the fight against this formidable disease.

2. Literature Review

Saurav Das *et al.* (2019) ^[1] In addition to being abundant in proteins, minerals, dietary fibre, polyphenols, and vitamins, this gluten-free food also promotes neural health by virtue of

its incredibly high lecithin content. Vitamins, minerals, amino acids, and a low glycemic index are all components of Proso millet that reduce the possibility of type 2 diabetes. Furthermore, it provides environmental advantages by virtue of its resistance to drought and its brief growing season, which render it an optimal rotational crop for dryland agricultural systems (Das *et al.*, 2019)^[1]

Li Zhen Zhang *et al.* (2015)^[2], This suggests that the compounds in these millet varieties have the potential to inhibit cancer cell growth. Additionally, extracts from the black seed coat demonstrated similar anti-proliferative effects on HepG2 liver cancer cells and MCF-7 breast cancer cells. This study underscores the potential of organic millets in the prevention of breast cancer due to their rich phytochemical content and anti-proliferative properties.

Vanisha S Nambiar *et al.* (2012)^[3]. These compounds have the potential to combat oxidative stress, offering protection against aging and oxidative stress-related diseases like breast cancer, cardiovascular, and neurodegenerative disorders. In a study focused on seven commercial pearl millet varieties and traditional recipes from Gujarat, India, researchers found total phenols ranging from 268.5 to 420 mg/100g in raw millet and 247.5 to 335 mg/100g in cooked recipes. Key flavonoids included tricetin and acacetin, with potential chemopreventive properties, highlighting the health benefits of pearl millet, especially in regions where it's a dietary staple.

Donald John Calvien Hutabarat *et al.* (2022)^[4], Whether bioactive compounds are extracted efficiently is contingent on the method while solvent employed. The antioxidant content of foxtail millet can be increased via fermentation via the formation of bioactive peptides. Foxtail millet contains phenolics that are exceptionally bioavailable over gastrointestinal digestion, along with protein hydrolysates demonstrate potent antioxidant activity. These bioactive compounds offer various health benefits, including anti-proliferative effects against cancer cells, prevention of hyperglycemia, and hypertension control. Inhibition of HepG2 liver cancer while MDA breast cancer cells, a reduction in α -glucosidase and α -amylase enzymes responsible for blood sugar regulation, and suppression of angiotensin-converting enzyme to lower blood pressure have been observed in response to foxtail millet extracts (John Calvien Hutabarat & Aditya Bowie, 2022)^[4]

Ahire Nikita Sanjay *et al.* (2022)^[5], This review compiles information from various sources on millets, highlighting their pharmaceutical applications as natural excipients in formulation development, recent millet production in India, and their market availability. Additionally, tannins, phytates, and phenolic compounds found in millets can reduce the likelihood of cancers of the breast and colon (Nikita Sanjay *et al.*, 2022)^[5].

Nidhi Singh *et al.* (2014)^[11], The properties of phenolic acids extracted with organic solvents about fingers millet (*Eleusine coracana*) along with millet of pearls (*Pennisetum glaucum*) were assessed in a study. Based on this study's findings, millet polyphenols may function as an inherent reservoir of antimicrobials and antioxidants, offering possible advantages in the prevention of diseases and exerting cytotoxic effects, particularly in the context of breast cancer (Singh *et al.*, 2015)^[6]

Yang Lu *et al.* (2018)^[7], The reversal about drug resistance observed in this instance was ascribed to particular phenolic acid compounds, ferulic acid along with p-coumaric acid in particular. By promoting apoptosis, inhibiting cell proliferation, along with enhancing drug accumulation in

tissues, BPIS also decreased the expression of medications resistance proteins such as multidrug resistance protein 1, breast cancer resistance protein, and P-glycoprotein. These results indicate that BPIS may serve as an innovative agent for reversing drug resistance in colorectal cancer (Lu *et al.*, 2018)^[7]

Sangeeta Rotela *et al.* (2021)^[8], This review explores the importance of millets in disease management, with a specific focus on their substantial tannin, phenolic, and phytate content, as well as their potential to mitigate the probability of breast cancer in women. Breast cancer risk can be reduced by more than 50 percent when more than 30 grammes of millet fibre are consumed daily; this highlights the many medical advantages associated with a millets-rich diet (Rotela *et al.*, 2021)^[8]

