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A Study to Assess the Awareness Level of Millets among Youth

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ABSTRACT

Background: The year 2023 was declared as the International Year of Millets by the United Nations and India has worked tirelessly to promote these wonder crops in multiple ways.

Methods: This study has been designed to assess the awareness level about millets among the youth. A survey was conducted in online mode across India to assess awareness related to millets. A questionnaire consisting of the sections related to identification of major millet plants and seeds, their nutrient content, health benefits and consumption was utilized for data collection.

Result: Responses were received from many states and cities. The result showed that most of the respondents were post-graduates in the 26-40 age group. Majority of respondents identified pearl millet plant correctly. In the case of seeds, the respondents mostly identified barnyard millet. A high percentage of respondents viewed millet as a significant source of calcium, fibre, and protein only. Other than finger millet, the other cereal consumed was Barely and about one-seventh of the total respondents were not consuming any millet. It may be concluded that more awareness needs to be created to increase millet production and consumption among the country's youth.

Key words: Consumption, International year of millets, Knowledge, Millets, Practice.

INTRODUCTION

Food security of the world is under extreme strain due to multiple reasons. Millets play a crucial role in providing nutritional security as they are nutritionally rich and can be cultivated with low agricultural inputs, withstanding high temperatures and drought conditions. Millets, the traditional grain, is the collective term for cereal species that have small/tiny grains, approximately one-quarter to one-tenth the size of wheat kernels (Taylor, 2017). They are often referred to as 'nutrigrains' since they are rich in protein, micronutrients, minerals and B-complex vitamins.

According to the Ministry of Agriculture and Farmers Welfare's Report, 2016-17, the area in India that is used for the cultivation of millets has decreased by 60%, *i.e.*, 14.72 million hectares (Banerjee *et al*., 2024) and the crop area has been replaced by high value commercial crops (Naik *et al*., 2025). Among millets, Sorghum (*Sorghum bicolor* L. *Moench*.), Pearl millet (*Pennisetum typhoides Stapf* and *Hubb*.), Finger millet (*Eleusine coracana Gaertn*.), Foxtail millet (*Setaria italic Beauv*.), Little millet (*Panicum miliare Lam.*), Barnyard millet [*Echinochloa frumentacea (Roxb.) Link*.], Proso millet (*Panicum miliaceum Linn.*) and Kodo millet (*Paspalum scrobiculatum Linn.*) are grown in India. A total of about 15.3 million tonnes of millet food grains are produced in India from nearly 12.7 million ha area, which constitutes about 6% of the national food grain basket. Pearl millet is grown on about 6.77 million hectares yielding 8.9 million tonnes, followed by Sorghum (4.48 million ha, yielding 4.38 million tonnes) and Finger millet (0.97 million ha, yielding 1.68 million tonnes) and other millets (0.46 million ha yielding 0.34 million tonnes) (Nain *et al.,* 2023).

For various reasons, millet production is decreasing in India. Agronomically, through the use of integrated weed management and optimum irrigation, the low production of millets can be addressed (Hasanath *et al*., 2025). To promote millets production and consumption, various steps are being taken at the national and international levels. 2018 was declared as the National Year of Millets by the Government of India aiming at larger promotion and demand generation. Later, the United Nations too declared 2023 as the International Year of Millets (IYM), considering the crops' nutritional qualities, resilience to climate change, and potential to alleviate poverty among farmers in drought-prone areas. In our country, the Ministry of Sports and Youth Affairs, the Ministry of Food Processing Industries, FSSAI, Agricultural and Processed Food Products Export Development Authority (APEDA), ICAR (Indian Council of Agriculture and Research), SAUs (State Agriculture University) and the Department of Agriculture and Family Welfare organized many programs to meet the objectives of IYM. The objective of the present study was to assess the knowledge or level of awareness of youth regarding different varieties of millets, their nutritional and health benefits.

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MATERIALS AND METHODS

Knowledge about food is crucial because it enables individuals to make decisions that will improve their health and prevent or control chronic illnesses. Identifying and comprehending the nutritional and health benefits of foods enables people to select diets that supply nutrients required for the optimum physical and mental wellbeing, avoid unhealthy foods and choose nutrient-dense options.

A cross-sectional study was designed to assess the knowledge or level of awareness and practices related to millets among youth to strengthen future strategies to further popularize millets. A detailed self-structured questionnaire consisting of five sections a total of eleven questions including, identification of major millet plants and seeds, their nutrient content, health benefits and consumption was prepared and used for the online survey across India. For the identification of millet plants pictorial images of four well-known millets namely Finger millet, Barnyard millet, Pearl millet and Sorghum were shown to the respondents and they were asked to identify them. Similarly, for the identification of millet seeds, pictorial images of the four well-known millet seeds namely Barnyard millet, Finger millet, Sorghum and Foxtail millet were shown to the respondents. The study was conducted in January, 2024. A total of 200 respondents were contacted for the study however, 9 of them did not participate. 191 respondents who participated in the survey belonged to the age group between18 to 70 years. The percentage of the response concerning each question was calculated and conclusions were drawn.

