ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE ON MILLETS AMONG COLLEGE STUDENTS

PROJECT SUBMITTED

In Partial Fulfilment of the Requirement for the Award of the degree of

B.Sc NUTRITION AND DIETETICS

BY

ANNLIYA V PRAKASH, FEMINA FASAL & MARIA THERESA

(Register No: – SB21ND009, SB21ND020, SB21ND028)

DEPARTMENT OF CLINICAL NUTRITION AND

DIETETICS

ST.TERESA 'S COLLEGE (AUTONOMOUS)

ERNAKULAM

APRIL 2024

CERTIFIED AS BONAFIDE RESEARCH WORK

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Signature of Internal Examiner **Signature of External Examiner**

CERTIFICATE

I hereby certify that the project entitled "**ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE ON MILLETS AMONG COLLEGE STUDENTS**", submitted in partial fulfilment of the requirement for the award of the degree of B.Sc. Nutrition and Dietetics is a record of original work done by **Ms. Annliya V Prakash, Femina Fasal and Maria Theresa**, during the period of the study under my guidance and supervision.

Signature of the HOD

Ms. Surya M. Kottaram
Head of the Department
Department of Clinical Nutrition
and Dietetics
St. Teresa's College (Autonomous)
Ernakulam

Signature of the Research Guide with designation

Dr. Samja Sabu
Assistant Professor
Department of Clinical Nutrition
and Dietetics
St. Teresa's College (Autonomous)
Ernakulam

DECLARATION

I hereby declare that the project entitled **"ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE ON MILLETS AMONG COLLEGE STUDENTS"** submitted in partial fulfilment of the requirement for the award of the degree of B.Sc Nutrition and Dietetics is a record of original research work done by me under the supervision and guidance of Dr. Samja Sabu, Assistant Professor, Department of Clinical Nutrition and Dietetics, Women's Study Centre, St. Teresa's College (Autonomous), Ernakulam and has not been submitted in part or full of any other degree/diploma/fellowship or the similar titles to any candidate of any other university.

Place: Annliya V Prakash, Femina Fasal & Maria Theresa
Date:

ACKNOWLEDGEMENT

This project has been kept on track and has been seen through to completion with the support and encouragement of numerous people especially my friends and colleagues. I thank everyone who made the completion of this project possible. I would like to thank all those who have contributed in ways they can, to complete my study.

First and foremost, I thank God Almighty, for providing me with all the strength and courage to complete this project.

I hereby express my sincere gratitude to Rev. Sr. Emeline CSST, Director, Rev. Dr. Sr. Celine E (Sr. Vinitha CSST), Provincial Superior and Manager, and Dr. Alphonsa Vijaya Joseph, Principal, St. Teresa's College (Autonomous) Ernakulam, for granting me the permission to commence this project in the first instance and for allowing me to continue the same.

I am highly indebted to the Head of the Department of Clinical Nutrition and Dietetics, Ms. Surya M Kottaram, for her support and encouragement throughout the study.

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Also, my sincere and hearty thanks to all the teachers of the Department of Clinical Nutrition and Dietetics for their valuable suggestions.

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I also wish to place on record my deep sense of appreciation and humble thanks to my beloved parents for their encouragement to withstand the stress and kind motivation in completing my project. Their unconditional love and support provided me with all the courage to finish my study.

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Once again, thanks to all those who gave me the strength, courage, motivation, guidance and suggestions for making my project a success.

ANNLIYA V PRAKASH, FEMINA FASAL & MARIA THERESA

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1. INTRODUCTION

“Millets are a group of highly variable small seeded grasses, widely grown around the world as cereal crops or grains for fodder and human food. They do not form a taxonomic group, but rather a functional or agronomic one” (Vilas *et al*., 2017).

Sorghum (*Sorghum bicolor*), Pearl millet (*Pennisetum glaucum L.*), Finger millet (*Eleusine coracana L.*), and small millets like Barnyard millet (Echinochloa frumentacea L.), Proso millet (Panicum miliaceum L.), Kodo millet (*Paspalum scrobiculate L.*), Kutki (*Panicum sumatrense*), and Foxtail millet (*Setaria italica L.*) are among the many millets grown in India that are suited to diverse agroclimatic conditions. In the past, millets accounted for nearly the same amount of land coverage as wheat and rice and were widely produced and consumed in the nation. Despite the fact that grains have a variety of uses and advantages, the area under cultivation of them drastically decreased by 41.65 percent between 1950–1951 and 2018–19 in the post–green revolution era (Rao *et al*., 2023).