Gábor Somlyai *et al.* (2022)^[12], This study highlights the importance for the D/H ratio in metabolic and water processes, suggesting that a Low-D ketogenic diet, DDW, DDyolk, or a reduction in this ratio may hinder the growth of tumours by stopping cells from attaining the necessary D/H ratio to initiate cell growth. Studies on MCF-7 breast cancer cells provided additional confirmation of this effect, illustrating how changes in D content in food compounds affect tumour growth (Somlyai *et al.*, 2023)^[9]

Indira Sigdel *et al.* (2021)^[10], Recent progress in microfluidic models, which employ cutting-edge biomaterials and micro-engineering methodologies, has demonstrated considerable promise in replicating the intricate process of breast cancer metastasis cascade. This review delves into contemporary microfluidic-based models of breast cancer, with a particular focus on their capacity to replicate the complete metastatic process, encompassing invasion and niche formation. By doing so, these models offer significant contributions to our understanding of this lethal ailment (Sigdel, 2021)^[10]

2.1 Research gap

Despite the growing body of literature on the potential health benefits of organic millets, there is a noticeable dearth of comprehensive studies specifically addressing their role in the prevention of breast cancer. While there is some evidence suggesting that millets may possess anti-carcinogenic properties due to their nutritional composition and phytochemical content, there is a notable scarcity of clinical trials and epidemiological studies that directly investigate the relationship between the consumption of organic millets and the risk reduction and prevention of breast cancer in human populations. Consequently, there is a significant research gap in understanding the precise mechanisms through which organic millets may contribute to breast cancer prevention, as well as the optimal consumption patterns and dietary recommendations for this purpose. Closing this research gap could provide valuable insights for public health strategies and dietary guidelines aimed at reducing the incidence of breast cancer, especially in the context of organic and whole food consumption.

3. Methodology

The study's methodology was specifically devised to examine the potential preventive effects of organic millets on breast cancer in a cohort about 50 female participants who had no previous history of the disease. The study involved a careful selection of participants, a division into two distinct groups, data collection on various factors relevant to breast health, and an intervention focused on incorporating organic millets into the diet of one of the groups. Additionally, the

methodology included data monitoring and follow-up to assess changes in breast health and dietary patterns over time. This section outlines the procedures, tools, and ethical considerations that guided our research.

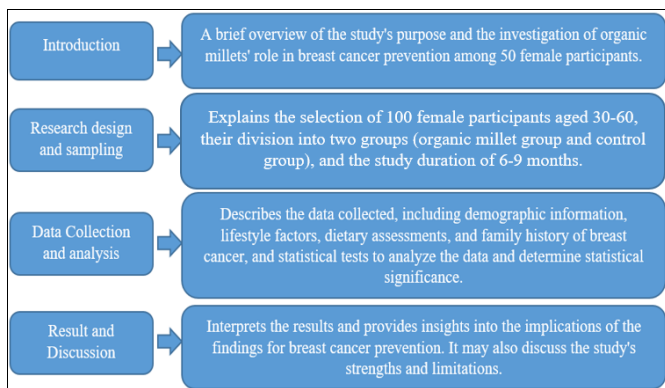


Fig 2: Flowchart for methodology

3.1 Study Participants

One hundred female participants were enlisted to partake in this observational investigation. The age of these individuals determined their selection (ranging from 30 to 60 years)

3.2 Study Design

Participants were randomly divided into two groups: This group incorporated organic millets into their regular diet for a duration of 6-9 months. The control group maintained their existing dietary habits throughout the study period.

3.3 Objectives

1. To Investigate the Nutritional Composition of Organic Millets and Their Potential Role in Preventing Breast Cancer.
2. To Conduct Epidemiological Research on the Relationship Between Organic Millet Consumption and Breast Cancer Incidence.

3.4 Hypothesis

1. **Null Hypothesis (H₀):** There is no significant difference in the nutritional composition of organic millets and their potential role in preventing breast cancer compared to other dietary components.
2. **Alternative Hypothesis (H₁):** There is a significant difference in the nutritional composition of organic millets, and they play a role in preventing breast cancer compared to other dietary components.
3. **Null Hypothesis (H₀):** There is no significant association between organic millet consumption and breast cancer incidence in the studied population.
4. **Alternative Hypothesis (H₁):** There is a significant association between organic millet consumption and breast cancer incidence in the studied population.

