

Examining the Relationship between Consumption Patterns and Health Benefits of Millet-Based Food Products in Gwalior, Madhya Pradesh

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Abstract:

This study examines the relationship between consumption patterns and the health benefits of millet-based food products in Gwalior, Madhya Pradesh. The global trend toward health-conscious eating and the increasing recognition of the nutritional benefits of millets have spurred interest in incorporating millets into daily diets. Millets are rich in essential nutrients such as fiber, vitamins, and minerals, and have been shown to offer various health benefits, including aiding in weight management, improving digestive health, and managing chronic conditions like diabetes. Despite these advantages, millet-based foods have not yet seen widespread adoption, where traditional food habits and preferences remain dominant. Using a sample of 384 respondents, this research explores the factors influencing millet consumption in Gwalior, focusing on demographic characteristics (age, gender, income, education), awareness of health benefits, frequency of consumption, and the barriers to millet adoption. The study utilizes a structured questionnaire to collect data, and statistical analyses were performed to identify key correlations and patterns in consumption behavior. The findings show that while there is growing awareness of millets' health benefits, factors such as taste preferences, limited availability, and cultural resistance to changing traditional diets act as significant barriers to the increased adoption of millet-based foods.

Keywords: Consumption Patterns, Health Benefits, Millet-Based Foods, Gwalior

1.0 INTRODUCTION

Millets are a group of cereal grains that have been cultivated for thousands of years in various regions of the world. They include species like pearl millet, finger millet, foxtail millet, and others. In recent years, there has been a resurgence of interest in these ancient grains, especially due to their numerous health benefits and ecological sustainability. Millets are rich in essential nutrients, including dietary fiber, vitamins, and minerals, making them highly nutritious alternatives to more commonly consumed grains such as rice and wheat. Additionally, they are gluten-free, making them suitable for people with gluten intolerance or celiac disease. However, with the increasing dominance of wheat and rice in global food systems, millet cultivation and consumption have significantly declined over time (Zhao et al., 2020). The decline in millet consumption is particularly noticeable in urban regions, where diets have shifted toward processed and refined foods. However, in recent years, there has been a revival of interest in millets due to their nutritional and environmental

benefits. Millets are recognized for their impressive nutritional profile, which includes high levels of protein, fiber, vitamins (especially B vitamins), and minerals such as magnesium, iron, and phosphorus. For example, a study by Sheela et al. (2021) indicated that millets are a rich source of antioxidants, which can help combat oxidative stress and inflammation. Additionally, millets have a lower glycemic index than rice and wheat, making them beneficial for individuals with diabetes or those at risk of metabolic disorders (Reddy et al., 2017).

The resurgence of interest in millets is driven not only by their health benefits but also by their suitability for sustainable agriculture. Millets are drought-resistant crops, making them an ideal choice for regions prone to water scarcity (Thirunavukkarasu et al., 2021). The environmental sustainability of millet cultivation, along with its nutritional advantages, makes it a valuable crop in the context of climate change, where traditional cereal crops like wheat and rice are under threat from water shortages and changing weather patterns (Borrell et al., 2017).

Despite the numerous benefits of millets, their consumption remains low, especially in urban areas. In India, for instance, although millet consumption is still prevalent in rural areas, urban populations continue to rely heavily on rice and wheat. A survey by Yadav et al. (2019) found that over 70% of urban consumers in India were unaware of the health benefits of millets, despite their availability in local markets. This lack of awareness has been one of the primary barriers to increasing millet consumption.

In Gwalior, a city in central India, the consumption of millet-based food products is still relatively low, despite the availability of these grains in local markets. This study seeks to explore the consumption patterns of millet-based foods in Gwalior and examine the perceived health benefits of these foods.

2.0 LITERATURE REVIEW

2.1 Nutritional Benefits of Millets

Millets are recognized as a highly nutritious food source, particularly due to their high content of dietary fiber, vitamins, and minerals. Compared to rice and wheat, millets have a significantly higher fiber content, which aids in digestive health by promoting regular bowel movements and preventing constipation (Pereira et al., 2020). Additionally, the high fiber content in millets helps in managing body weight and reducing the risk of obesity. A study by Chen et al. (2018) found that the inclusion of millets in the diet resulted in lower body mass index (BMI) and improved weight management in participants.