The following qualities make millet a highly significant crop: it has a shorter growing season than other major grains, is resistant to pests and diseases, and is reported to be drought-tolerant. Owing to the aforementioned beneficial qualities, millet grains are gaining particular interest in emerging nations (such as China, India, and several African countries) for use as food. Millet grains are receiving the attention they deserve in certain wealthy nations because of their promising potential for producing bioethanol and biofilms. A significant food crop in emerging nations is millet. Major and minor nutrients are remarkably abundant in millets. Millet is known to be a high-energy, nutrient-dense meal that can help prevent and treat diseases including obesity, diabetes, cardiovascular disease, and others, as well as reduce malnutrition in the general population. Millets are gluten-free food. Those with celiac disease can use millet as a replacement (Sarita and Ekta, 2016).

In the US, pearl millet (*Pennisetum glaucum (L.) R. Br., Poaceae*) has long been used for cattle grazing and fodder production. On more than 26 million hectares, mostly in arid and semi-arid parts of India and Africa, it is widely farmed as a multipurpose cereal grain crop, mostly for food but also for feed, fodder, fuel, and mulch (FAO 2000). About 90 million people who live in the semi-arid tropical parts of Africa and the Indian subcontinent rely on it as a staple crop. Aside from its significance as a food and feed crop, pearl millet's small diploid genome with big chromosomes, progynous blooming behavior, and abundance of phenotypic variation make it a potentially perfect species for genetic research. It is a new-

use grain crop with relatively little acreage in the US now, but it has great promise because to its superior nutritional qualities, tolerance of low fertility and drought, and variety of uses compared to other cereals (Wilson *et al*., 2007).

Due to their enormous potential yields, major grains including rice, maize, wheat, and others have dominated the agriculture sector; nevertheless, they are unable to withstand the effects of climate change (Cheng *et al*., 2017). India is the country with the second-highest rate of childhood malnutrition worldwide, accounting for about one-third of all malnourished children (Nainwal *et al*., 2018). Due to their deficiencies in numerous nutritional aspects, main cereals are unable to meet the requirements for a balanced diet, which is necessary for overall health. Due to their flavor and nutritional value, millets are an essential component of Indian traditional cuisine. As a result, India has long been the world's largest millet eater, which is largely responsible for the nutritious diet that millets provide for Indians (Ashoke *et al*., 2020).

Objectives

Primary objective

- To assess the knowledge, attitude and practice of millets among college students

Secondary objective

- To contribute to ongoing research on millets and reduce the research gap in relation to millets
- To promote the inclusion of millets in the diet

2. REVIEW OF LITERATURE

"Millets are a group of highly variable small seeded grasses, widely grown around the world as cereal crops or grains for fodder and human food. They do not form a taxonomic group, but rather a functional or agronomic one. Millets are important crops in the semi-arid tropics of Asia and Africa (especially in India and Nigeria), with 97% of millet production in developing countries. The crop is favored due to its productivity and short growing season under dry, high-temperature conditions." (Rao B *et al.*,2017). The present study "Assessment of Knowledge, Attitude and Practice (KAP) on millets among college students" has been reviewed under the following headings:

2.1 Health benefits of millets

2.2 Awareness of millets

2.3 Millet consumption pattern

2.4 Need to include millets in the diet

2.1 Health benefits of millets

According to a 2013 study by Amadou *et al.,* millets are nutrient dense and have a high carbohydrate energy content, which makes them excellent for dietary and nutritional balance in meals. If millets were combined with other protein sources, the lack of some amino acids, including lysine, may be made up for. Millets make excellent energy sources. Protein, fatty acids, minerals, vitamins, dietary fiber, and polyphenols are all provided by them. A significant concentration of necessary amino acids, particularly those containing sulphur (methionine and cysteine), are present in typical millet protein. Antioxidants like phenolic acids and glycated flavonoids can be found in millets. Foods made with millet have the potential to act as prebiotics and can improve the functionality or viability of probiotics with important health advantages.

According to a study by Tripathi *et al.,* (2023), millets, cultivated on the Indian subcontinent, are a rich source of essential nutrients such as dietary fiber, protein, minerals, vitamins, and B-complex. These nutrients are crucial for maintaining the immune system and energy metabolism. Millet also contains phytochemicals like phytic corrosive and phytate, which can lower cholesterol and reduce disease risk. Its high dietary fiber content and prebiotic qualities also benefit gut health, preventing constipation and encouraging

regular bowel movements. The prebiotic action of millet fibers supports the growth of lactobacilli and Bifidobacteria, promoting a healthy gut microbiota. This leads to stronger immune responses, reduced inflammation, and better nutrient absorption. Millet is also high in antioxidants, which protect against cancer.

According to a study by Singh (2016), millet is a gluten-free, alkaline-forming grain. Millets have numerous functions in the immune system of the body and are also abundant in phytochemicals and minerals. Millets include antioxidants, which are nutraceutical qualities that keep human health from declining. These benefits include lowering blood pressure, heart disease risk, cancer and cardiovascular disease prevention, diabetes management, and a decrease in tumor cases, among other health-related issues. Additional health advantages include prolonging the period of stomach emptying and giving the gastrointestinal tract roughage. Foods that form alkali include millet. A diet high in alkali is frequently advised to attain optimum health. Those with celiac disease can use millet as a replacement.

