A Study on Assessing the Awareness of Nutritional Benefits and Health Benefits of Millets Among Adolescents

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Abstract— This study aims to assess the awareness of nutritional benefits of millets among adolescents. Millets are ancient grains that have gained popularity in recent years due to their high nutritional value and health benefits such as high in protein, fiber, and mineral content. Despite these benefits, there is limited awareness among adolescents about the importance of incorporating millet into their diets. This study will discuss the various types of millets, their nutritional composition, and the potential health benefits millets offer to adolescents. Overall, this study will focus on the importance of including millets in adolescents' diets can have significant positive impacts on their nutritional intake and overall health.

Index Terms— Adolescents' health, Health Benefits of Millets, Nutritive Benefits of Millets, Adolescents Diet, Mainstream Food Item.

I. INTRODUCTION

In recent years, there has been a growing global interest in traditional grains like millets due to their numerous health benefits and their potential to address various health concerns. Millets, often referred to as "Nutri-cereals," are a group of small-seeded grasses that have been cultivated for centuries. They are rich in essential nutrients, including vitamins, minerals, fibre, and antioxidants (Devi, P., & Singh, V. 2021).

Despite their nutritional value, millets have often been overlooked in modern diets, particularly among younger generations.

Adolescence is a critical period for establishing healthy eating habits that can impact lifelong health. Therefore, it is crucial to understand the level of awareness among adolescents about the nutritional and health benefits of millets.

II. OBJECTIVES OF THE STUDY

- Awareness Assessment: To evaluate the level of awareness among adolescents regarding millets, their nutritional profile, and health benefits.
- Perception and Consumption Patterns: To understand the perception of millets among adolescents and their current consumption patterns.
- Identifying Knowledge Gaps: To identify specific areas where adolescents lack knowledge about millets.
- Exploring Factors Influencing Consumption: To explore factors influencing the consumption of millets among adolescents, such as taste, availability, and perceived health benefits.

III. LITERATURE REVIEW

Amadan et al., (2013) reviewed the nutrition composition and health benefits of millets. Millets are a staple for the millions of poor people in Asia and Africa. Compared to other cereals, millets have high carbohydrate energy content and a nutritious combination of millets with other sources of protein would compensate for the deficiency of certain amino acids.

Saleh et al. (2013) investigated the impact of millet consumption on blood glucose levels and reported that incorporating millets into the diet can help regulate blood sugar levels and reduce the risk of diabetes.

Ragaee et al. (2014) conducted a study on the nutritional properties of millets and found that they are a good source of essential nutrients such as iron, calcium, zinc, and B vitamins.

Hou and Chen (2018) in their study mentioned that millets were among the first foods that humans are known to have consumed, but their importance and cultivation have decreased because of industrialization, urbanization, and large-scale wheat and rice production. Millets have started gaining popularity again due to their high nutritional content leading to benefits like reducing the risk of lifestyle

disorders like diabetes, hypertension, and cardiovascular disease.

According to the reports of Sreekala and Devi (2023) Low compensation relative to other food crops, a lack of price incentives and input subsidies, subsidized supply of flour through the Public Distribution System (PDS), a shift in consumer preferences as a result of processing difficulty, low flour shelf life and low social status associated with millets and the emphasis placed on rice and wheat during the green revolution are the main causes of this decline.

In another study, Rizwana et al. (2023) assessed the awareness of health values (HVs) among women in Bengaluru, India. They stressed the importance of awareness and epistemic value (EV) in enhancing satisfaction and usage intention of millet-based foods.

IV. RESEARCH METHODOLOGY

To assess the nutritional and health benefits of millets in adolescent diet a comprehensive literature search was conducted using electronic databases such as PubMed, Scopus, and Google Scholar keywords such as, “Millet”, “Adolescents”, “Nutrition”, “Health Benefits”, “Awareness” were used to identify relevant studies published in the last ten years (2012-2022).