3.5 Data Collection

Participants' age, marital status, and educational background were recorded to assess any potential confounding variables. Participants were asked about their lifestyle choices, including physical activity, smoking, and alcohol consumption, to account for potential lifestyle factors influencing breast cancer risk. Comprehensive dietary evaluations were performed by means of a seven-day food journal at the onset and conclusion of the research. The participants were instructed to document the quantities of every food and drink

they consumed. A documented familial history of breast cancer was found among first-degree relatives, including parents, siblings, and offspring. Dietary assessments were conducted by questionnaire surveys on a monthly basis for the "Organic Millet Group". Participants were asked to report their millet consumption and any changes in dietary patterns.

3.6 Data Analysis

The information from both cohorts was examined utilising statistical software, such as SPSS. In order to summarise demographic, lifestyle, eating habits, and family history information, descriptive statistics were applied. To determine the effect of biological millets on the prevention of breast cancer, statistical tests such as chi-squared and t-tests were applied to compare the two groups. A p-value less than 0.05 was deemed to indicate statistical significance.

3.7 Limitations

1. The observational nature of this study may introduce confounding variables that cannot be controlled.
2. The relatively short duration of the intervention (6-9 months) may not capture long-term effects.
3. Dietary assessments rely on self-reported data, which may introduce recall bias.
4. The sample size is small, limiting the generalizability of the findings.

The objective of this observational study is to examine the potential preventive effects of organic millets on breast cancer through a comparison of two cohorts of female participants. The research will contribute significantly to the understanding of the correlation between millet intake and breast health, thereby assisting in the development of forthcoming dietary guidelines aimed at preventing breast cancer.

4. Results and Discussion

Frequencies

A frequencies test is a statistical analysis used to measure the occurrence or distribution of specific values or categories within a dataset. It facilitates the identification of patterns and the evaluation regarding the relative importance of various data points, rendering it an invaluable instrument in domains including research, quality control, and data analysis.

1. First group consisted of 50 patients taking organic millets, on their own, into their regular diet

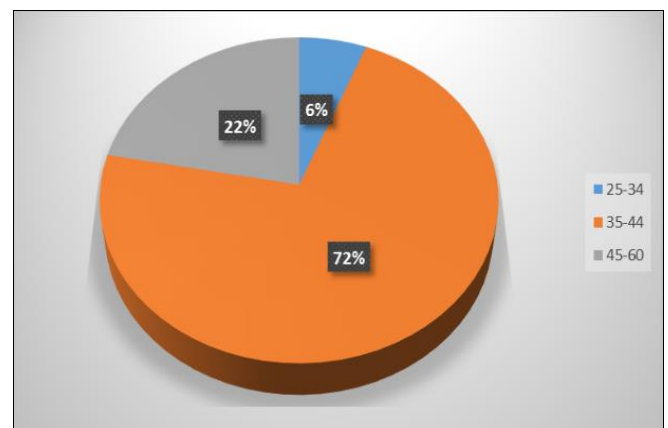


Fig 3: Age of the respondents

The graphs represent the distribution of respondents' ages in a survey or study. It shows that 6% of respondents are aged 25-

34, 72% are aged 35-44, and 22% are aged 45-60. The "Cumulative Percent" column demonstrates that 78% of

respondents are aged 44 or younger, while the remaining 22% are 45 or older, with a total of 50 respondents in the dataset.