A study by Rotela *et al.,* (2021), painted out that millets are reported to provide several health benefits and to be effective against a variety of conditions, including malnutrition, gastrointestinal tract disorders, cardiovascular disease (CVD), diabetes mellitus, and celiac disease. The staple diet of millions of underprivileged people in Asia and Africa continues to be millet. The GI values of foxtail millet, small millet, finger millet, and pearl millet range from 54 to 68, which means that the millets break down more slowly. It is also believed that the GI of sorghum is 70. Millets are composed of 65 percent of carbohydrates, the majority of which come from dietary fiber and non-starch polysaccharides. These components decrease blood cholesterol, prevent constipation, and slow the absorption of glucose.

2.2 Awareness of millets

A research conducted by Sivakumar *et al.,* (2023), studied psychographic, behavioral, economic and social characteristics of 120 college going students from four different universities. According to the study, 80.83 percent of respondents learned about millet-based products through word-of-mouth recommendations from friends and family, and 94.17 percent of respondents were aware of them. The most popular millet products were those manufactured with ragi millet. The main factor influencing the use of millet products was their nutritional and health benefits. The results can help companies promote their millet-based products more successfully.

In order to determine whether women in Bangalore were aware of the nutritional benefits of millets, Rizwana *et al.,* undertook a study in 2022. The conclusions of the study show that majority of the participants consumed millets to maintain their health and to boost their immunity. The study's findings show that while 80.6 percent of the women who participated in the study knew about millets, only 62.7 percent of the women consumed them. The factors influencing and inhibiting millet consumption are also identified. It can be understood from the study that millet intake is directly influenced by demographic variables including age, income, and qualification.

In order to investigate millet consumption and awareness in both rural and urban parts of Telangana state in Mahabubnagar and Medak districts, Prashanthi *et al.,* (2022) carried out a cross-sectional study. For the study, 160 students in the eighth and ninth grades from both the district's rural and urban sections were enlisted. A Chi-square test was employed to see whether categorical variables were related. It was discovered that 56.25 percent of the respondents, or more, said they knew about millets, while 43.75 percent said they did not. Furthermore, of the 56.25 percent of schoolchildren who said they knew about millets, 23.75 percent said they knew about finger millet, pearl millet, and sorghum. At the 5 percent level, there was a strong correlation between schoolchildren in rural and urban areas' awareness of and consumption of millet. These findings showed that consumption of millet among school children is influenced by their knowledge of millets. Thus, it is necessary to provide nutrition education on millet to raise awareness among students, which may also encourage millet consumption.

In the Marathwada region in Maharashtra, Kapse *et al.,* (2023) studied the relationship between the respondent’s profile and their knowledge and use of millets. The eight districts of the Marathwada region were the study's locations. According to the survey, 74.06 percent of them learned about millets from friends or family. The study came to the conclusion that respondent’s awareness of millets was positively correlated with their age, primary occupation, family background, and source of information on millets, among other independent variables. Education, gender, family size, and annual income, on the other hand, are unrelated to millets awareness. The data also showed a highly favorable and substantial association between the respondent’s consumption score of millets and the independent factors of age, family background, and source of information about millets. Conversely, there is a positive and substantial correlation between the primary occupation of the respondents and their millets intake score.

2.3 Millet Consumption pattern

The study conducted by Reddy *et al.,* (2023) focuses on understanding millet consumption patterns in Kurnool district, Andhra Pradesh, as well as identifying factors that influence consumption. Marketing strategies for promoting millets in the region are also explored. Among the participants, 66.67 percent were men and 33.33 percent were women. The highest education level reported was intermediate (29.86%), followed by secondary education (22.92%) and illiterate (9.72%). Family tradition of consuming millets were observed in 38.89 percent of the millet consumers. Consumption frequency varied, with 48.61 percent consuming millets daily, 17.37 percent twice a week, and 15.27 percent once a week. Among high-income groups, lunch was the preferred time for millet consumption (50%), followed by breakfast (31.25%) and dinner (18.75%). Sorghum was the most consumed millet, followed by ragi, korra, and bajra. The main factor influencing millet consumption was identified as health benefits. Other factors included tradition and medical recommendations.

According to George *et al.,* (2021) recent consumer trends indicate a move toward leading healthier lives, which has incentivized them to include more nutrient-dense foods in their regimen. A food that is becoming more and more popular because of its health and nutritional value is millet. In order to determine how demographic factors affect the consumption pattern of millets, a study was conducted by covering 14 districts in the state of Kerala. Original information was gathered using an online survey and a convenience sampling technique. Merely 278 out of the 641 respondents in the sample were found to have consumed millets, according to the data collected. To test the hypothesis, chi-square is also utilized. The study findings indicate that there is a relationship between the consumption pattern of millets and demographic factors other than age and income. In order to increase the consumption of millets, among the people in Kerala, the relevant agricultural department can create policies and initiatives.