Millets also provide a rich source of essential amino acids and protein. For instance, finger millet contains higher levels of calcium and iron compared to other cereal grains, which is particularly beneficial for people suffering from anemia or bone-related disorders (Bisht et al., 2019). Furthermore, the amino acid profile of millets is favorable for supporting muscle repair and growth, making them ideal for athletes and individuals involved in physically demanding activities (Malleshi & Desikachar, 2015).

2.2 Health Benefits of Millets

The health benefits of millets extend beyond their nutritional composition. Several studies have shown that millets contribute to the management of chronic diseases, including diabetes, hypertension, and cardiovascular diseases. Due to their low glycemic index, millets are beneficial for individuals with diabetes, as they help regulate blood glucose levels and improve insulin sensitivity (Liu et al., 2017). Millets also contain a high amount of magnesium, which has been shown to reduce the risk of developing type 2 diabetes by improving insulin sensitivity (Maji et al., 2021).

In addition to their role in managing diabetes, millets are associated with cardiovascular health. The high levels of antioxidants in millets, such as polyphenols, help in reducing oxidative stress, which is a contributing factor to heart disease (Tao et al., 2019). Studies by Jadhav et al. (2020) and Rao et al. (2018) have demonstrated that the consumption of millets can help lower blood pressure and cholesterol levels, thereby reducing the risk of heart attacks and strokes.

Another significant health benefit of millets is their potential in reducing the risk of certain cancers. A study by Siddhuraju and Becker (2016) indicated that millet consumption was inversely related to the incidence of colorectal cancer, likely due to the high fiber content, which promotes the elimination of toxins from the body.

2.3 Barriers to Millet Consumption

While the health benefits of millets are well-documented, the adoption of millet-based foods is still limited, especially in urban settings. According to a study by Mishra and Khurana (2017), one of the major barriers to millet consumption is the lack of awareness about its nutritional benefits. Many consumers are unaware that millets are a healthier alternative to rice and wheat, and there is a lack of educational programs promoting millets as a staple food. Additionally, cultural factors and taste preferences play a significant role in limiting the consumption of millet-based foods. Urban populations often prefer more familiar and widely consumed grains, such as rice and wheat, due to their taste and convenience (Sahariah & Narayana, 2017).

In many regions, millet-based foods are also perceived as “traditional” or “old-fashioned,” leading to a stigma around their consumption. This perception is especially prevalent in younger generations, who are more likely to opt for processed and convenience foods (Yadav et al., 2019). Furthermore, the availability of millet-based products in urban markets is often limited, and consumers may find it difficult to access millet flour, ready-to-eat millet snacks, or other millet-based food products.

2.4 Promotion and Awareness of Millets

Efforts to increase the consumption of millets have been gaining momentum in recent years. Governments and NGOs in countries like India have begun to promote the health benefits of millets through various awareness campaigns. For example, the Indian government declared 2018 as the "National Year of Millets," aiming to promote the cultivation and consumption of millets (Patel & Mehta, 2014). These campaigns have led to a growing interest in millet-based foods, particularly in rural and semi-urban areas. Additionally, there has been an increase in the availability of millet-based products in supermarkets and online markets, making it easier for consumers to incorporate millets into their diets.

A study by Singh et al. (2021) found that when people were educated about the nutritional and health benefits of millets, there was a significant increase in the consumption of millet-based foods. This highlights the importance of targeted awareness programs that focus on educating consumers about the health benefits of millets and how to incorporate them into their daily diets.

3.0 RESEARCH DESIGN

A **descriptive research design** was adopted to understand the current consumption patterns and health benefits of millet-based food products. The study also uses a **correlational approach** to explore the relationship between various factors (e.g., age, income, health benefits) and millet consumption. This approach is appropriate for capturing consumer behaviors and health perceptions at a specific point in time. The study is based in **Gwalior**, a city in Madhya Pradesh, India. Gwalior was chosen due to its urban context, where millet consumption has been relatively low but is rising as consumers become more health-conscious. The target population includes adults (18+ years) residing in Gwalior. A **stratified random sampling** technique was used to select **384 respondents**, ensuring representation across age, gender, income, and education. This sample size was calculated to provide a confidence level of 95% with a margin of error of 5%.