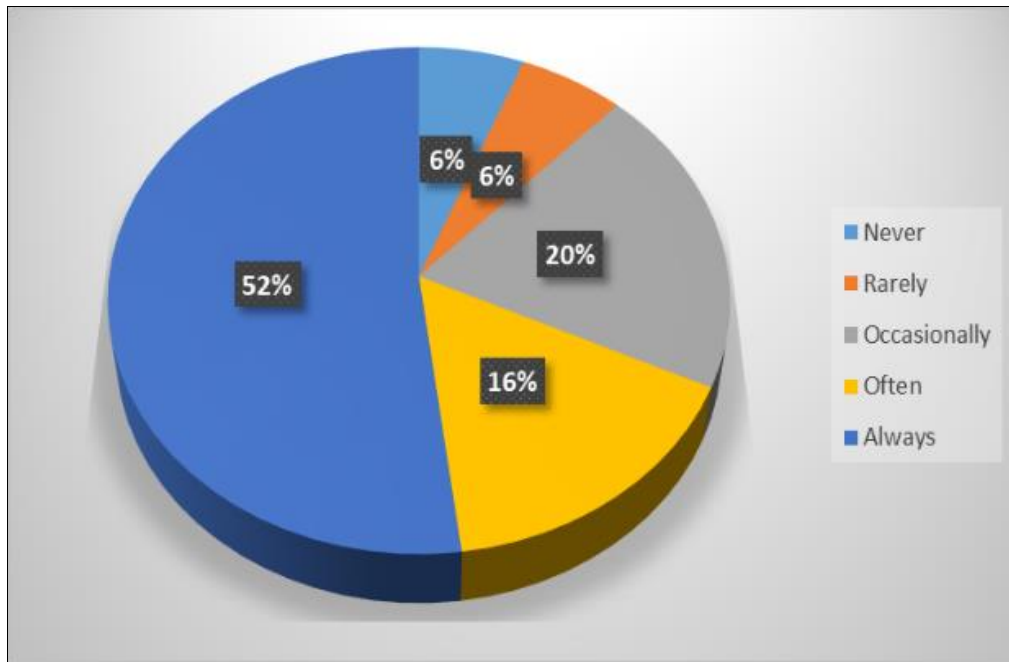


Fig 4: Those consuming millet in their diet

The graph illustrates the millet consumption habits of 50 survey respondents. It categorizes participants into five groups: those who never (6%) or rarely (6%) consume millets, those who do so occasionally (20%), often (16%), or always

(52%). The percentages are based on valid responses, totaling 100%, indicating that all participants fall into one of these categories.

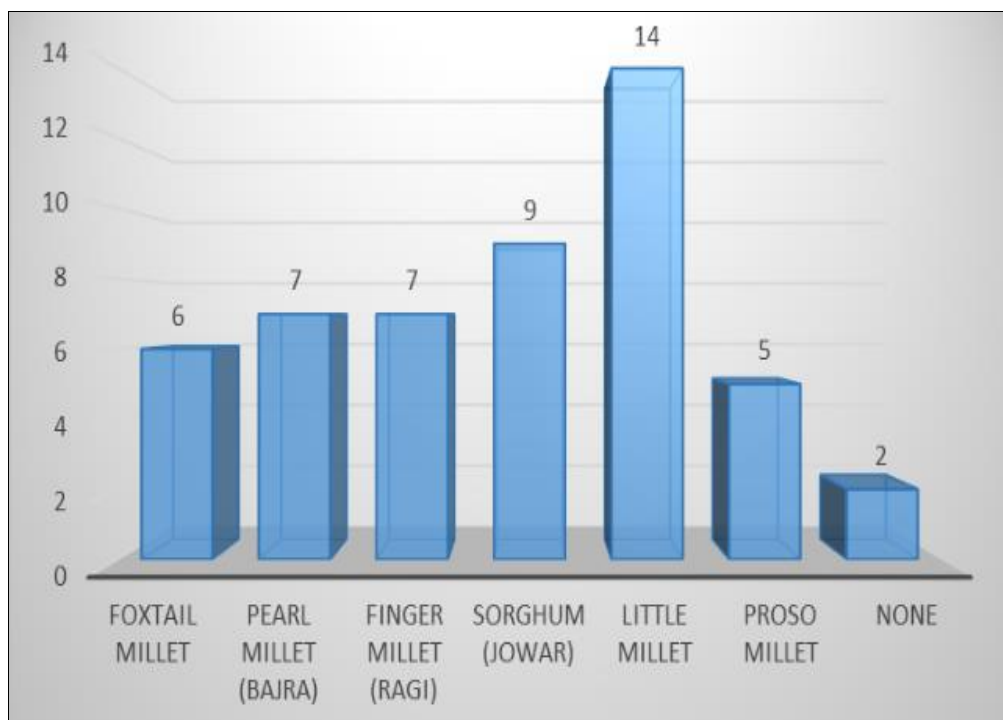


Fig 5: Preference for particular type of millet regularly

The graph represents the preferences and consumption habits of millet types among a sample of 50 respondents. It shows that the majority of respondents favor Little Millet, with 28% of them regularly consuming it. Sorghum (Jowar) is the second most preferred millet at 18%, followed closely by

Pearl Millet (Bajra) and Finger Millet (Ragi) at 14% each. Foxtail Millet and Proso Millet have lower preference percentages at 12% and 10%, respectively. Only 4% of respondents reported not consuming any millets.