According to a study conducted by Kane-potaka *et al.,* (2021), Governments and business are paying closer attention to how millets, especially sorghum, can help farmers become more resilient and deal with major issues like diabetes, malnutrition, and climate change. Following data collection, 15,139 observations were analyzed using descriptive and inferential statistics in order to gain insight into the public's knowledge and consumption practices regarding millets in urban settings. The survey comprised 15,522 participants from seven major cities in India. The study revealed that individuals with health issues accounted

for the greatest proportion of early adopters of millets (28 percent), with weight loss (15 percent) and taste preferences (14 percent) following closely behind. Between those who were certain millets were healthy (40 percent) and those who were health conscious (91 percent), there was a sizable disparity. Not eating millets at home (40%) and other responses like not enjoying the taste (22%) were the main reasons given by the respondents for not eating more of them. Social media platform was suggested to spread awareness since it is the primary information source for urban consumers. Between state-by-state per capita production and the frequency of millets consumed in urban areas, there was no statistically significant correlation. Developing delectable products to satisfy taste buds, disseminating information about the nutritional value and health benefits of millets, and facilitating easier access to millets in urban markets are the three main steps that are advised to increase millet consumption.

2.4 Need to include millets in the diet

In an animal study conducted by Konapur *et al.,* (2014), comparing the quality of wheat and pearl millet-based supplements for preschool children, it was found that protein efficiency ratio, food efficiency ratio, biological value, net protein utilization, and net protein retention and protein retention Activity and growth were significantly higher in rats fed with pearl millet supplements than those fed with wheat supplements. Similarly, when rats were fed with four isocaloric diets which differed in cereal type, ie. pearl millet, sorghum, wheat and rice, greater absorption of liver zinc and iron were observed in the pearl millet and wheat group than in the other experimental groups. Weight gain was also the greatest in pearl millet group compared to sorghum, wheat and rice groups. These studies show that the bioavailability of iron and zinc from millets is better when compared to cereals. Therefore, millets can be recommended to be included in the school lunch program after proper treatment.

In a study by Singh (2016), Millet grains have significant advantages as a drought-tolerant crop, they provide good productivity in water-scarce areas, have significant edible and nutritional value, and are easy to process and produce. Most developing countries have already started working to improve the edible potential of millet grains. Millet oil could be a good source of linoleic acid and tocopherols. Millet is an alkaline grain which is gluten-free. Millet is also a rich source of phytochemicals and micronutrients and they have many functions in the body's immune system. Millet has nutritional properties in the form of

antioxidants that prevent the deterioration of human health, such as lowering blood pressure, risk of heart disease, cancer and cardiovascular disease, diabetes, tumor incidence, etc. Other health benefits include extended time frame of emptying the stomach, and providing fibre. Millet is an alkali forming food. An alkaline diet is often recommended for optimal health. In developing countries, the bioavailability of minerals such as iron and zinc in cereal-based foods for infants and young children is low. Food processing technologies are used to improve nutritional quality, improve digestion and bioavailability of food nutrients by reducing anti-nutrients.

In a study by Singh *et al.,* (2020), a significant reduction in fasting and 2-hour postprandial blood glucose, as well as a decrease in HbA1c, were linked to a 12-week millet-based intervention diet, suggesting that this diet may help prevent diabetes. Triglycerides, total cholesterol, and VLDL cholesterol were significantly decreased from baseline values. Pro-inflammatory cytokines, including as interleukin-6, TNF-alpha, C-reactive proteins, and TNF-alpha, also significantly decreased during intervention diet treatment in comparison to baseline levels. Systolic and diastolic blood pressure, markers of oxidative stress, such as TBARS, MDA, and diene conjugates, significantly decreased in correlation with these alterations, whereas antioxidant vitamins A, E, and C as well as beta-carotene increased. Haemoglobin, serum calcium, and magnesium levels significantly increased in females, suggesting that a millet-based diet can help prevent undernutrition.

In a study by Srivastava *et al.,* (2023), in order to improve farm income, diversify agricultural systems, and provide nutritional security, millets can be extremely important. Because millets come in so many different types and variations, they present fantastic crop diversification opportunities. Because they can be cultivated in several seasons, they can be used for intercropping and crop rotation, which can lessen reliance on a single crop and increase system resilience. Growing consumer awareness of health issues is increasing the demand for nutrient-dense millets, creating new market potential. Farmers that want to increase their revenues might take advantage of this trend and convert to millet farming.