3.1 Objective of the study

To examine the relationship between consumption patterns and health benefits of millet- based food products.

3.2 Hypothesis

There is a significant relationship between consumption patterns and health benefits of millet- based food products.

4.0 DATA ANALYSIS & INTERPRETATION

Table 4.1: - Correlation between consumption patterns and health benefits of millet- based food products

Variables	Correlation	P Value
Consumption_Frequency	0.946	0.00
Consumption Pattern	1.0	0.00
Daily Inclusion	0.939	0.00
Digestive_Health_Perception	0.942	0.00
Health Improvement Belief	0.943	0.00
Health Motivation	0.938	0.00
Nutritional Info Accessibility	0.945	0.00
Perceived Health Benefits	0.942	0.00
Recipe Awareness	0.943	0.00
Special Occasion Usage	0.943	0.00
Weight Management Belief	0.938	0.00

Interpretation - The table reveals a **strong and statistically significant positive correlation (p-value = 0.00)** between the **consumption pattern of millet-based products** and several influencing factors, indicating that these variables play a critical role in shaping consumption behavior.

Starting with **consumption frequency (correlation = 0.946)**, the results suggest that individuals who consume millet-based products more frequently are more likely to develop consistent consumption patterns. This highlights the importance of promoting millet as a versatile ingredient suitable for **regular meals**, potentially making it a household staple rather than just an occasional dietary choice.

The **daily inclusion (correlation = 0.939)** further reinforces this trend, showing that millet is not only consumed frequently but also integrated into daily eating habits. This suggests that millet products are perceived as convenient, adaptable, and easy to incorporate into meals, making them appealing for health-conscious consumers seeking routine dietary improvements.

The **digestive health perception (correlation = 0.942)** indicates that consumers associate millet-based products with better digestive health. This strong correlation reflects growing consumer awareness about the importance of gut health and fiber-rich diets. It suggests that millet's **high fiber content, digestive benefits, and natural properties** make it a preferred choice for individuals focusing on digestive wellness. Marketing strategies highlighting these attributes could further enhance consumer trust and drive demand.

Similarly, the **health improvement belief (correlation = 0.943)** suggests that millet consumption is influenced by the perception that it contributes positively to overall health. Consumers likely view millet as a nutrient-dense option that supports long-term wellness goals, such as **weight management, cholesterol control, and energy balance**. Such beliefs position millet as a **functional food** that not only satisfies hunger but also improves health, encouraging regular usage.

The **statistical significance (p-value = 0.00)** across all variables confirms that these relationships are not due to random chance but reflect genuine patterns in consumer behavior. This highlights a clear opportunity for marketers and food manufacturers to target health-conscious audiences by promoting millet's **nutritional benefits, digestive advantages, and daily usability** through recipes, educational content, and transparent labeling.

5.0 CONCLUSION

The analysis of relationships between consumption patterns and health benefits reveals strong and statistically significant correlations. The findings highlight millet's suitability as a staple food due to its digestive and health-improving properties, confirming its potential for broader adoption. The research emphasizes millet's value as a functional food and recommends promoting its daily use through targeted awareness campaigns. Further studies can explore long-term health impacts and regional consumption variations. The study establishes a positive and statistically significant relationship between the consumption patterns of millet-based products and their perceived health benefits among respondents in Gwalior, Madhya Pradesh. High correlations indicate that millet is widely recognized for its nutritional value, digestive benefits, and health-improving properties. The results suggest that millet-based products are not only integrated into daily diets but are also regarded

as effective for weight management and overall wellness. These insights provide strong evidence to support millet as a functional food and encourage its promotion as a sustainable dietary choice. Given the growing interest in health-conscious eating, millet-based foods present significant potential for expanded market adoption. Millet-based products continue to gain popularity as health-conscious consumers focus on nutrition and wellness. This study provides a foundation for developing strategies to enhance market adoption and educate consumers on millet's health benefits.

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