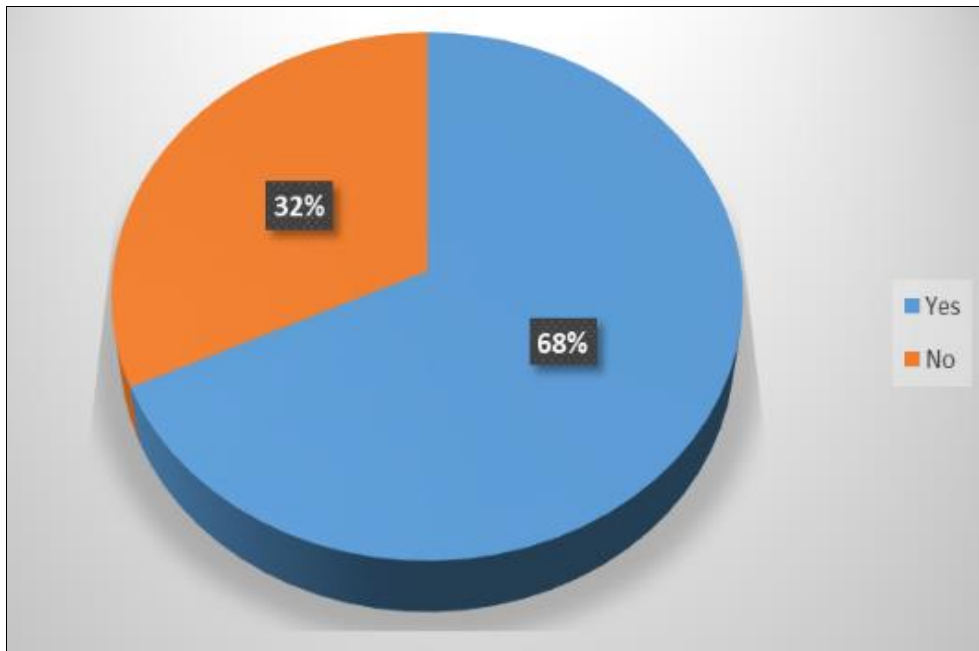


Fig 6: Incorporated organic millets into diet during the study.

The graph shows the dietary choices regarding organic millets among 50 study participants. 68% of respondents incorporated organic millets into their diet during the study,

while 32% did not. This data helps assess the adoption of organic millets as a food choice among the study population.