3. METHODOLOGY

The present study entitled “Assessment of knowledge, Attitude and Practice on millets among college students” consists of the following steps:

3.1 Selection of area

3.2 Selection of Samples

3.3 Development of tools

3.4 Conducting the study

3.5 Analysis of data

3.1 Selection of area

The study was conducted in the Ernakulam district of Kerala. According to the 2011 Census, there are 3,282,388 people living in Kerala's Ernakulam district. Among them, 1,662,831 are female and 1,619,557 are male. Ernakulam district had 814,011 families living there as of 2011 and the district's average sex ratio is 1,027. The overall literacy rate of the Ernakulam district was 95.89 percent, higher than Kerala's average of 94 percent with the literacy rate for men being 88 percent and for women being 86 percent. The year, 2023 has been designated as the International Year of Millets, or IYM2023 (FAO, 2023) to raise awareness of the nutritional and health advantages of millets. The 2011 Census revealed it to be one of districts with the highest literacy rate. Ernakulam district also has the most educational institutions in the state as of 2019, Therefore, Ernakulam district was chosen as the area to assess the awareness of millets among the college students.

3.2 Selection of Samples

Hundred and four College students attending various institutions in Ernakulam district were selected for the study. Random sampling was employed for the selection of samples. Study participants are chosen at random from the community of individuals who fit the study's inclusion requirements using the sampling process known as random sampling (Emerson, 2015).

The Selection criteria for the samples is based on whether the respondents are students attending a college. Students pursuing Life Sciences, including the field of nutrition and Students in the medical field were excluded from the study based on the pre-set exclusion-inclusion criteria.

The respondents were Students attending colleges or universities and hostel residents which includes students pursuing various levels of educational degrees including Undergraduate, Post-graduate and Diploma courses.

3.3 Development of tools

The tools used for the study was a questionnaire. Standardized questionnaires are tools which are used to assess the User Experience (UX). It consists of a set of questions that the users answer themselves after using a product or system. They are considered as an economical and a reliable source (Guerrero *et al.*, 2019*).*

Standardized questionnaire with necessary modifications was used for the study. To get accounts of facts, attitudes, and other subjective states, questionnaires are employed in sample surveys and censuses. Interviewers can conduct in-person or telephone interviews with respondents, or they can self-administer the questionnaires using paper, audio cassettes, the internet, or another medium. Respondents could be requested to provide information about themselves, other members of their family, or other organizations, including companies (Martin, 2006).

The Questionnaire comprised of questions which were developed to elicit information regarding the knowledge, attitude and practice of millets among students attending college. The grasses referred to as millets are a group of incredibly diverse, small-seeded plant species that are native to numerous parts of the globe (McDonough *et al.*, 2000).

3.4 Conduct of the study

A total of 104 samples were interviewed and the data was collected with the help of a standardized questionnaire which were circulated through ‘Google forms’. The following parameters were collected:

i. General information: Information such as the name, gender, name of the college, course and year of the study, awareness of millets, source of awareness, pre-dominant type of media which created awareness were collected.

ii. Knowledge of millets: This section of the questionnaire was designed to assess the respondent's knowledge regarding millets. The subject was asked to respond to questions in relation to the health benefits offered by millets.

iii. Attitude of millets: This section of the questionnaire was designed to assess the respondent's attitude toward millets. The subject was asked to respond to questions related to the supposed benefits of millets and their cost-effectiveness.

iii. Practice of millets: This section of the questionnaire was designed to assess the respondent's practice of millets. In this section, the subject was asked to respond to questions related to the millets consumption and ease of recipe preparation.

3.5 Analysis of data

The data collected were consolidated and frequencies were analyzed and discussed. The knowledge, attitude and practice on millets among college students were noted.

4. RESULT AND DISCUSSION

The Salient features of the study entitled "Assessment of Knowledge, Attitude and Practice on Millets among college students" was discussed under the following headings:

4.1 General Awareness of millets

4.2 Knowledge level approach

4.3 Attitude level approach

4.4 Practice level approach

4.1 General awareness of millets

Figure 1 represents the gender of the respondents involved in the study.