Method of study: Survey research because the main purpose of this study is to increase awareness among adolescents. The sampling frame of this study was adolescents aged 13 to 19 years. The tool used to collect data was a questionnaire. The researcher took a self-prepared schedule to ask questions from a sample. It was a set of structured questions in which answers were recorded by the interviewers.

V. TYPES OF MILLETS

Adolescence is a critical period of growth and development, where nutritional intake plays a crucial role in shaping long-term health outcomes (FAO, WHO. 2016). In recent years, there has been a growing interest in the potential benefits of incorporating millets into the diets of adolescents. Millets, a group of small-seeded grains, have gained recognition for their high nutrient content, including fiber, protein, vitamins, and minerals, all of which are essential for the optimal growth and development of adolescents. This study aims to assess the awareness of the nutritional benefits and health benefits of millets and explore the nutritional and health benefits of including millets in the diets of adolescents, with a focus on their potential role in improving digestion, reducing the risk of chronic diseases, and aiding weight management (Rao, L. J., & Murthy, P. S. 2019). Additionally, the low glycaemic index of millets makes them a suitable option for managing blood sugar levels in adolescents. Furthermore, the sustainable production and environmental conservation aspects of millets add to their appeal as a nutritious food choice for this age group.

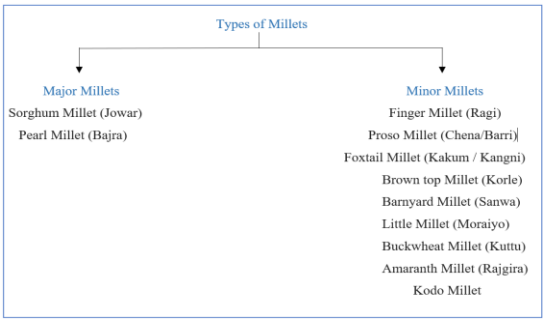

Fig: - 1- Types of Millets

Millets were among the first foods that humans are known to have consumed, but their importance and cultivation have decreased because of industrialization, urbanization, and large-scale wheat and rice production. Millets have started gaining popularity again due to their high nutritional content leading to benefits like reducing the risk of lifestyle disorders like diabetes, hypertension, and cardiovascular disease (Hou and Chen, 2018). Millets are an important part of traditional meals in rural India since they provide a wholesome and enduring source of food (Divya and Garg, 2024).

VI. REASONS FOR THE POPULARITY OF MILLETS PRODUCTS IN ADOLESCENT’S DIET

- For its Nutritional Benefits to overcome the nutritional deficiencies due to their nature of nutrient-dense composition.
- Due to the Health Benefits of millet, like millet flour, which is derived from different millet, such as Finger millet, Pearl millet, and Sorghum millet, which offers a range of nutritional benefits.
- The main reason is that millet's Nutritional value has compelled decision-makers and the business community to promote it as a mainstream food item, as per recent studies.

Table 1*:* Nutrient Content of Different Millets

Crop / Nutrient	Protein (g)	Fibre (g)	Minerals (mg)	Iron (mg)	Calcium (mg)

Pearl millet	10.6	1.3	2.3	16.9	38
Finger millet	7.3	3.6	27	3.9	344
Foxtail millet	12.3	8	3.3	2.8	31
Proso millet	12.5	2.2	1.9	8	14
Kodo millet	8.3	9	2.6	0.5	27
Little millet	7.7	7.6	1.5	9.3	17
Barnyard millet	11.2	10.1	4.4	15.2	11
Rice	6.8	0.2	0.6	0.7	10
Wheat	11.8	1.2	1.5	5.3	41

VII. NUTRITIONAL BENEFITS OF MILLETS

Millets are known as the first food and evergreen favourite grain making its place in our food lifestyle in many dimensions in so many forms from different dishes to processed foods, packed with essential nutrients that play an utmost role in adolescents' overall health (Devi, P., & Singh, V. 2021). As millets provide high energy and required nourishment in the early stages of development over other cereals.