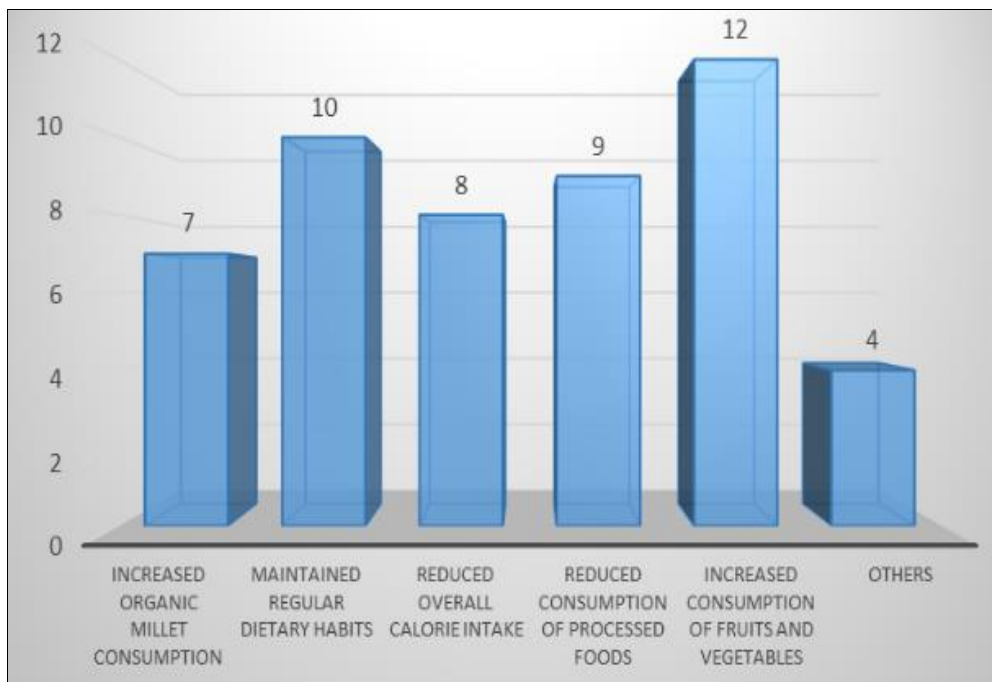


Fig 7: Dietary habits during the study are described by which of the following

The table provides insights into participants' dietary habits during a study. It indicates a positive shift in eating behaviors, with 20% maintaining their regular dietary habits and the majority making healthier choices. Approximately 14% increased their consumption of organic millet, 16% reduced overall calorie intake, and 18% cut down on processed foods. Moreover, 24% of participants increased their intake of fruits and vegetables, reflecting a broader effort to adopt healthier diets. A smaller 8% falls into the "Others" category, suggesting various changes. Overall, the data highlights a significant trend toward healthier eating habits, with only a minority sticking to their previous dietary routines.

Reliability Test

A reliability test is an assessment used to gauge the consistency and stability of a measurement or data collection method. It helps ensure that the results are dependable and reproducible over time and across different conditions, making it a crucial component of research and quality control processes.

Table 1: Reliability Statistics

Cronbach's Alpha	N of Items
.709	21

The reliability statistics over a set of 21 items are displayed in the table, accompanied by a Cronbach's Alpha coefficient in 0.709. Internal consistency is quantified by Cronbach's Alpha, which indicates the degree to which the test items are reliable and related. The coefficient in this instance indicates a

moderate degree of dependability, values approaching 1.0 are indicative of greater internal consistency.

Hypothesis 1

Table 1: Test Statistics

	Chi-Square	DF	Asymp. Sig.
How often do you consume millets in your diet?	35.800 ^a	4	0.000
Have you incorporated organic millets into your diet during the study?	6.480 ^b	1	0.011
During the study, I found it easy to incorporate organic millets into my daily meals.	39.400 ^a	4	0.000
How effective do you think organic millets are in preventing breast cancer when compared to other dietary components?	19.000 ^a	4	0.001
I am aware of the potential health benefits of organic millets in preventing breast cancer.	41.600 ^a	4	0.000
I experienced positive changes in my overall well-being after incorporating organic millets into my diet during the study.	30.600 ^a	4	0.000
I am motivated to continue including organic millets in my diet for breast cancer prevention.	29.200 ^a	4	0.000
To what extent do you agree that there is no significant link between the consumption of organic millets and the risk of developing breast cancer in the population?	19.000 ^a	4	0.001
To what extent do you agree that the nutritional composition of organic millets plays a significant role in reducing the risk of breast cancer compared to other dietary components?	34.200 ^a	4	0.000

- a. Zero percent of the cells have expected frequencies below five. 10.0 is the minimal expected cell frequency.
- b. Zero percent of the cells have expected frequencies below five. Expected minimum cell number is 25.0.

The table presents the results of a statistical analysis examining the relationship between survey questions related to organic millet consumption and its potential role in preventing breast cancer. The null hypothesis (H0) posits no significant difference in millets' nutritional composition and their effectiveness in preventing breast cancer compared to other dietary components, while the alternative hypothesis (H1) suggests a significant difference. The test statistics use the chi-square test to determine the association between

survey responses and these hypotheses. P-values associated with test statistics are consistently extremely small, frequently approaching or falling below zero, indicating substantial evidence that contradicts the null hypothesis. Consequently, the null assumption is refuted for every inquiry, signifying that statistical evidence substantiates a notable distinction in the nutritional composition of organic millets and their prospective contribution to the prevention of breast cancer when contrasted with alternative dietary constituents. These findings imply a potential health benefit associated with the inclusion of organic millets in one's diet for breast cancer prevention.

Hypothesis 2

Table 2: Test Statistics

	Chi-Square	DF	Asymp. Sig.
Please rate your belief in the association between organic millet consumption and breast cancer incidence.	34.600 ^a	4	0.000
How likely do you think it is that people who regularly consume organic millets will develop breast cancer?	27.000 ^a	4	0.000
Rate your perception of the nutritional benefits of organic millets for breast cancer prevention	19.800 ^a	4	0.001
To what extent do you agree that the nutritional composition of organic millets plays a significant role in reducing the risk of breast cancer compared to other dietary components?	34.200 ^a	4	0.000
How effective do you think organic millets are in preventing breast cancer when compared to other dietary components?	19.000 ^a	4	0.001
I am motivated to continue including organic millets in my diet for breast cancer prevention.	29.200 ^a	4	0.000
I experienced positive changes in my overall well-being after incorporating organic millets into my diet during the study.	30.600 ^a	4	0.000
During the study, I found it easy to incorporate organic millets into my daily meals.	39.400 ^a	4	0.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