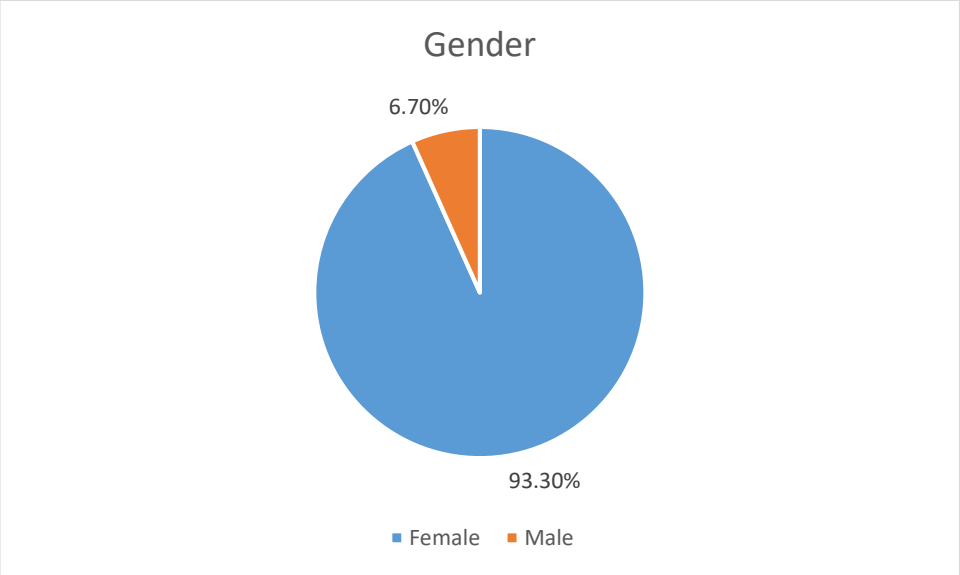

Figure 1. Gender of the respondents

Majority of the subjects are female, because most of the respondents who took part in the study, were selected from St. Teresa's college, Ernakulam. Students from various colleges in Ernakulam, pursuing undergraduate, post- graduate and diploma courses also took part in the study.

The figure 2 represents the awareness of millets among the respondents.

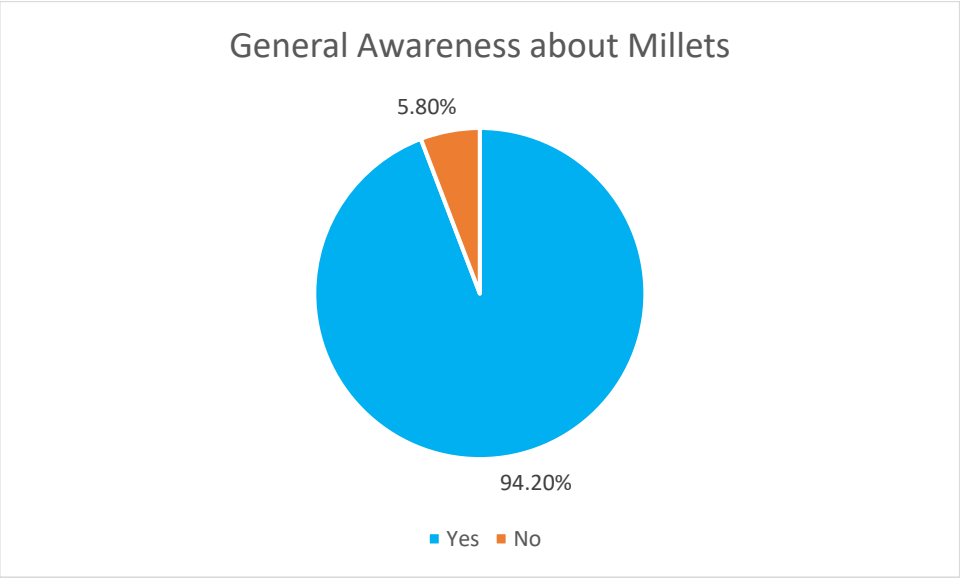

Figure 2. General awareness about millets

It has been observed that 94.2 percent of the respondents were aware of millets, while the rest 5.8 percent of the respondents were not aware of it.

Figure 3 represents the sources through which the respondents were aware of millets.

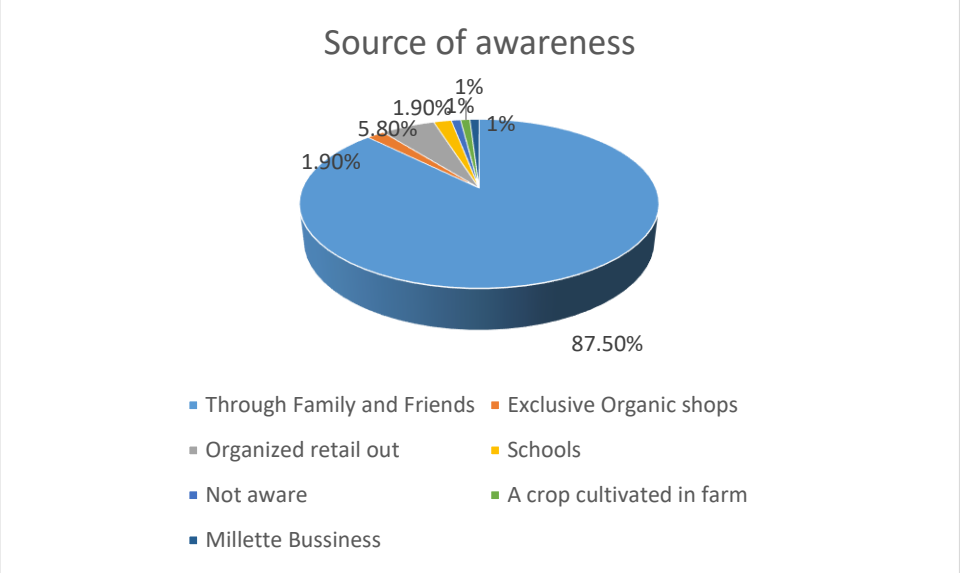

Figure 3. Source of awareness

It was found that majority of the 87 percent of respondents were aware of millets through family, friends, and other elders, while rest of the respondents were aware of millets through exclusive organic shop, organized retail outlet and schools. Out of the subjects, 1 percent of the respondents were aware of millets as it was among one of the crops cultivated

in their family, and 1 percent of the respondents were aware as they run a millet based business. It was found that 1 percent of the respondents were not aware of millets through any source.