a. Millets are rich in nutrients- which can help in healthy bone development and general growth supported by iron, calcium, and vitamins found abundant in millets.
b. Millets are high in Dietary Fiber - an outstanding source of dietary fiber that can help adolescents in assisting their digestion, promoting a healthy gut, and potentially supporting weight management for weight loss by providing a feeling of fullness. Millets have a low-calorie count and they are very excellent food products for weight loss.
c. Millet as a Protein source- a very good source of plant-based proteins, containing different amounts depending on the type of millet. They provide essential amino acids necessary for building and repairing body tissues and general body upkeep by boosting development and strengthening the immunity system which means fewer chances of catching diseases.
d. Millets are a rich source of Carbohydrates – it plays a very important role in supplying the body with energy. And assisting with blood pressure regulation and keeping active for long-lasting fuel for activities.
e. Millets are Gluten-free alternatives - as millets are gifted with gluten-free, and can be consumed by anyone like adolescents who have celiac disease gluten sensitivity, allergies, or promoting a varied and inclusive diet.
f. Millets are rich sources of Vitamins - including B vitamin, niacin, thiamine, riboflavin, and vitamin B6, which play essential roles in energy metabolism, cognitive and overall health.
g. Millets are high in Minerals - like iron, calcium, magnesium, phosphorus, and zinc which are essential for bone health, immune function, and different physiological processes in the body.
h. Millets act as an Antioxidant - Millets contain antioxidants like polyphenols and flavonoids which help combat oxidative stress and reduce the risk of chronic diseases.

VIII. HEALTH BENEFITS OF MILLETS

A powder made by grinding the raw grains of millets from different types of millets like sorghum, finger millet (RAGI), pearl millet BAJRA), and others., which offers a range of nutritional benefits (Hussain, S. A., & Anwar, F. 2018).

a. Versatility in Culinary Uses: Millet flours can be used in various culinary applications, including baking, cooking, and as a thickening agent in soups or sauces. They add a nutty flavor and unique texture to dishes, contributing to their versatility in different recipes.
b. Rich in Nutrients: Millet flours contain essential nutrients (especially B vitamins like niacin, thiamine, and riboflavin), minerals (such as magnesium, Phosphorus, and iron), antioxidants, and dietary Fiber (Ayele, A. 2020). These nutrients contribute to overall health, supporting energy production, and proper nerve function, and play a very important in maintaining healthy blood cells.
c. Gluten-Free Alternative: Millet flour acts as a good source of gluten-free substitute for traditional wheat flour, making it suitable for individuals with celiac disease or gluten sensitivities.
d. Dietary Fiber: Millet flours are a good source of dietary Fiber, aiding digestion, promoting a healthy gut microbiome, and assisting in maintaining a feeling of Fullness, potentially supporting weight management.
e. Lower Glycaemic Index: Some millet flours have a lower glycaemic index compared to refined flours. Foods with a lower glycaemic index release glucose more gradually into the bloodstream, helping manage blood sugar levels, potentially beneficial for individuals aiming for more stable energy levels.

IX. MILLET ACTS AND HELPS IN CONTRIBUTING TO OVERCOMING DISEASES DUE TO INSUFFICIENT NUTRIENTS IN THE BODY

a. Iron Deficiency Anaemia: Some millets, like pearl millet (bajra), contain notable amounts of iron. Iron is crucial for red blood cell production, and incorporating iron-rich foods like millet into the diet can help in managing iron deficiency anaemia.
b. Vitamin Deficiencies: Millets contain various vitamins, including B vitamins like niacin, thiamine, riboflavin, and vitamin B6. Consuming millet as part of a balanced diet can contribute to meeting daily vitamin requirements.
c. Mineral Deficiencies: Millets are rich in minerals such as magnesium, phosphorus, calcium, zinc, and others, which are vital for various bodily functions. Including millet in the diet can support meeting mineral needs and potentially help in addressing certain mineral deficiencies.