RESULTS AND DISCUSSION

The results of the study are given in seven sections including the age and education of the respondents, the knowledge of the respondents regarding identification of millet plants and seeds; the nutrient content and health benefits and millet consumption pattern. Out of 191 respondents, 51 were males and 140 were females.

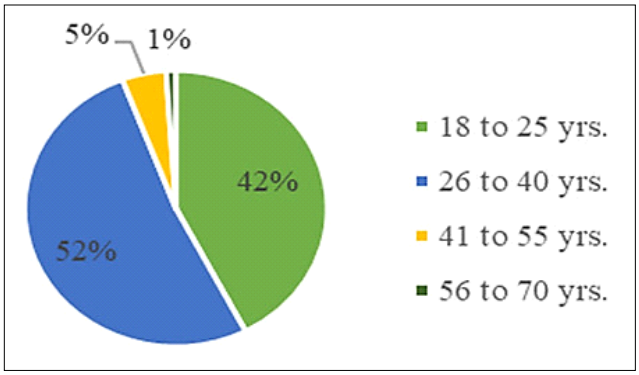
Age group and education of respondents

Graph 1 depicts the age group of the respondents. 52% of the respondents belonged to 26-40 years age group followed by 18 to 25 years (42%), 41 to 55 years (5%) and 56 to 70 years (1%). Age plays an important role as one of the intrinsic factors that affect the food choice and purchasing behaviour of individuals (Ogundijo *et al.,* 2022). Education can affect a person's food choices by making it easier for them to recognize the healthier available food options (Pedro and Patricia, 2004). Graph 2 depicts the educational status of the respondents. Most of the respondents (39%) were post-graduates, followed by 26% of the respondents who were graduates, 24% who were undergraduates.

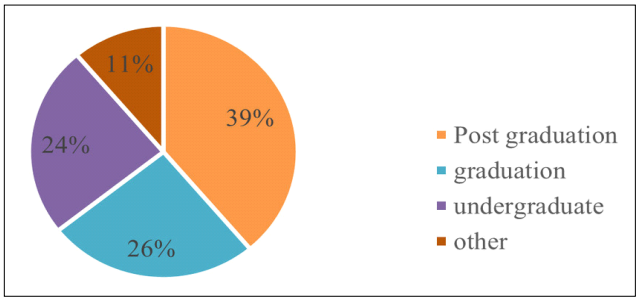
Identification of millet plants and seeds

Graph 3 depicts the percentage of respondents who identified the four types of millet plants *viz.* Barnyard millet, Finger millet, Proso millet and Sorghum. 51.30 % of the respondents identified the Sorghum plant accurately followed by Proso millet (48.70%) and Barnyard millet (45%). Among the four varieties of millets plants, the least well-known plant was the Finger millet plant.

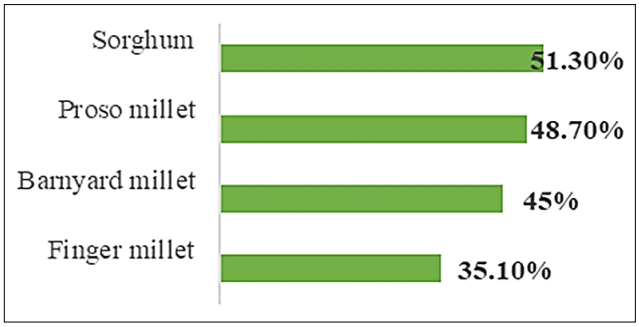
Graph 4 shows the percentage of respondents who identified the pictures of four millet seeds namely Barnyard millet, Finger millet, Foxtail millet and Sorghum. Among the four varieties, the most well-known millet was



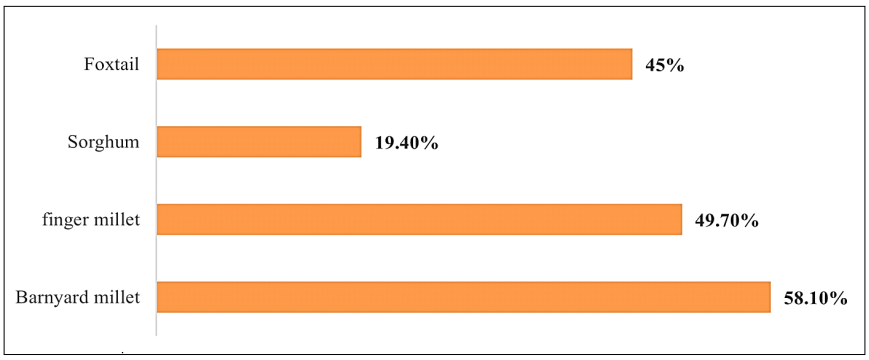
Graph 1: Age group of the respondents.