Figure 4 represents the pre-dominant type of social media which created awareness among the respondents.

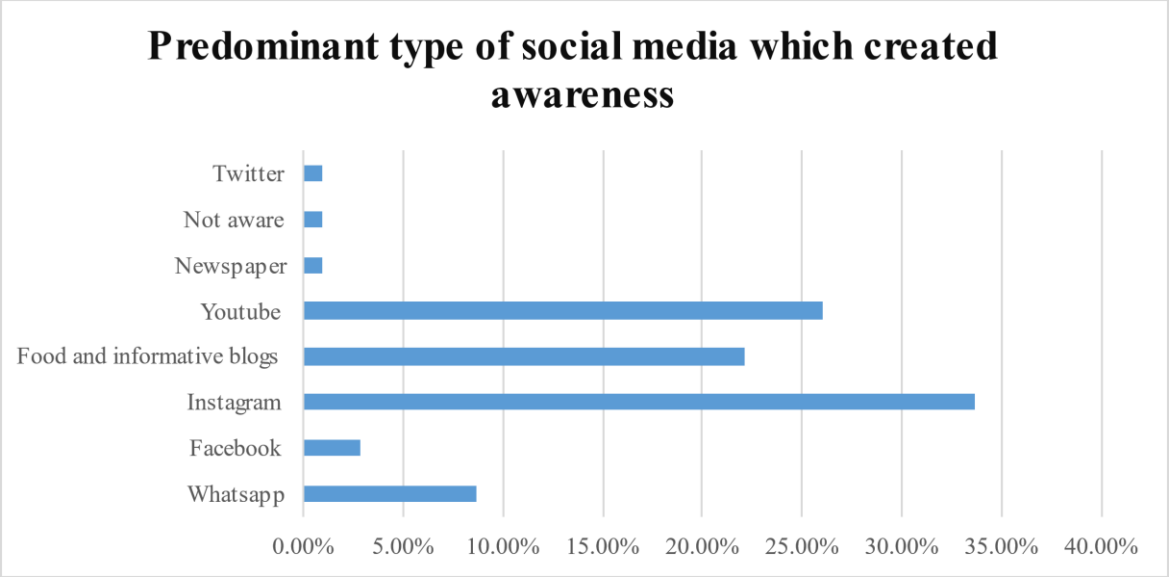

Figure 4. Predominance of social media

It was evident that Instagram was the pre-dominant type of social media which created awareness among 33 percent of the respondents, followed by YouTube with 26 percent. Among the subjects, 22 percent of the respondents were aware of millets through food and informative blogs, while 8 percent of the respondents were aware of millets majorly through WhatsApp. Newspaper, Google, Facebook, Twitter were the other pre-dominant type social media platforms which created awareness among the respondents and 1 percent of the respondents were not aware of millets through any social media platforms.

4.2 Knowledge level approach

The knowledge level of the participants about millets were assessed through certain questions (from question 1 to question 9). The results are presented in Figure 5 and Figure 6.

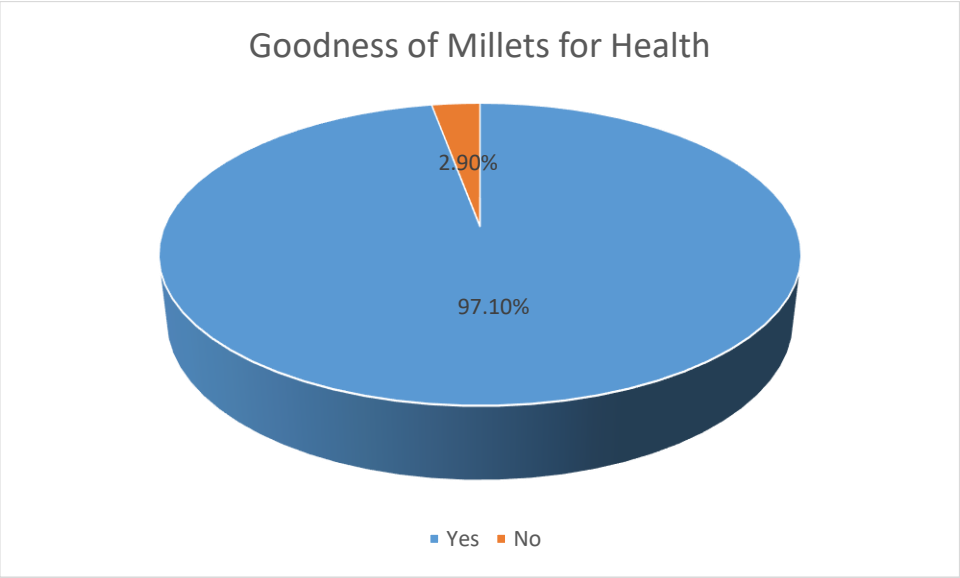

Figure 5. Goodness of millets for health

It is evident from figure 5 that, 97.1 percent of the respondents are aware that millets are good for their health, while the rest 2.9 percent of the respondents are not aware that millets are good for their health. It was found from the study that all the respondents are aware that millets have high fiber content.