X. MILLETS CAN BE INCORPORATED AS A "MAINSTREAM FOOD ITEM' INTO ADOLESCENTS' DIETS

Millets have various properties like nutritional benefits and are also a versatile and easy-to-cook grain that can be incorporated into a variety of dishes that adolescents can enjoy different dishes like porridge and cereals bread, muffins, cake, and even desserts. Millets can be used in numerous recipes to boost the nutritional value of meals for adolescents these tiny small-sized balls are soft making them easy to chew and digest with mild, nutty flavour making a palatable option for food lovers (Hou, D. and Chen, J. 2018). Just by introducing healthy millets into an adolescent's diet from an early age, parents and caregivers can help to establish healthy eating habits and ensure their kids are providing nourishment to the body. No, doubt food provides nutrition to them but at the same time, it is also necessary to eat the right food. Though all kinds of food provide nutrition at their best levels, millet is the most underrated of them all due to its nutritional value to promote millet as a mainstream food item for optimal growth and development (Divya and Garg, G.P. 2024).

a. Millet is a nutritious whole grain that is rich in fiber, protein, vitamins, and minerals, making it a good addition to an adolescent's diet.
b. Millet can be incorporated into the diet by substituting it for rice or other grains in dishes such as pilaf, stir-fry, or salads.
c. Millet can also be used to make porridge, bread, muffins, and even desserts like millet pudding or cookies.
d. Millet is gluten-free, making it a suitable option for adolescents who have gluten sensitivities or celiac disease.
e. Millet can help improve digestion and regulate blood sugar levels, making it a beneficial addition to a teenager's diet.
f. It is important to vary the grains in a teenager's diet to ensure they are getting a wide range of nutrients, so incorporating millet along with other whole grains like quinoa, barley, and brown rice is recommended.
g. To add flavour and variety to dishes made with millet, consider incorporating herbs, spices, vegetables, and protein sources like beans, tofu, or lean meats.
h. Encourage adolescents to experiment with different ways to prepare and enjoy millet to help them develop a preference for healthy, whole-grain options in their diet.

XI. RESULTS AND DISCUSSION

The results of a recent survey conducted on the awareness of the nutritional and health benefits of millet among adolescents revealed interesting findings. The study found that only 60% of the adolescents surveyed were aware of the nutritional benefits of millets, such as their high fiber content, low glycaemic index, and rich vitamins and minerals. Furthermore, only 25% of the participants knew about the health benefits of millet, including their role in preventing chronic diseases like diabetes and heart disease.

Interestingly, the survey also showed that there was a significant correlation between awareness of millets and dietary habits. Adolescents who were aware of the nutritional and health benefits of millet were more likely to include them in their diet regularly. On the other hand, those with low awareness tended to consume millet less frequently.

Overall, these findings highlight the importance of educating adolescents about the benefits of incorporating millet into their diet. By increasing awareness, we can help promote healthier eating habits among this age group and potentially reduce the risk of chronic diseases in the future.

The lack of awareness of the nutritional benefits of millets among adolescents is concerning, as millets are known to be a good source of protein, Fiber, vitamins, and minerals. Incorporating millet into the

diet can help prevent chronic diseases such as diabetes, heart disease, and obesity.

Educators, healthcare professionals, and parents should inform adolescents about the health benefits of millet and encourage the inclusion of these nutritious grains in their diet. Promoting millet as a healthy food option can help improve adolescents' overall health and well-being.

XI. CONCLUSION

Adolescents are the present as well as the future of our country and their health is beneficial for current development as well as the future development of our country. Keeping in mind these points this study was conducted which aims at knowing and Studying the general awareness of adolescents on the millets that they know the locally grown and nutritionally healthy food variety which they can add to their diet to meet their health and nutritional needs for day-to-day life. From this study, we can understand that adolescents are aware of the nutritive benefits of millets though they are a bit less aware of the overall health benefits of millets as compared to nutritive benefits but they still do not consume the millets in their diet as much. Thus, there is a need to increase the focus on making them aware of the benefits of millets but there should be more focus required to promote the consumption of millets among adolescents.

Future research should focus on developing educational programs and interventions to increase awareness and promote the consumption of millet among adolescents. Additionally, policymakers should consider implementing policies that promote the production and availability of millets to ensure their accessibility to the general population.

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