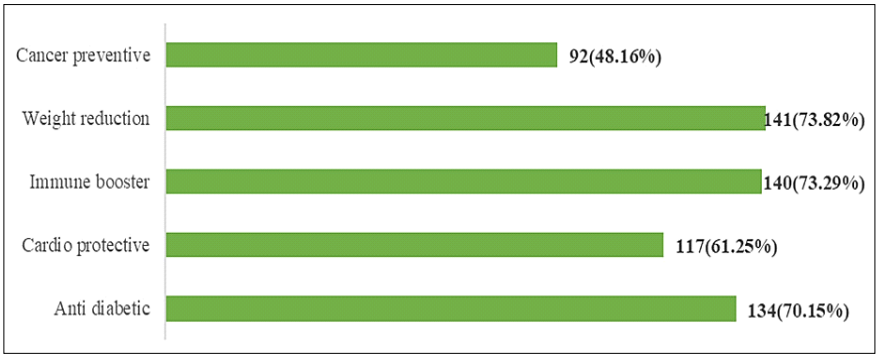
Graph 2: Education of the respondents.



Graph 3: Identification of millet plants.



Graph 4: Identification of millet seeds.



Graph 5: Knowledge of respondents regarding health benefits of millets.

Barnyard millet. 58.10% of the respondents identified Barnyard millet correctly, followed by Finger millet (49.70%), Foxtail millet (45%) and Sorghum (19.40%). A similar study conducted by Nadar *et al.* (2023), showed that 59.3% of the respondents recognized Finger millet (Ragi/ Nachni), 55% correctly identified Pearl millet (Bajra) and 39.8% identified Sorghum millet (Jowar) respectively, however, majority were not aware about Proso/ Broomcorn millet (Chena), Buckwheat (Kuttu) and Amaranth (Rajgira/ Ramdana) millets.

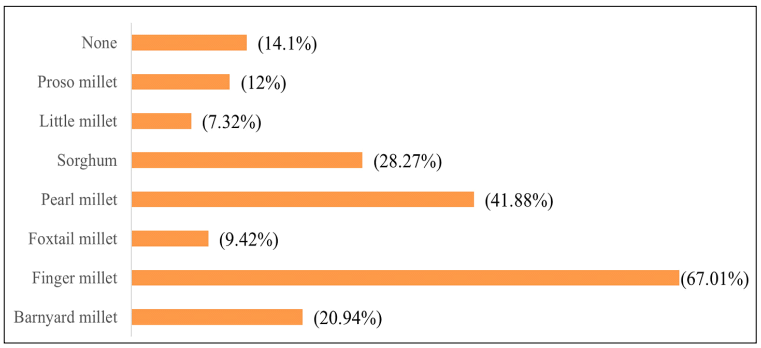
Knowledge of respondents regarding nutrient content of millets

Millets have been shown to have excellent nutritional content, equivalent to or exceeding that of major grains like wheat and rice, in addition to their cultivation advantages (Parameswaran and Sadasivam, 1994). Their high calories, calcium, iron, zinc, fats, and good quality protein make them an important addition to human diets (Hassan and Sebola, 2021). Millets are excellent sources of carbohydrates, micronutrients and phytochemicals with nutraceutical properties. Millets contain 7-12% protein, 2-5% fat, 65-75% carbohydrates and 15-20% dietary fibre. The physicochemical, structural, and functional characteristics of starch present in millets influence its application in a variety of ways (Dimri and Singh, 2022). Millet grains are also rich in B vitamins *viz.,* Thiamine, Riboflavin, Folic acid and Niacin. Millets are comparable to rice and wheat and are richer in some of the minerals as well as fatty acids (Dayakar *et al.*, 2017). The main polyphenols in millets, such as tannins and phenolic acids, function as antioxidants and are crucial in improving the body's immune system. (Chandrasekara and Shahidi, 2010). Antioxidants found in millets have nutraceutical qualities that improve human health by reducing the risk of metabolic disorders such as blood pressure, heart disease risk, cancer and cardiovascular disease prevention, diabetes and tumor (Bhat *et al.*, 2018).

Table 1 represents the knowledge of respondents regarding the nutrient content of millets. Majority of respondents (78.01%) considered millets as a good source of protein followed by fibre (65.96%), calcium (60.73%), iron (59.16%), and carbohydrate (53.40%). Half of the respondents considered B vitamins as nutrients present in millets. Fat, phosphorus and antioxidants were considered as nutrients present in millets by less than half the percentage of respondents. Fat was the least known nutrient present in millets (24.08%) however, millets contain good quality fat in significant amounts.