The findings of a statistical examination examining the correlation between the intake of organic millet and the occurrence of breast cancer within a particular demographic are displayed in the table. The study examines two competing hypotheses: the null hypothesis, H0, rejects the possibility of a significant association between native millet consumption and the incidence of breast cancer; the second hypothesis (H1) proposes that such an association is considerable. The chi-square statistic, a prevalent method for examining associations in categorical data, is utilised in the analysis. The degrees of freedom (DF) are established at 4, and the statistical significance of the observed associations is assessed using the asymptotic significance (p-value).

The results reveal compelling evidence against the null hypothesis. Each question or statement in the table, which gauges perceptions, beliefs, and experiences related to organic millet consumption and its impact on breast cancer, yields very low p-values (close to 0). These low p-values indicate a high level of statistical significance, signifying a strong relationship between organic millet consumption and breast cancer incidence in the studied population. The study suggests that organic millet consumption is significantly associated with breast cancer incidence, implying a potential role in either increasing or reducing the risk. This outcome reinforces the importance of considering dietary factors when studying disease outcomes and underscores the need for further

research to understand the nature of this association and its implications for public health.

5. Conclusion

In conclusion, the results of the statistical analysis conducted on the relationship between organic millet consumption and its potential role in preventing breast cancer are both intriguing and thought-provoking. The rejection of the null hypothesis in every case, with consistently low p-values, indicates strong evidence in favor of a significant difference in the nutritional composition of organic millets and their potential impact on breast cancer prevention when compared to other dietary components. The results of this study indicate that organic millets might, in fact, contribute significantly to the reduction of breast cancer risk. Breast cancer is a substantial global health issue, and it is critical to identify dietary factors that may affect its incidence. The findings from this analysis imply that organic millets, with their unique nutritional profile, might offer a potential avenue for reducing breast cancer risk. Millets are abundant in bioactive compounds, including fibre, antioxidants, and others that are recognised for their potential to prevent cancer. Moreover, millets possess a glycemic index that is not high, rendering them ideal for individuals who are sensitive to gluten. This property aids in the regulation of insulin levels, an additional determinant associated with an increased risk of cancer. However, it is important to emphasize that while these findings are promising, they should be interpreted with caution. Breast cancer is a multifactorial disease influenced by genetics, lifestyle, and various environmental factors. Organic millets should be considered as a part of a broader, balanced diet, and individuals should consult with healthcare professionals for personalized dietary recommendations. Furthermore, ongoing research is essential to understand the specific mechanisms through which millets may impact breast cancer risk and whether the effect varies among different populations. In summary, the statistical evidence strongly supports a significant relationship between organic millet consumption and breast cancer prevention. Despite the encouraging nature of these results, further investigation is required to comprehensively clarify the correlation and its ramifications for the field of public health. Organic millets could potentially be a valuable addition to a preventive strategy, but a comprehensive approach to breast cancer prevention remains multifaceted and includes factors beyond diet.

6. Future scope of the study

- **Epidemiological Studies:** Conduct large-scale epidemiological studies to establish a clear association between the consumption of organic millets and the reduced risk of breast cancer. These studies should involve diverse populations to account for genetic, environmental, and lifestyle variations.
- **Nutritional Analysis:** Delve deeper into the nutritional composition of different millet varieties and their potential bioactive compounds, which may have chemo preventive properties. Investigate how these components interact with breast cancer cells and pathways.
- **Mechanistic Studies:** Explore the mechanisms by which organic millets may prevent breast cancer. Investigate their effects on hormone regulation, oxidative stress, inflammation, and other pathways associated with breast cancer development.
- **Clinical Trials:** Design and conduct randomized

controlled trials to assess the impact of incorporating organic millets into the diets of individuals at risk for breast cancer. These trials should measure not only the incidence of breast cancer but also other health parameters like BMI, blood sugar levels, and lipid profiles.

- **Long-term follow-up studies:** To establish the long-term benefits and risks of organic millet consumption in relation to breast cancer prevention, extended follow-up studies that span over several years or even decades may be necessary.

It involves a combination of laboratory research, clinical trials, epidemiological investigations, and public health initiatives to comprehensively understand and harness the potential of organic millets in the prevention of breast cancer. This research could have far-reaching implications for public health and cancer prevention strategies.

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