Knowledge of respondents regarding health benefits of millets

The micronutrients (Vitamins A, C and B_6, Folic acid; Magnesium, Zinc, Iron and Copper) found in millets,



Graph 6: Consumption practices of millets by the respondents.

Table 1: Knowledge of respondents regarding nutrient content of millets.

Nutrient in millets	No. of respondents (n=191)	Percentage
Carbohydrate	102	53.40
Protein	149	78.01
Fat	46	24.08
Fibre	126	65.97
Calcium	116	60.73
Iron	113	59.16
Phosphorus	72	37.70
B vitamins	96	50.26
Antioxidants	87	45.55
Others	29	15.18

regulate the immune response and boost immunity hence preventing various infections (Ahnan-Winarno *et al.,* 2021). Several studies conducted by Kumari and Sumathi, 2002; Ugare *et al.,* 2011; Sireesha *et al.,* 2011; Park *et al*., 2008; and Montonen *et al*. (2003) demonstrated that millets due to their high magnesium, selenium, fibre and polyphenol content, exert hypoglycemic effect and are beneficial for diabetics. Being a good source of potassium, magnesium and antioxidants, millets such as Finger millet, Proso millet, Sorghum and Barnyard millet, provide cardio-protective effects by lowering blood glucose, serum cholesterol and triglycerides levels and increasing high-density lipoprotein (Dayakar *et al*., 2017). The high fibre and phenolic content of millets prevent the onset of esophageal cancer and breast cancer in females. The chances of breast cancer in females can be reduced by 50% by eating only 30 gm of millets every day (Dayakar *et al*., 2017).

Graph 5 depicts the knowledge of respondents regarding various health benefits of millets. Majority of respondents thought that millets were beneficial for weight reduction (73.82%) and boosting immunity (73.29%). 70.15% of respondents considered millets as a good food for managing diabetes. The cardioprotective and cancer-protective effect of millets was known by 61.25% and 48.16% of respondents respectively. The respondents were well aware of the health benefits of millet. A similar study conducted by Nadar *et al.* (2023) showed that majority of all the participants had good knowledge of the nutritional composition and health benefits of millets.

Consumption practice of millets by the respondents

Graph 6 represents the millet consumption practice followed by the respondents. The most consumed millet was finger millet (67.01%). Pearl millet, Barnyard millet, and Proso millet were consumed by less than 50% of respondents. Little millet and Foxtail millet were the least consumed which was 7.32% and 9.42% only. 14.1% of respondents were not consuming any millet. The findings of the present study were found to be similar to the findings of Sangeetha *et al.* (2022), where the respondents were conscious about the benefits of millets intake but the frequency of consumption was low. According to Government of India, (2014) the reduced consumption of millets may be due to longer cooking times, and difficulty in preparation. Insufficient domestic storage, poor marketing facilities, inadequate processing techniques and lower availability of grains may also leads to lower consumption of millets (Sukumaran *et al.,* 2023). Some other factors related to the low consumption of millets are socio-economic, which is unique for each consumer, the family income and the type of family which changes the food purchasing behavior (Sangeetha *et al.,* 2022).

CONCLUSION

Millets are wonder crops that provide multiple nutritional benefits along with their cultivation merits. The present study demonstrated that the awareness related to individual millet plants, and seeds were low among the respondents. Majority of the respondents considered millet as a good source of protein and minerals like calcium and iron, however the least known nutrients were fat, phosphorus and antioxidants. The overall health benefits of millet were well known however the consumption was low. Other than finger millet, any other millet was consumed barely and about one-seventh of the total respondents were not consuming any millet. The practice of millet consumption

was low among the respondents. From this study, it can be concluded that more awareness needs to be generated among the youth regarding millet production and consumption. The International Year of Millets (2023) declared by the United Nations is a huge success in promoting significant changes highlighting these nutrient-rich crops for food security and climate change. However, awareness of the cultivation and consumption of millets at the grassroots level through training by government agencies, KVKs and NGOs still needs to be done to increase the consumption of millets. Awareness through ICDS can be done to reach the mothers and adolescent girls to educate the health benefits of millet. Lastly, social media that plays a crucial role in influencing people can be used to promote the value-added products of millets, their processing techniques and marketing. These efforts will benefit both the producer and consumer by increasing the livelihood and maintaining good health respectively and help in making a sustainable globe ensuring future global food security.

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Disclaimers

The opinions and findings presented in this article are those of the authors only and may not be representative of those of the organizations with which they are affiliated. Although authors take responsibility for the quality and correctness of the information they give, they disclaim all liability for any losses, whether direct or indirect, that may arise from using this content.

Informed consent

Not applicable.

Conflict of Interest

All the authors declare no conflict of interest.

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