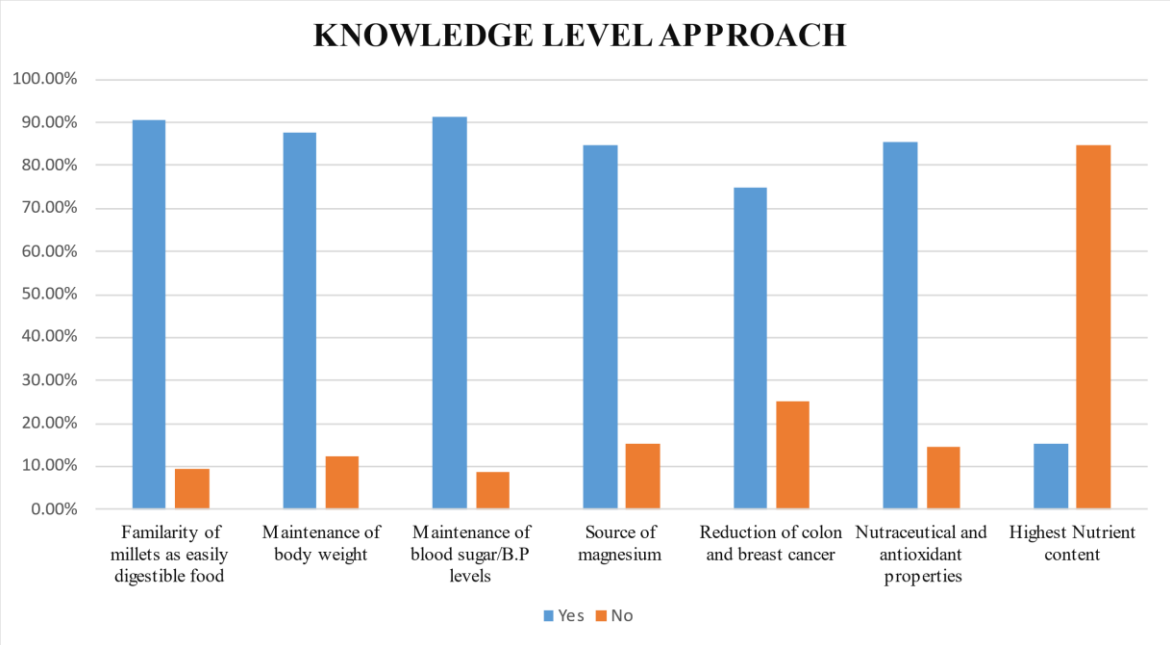

Figure 6. Knowledge level approach

Among the respondents, 90.4 percent of the respondents know that millets are easily digestible foods, whereas 9.6 percent of the respondents do now know of the same as

represented in Figure 6. From Figure 6, It is noted down that 87.5 percent of the respondents are aware that millets can help to maintain body weight. Among the subjects 12.5 percent of the respondents do not know that body weight can be maintained by millet consumption.

Millet has a low calorie content, making it a great food to help lose weight. It is beneficial to those who are conscious of their fitness in addition to helping them reduce weight. It enables individuals to sustain their energy levels during the day without continuously needing to consume more. Little millet is known to be of advantage for those are aiming to lose weight (Kumar *et al.,* 2023).

It is found that 91.3 percent of the respondents knew that consuming millets can help reduce their blood sugar or blood pressure levels, while 8.7 percent of the respondents were not aware of the same as represented in Figure 6. It can be understood that 84.6 percent of the respondents were aware and 15.4 percent of the respondents were not aware of millets being a good source of magnesium.

The insoluble dietary fibre included in foxtail millet may impede the activity of α-amylase, postpone the breakdown of carbohydrates, and prevent the release of glucose. This has been demonstrated to increase insulin sensitivity and reduce the chance of developing diabetes mellitus (Sharma *et al.,* 2018).

It has been observed from Figure 6 that, 75 percent of the respondents were aware that consuming millets could reduce the risk of colon and breast cancer. Among the subjects, 5 percent of the respondents were not aware of the same. It can also be noted that 85.6 percent of the respondents were aware of the anti-oxidant and nutraceutical properties of millets, while 14.4 percent of the respondents were not aware that millets have anti-oxidants and nutraceutical properties. It was noted down from Figure 6 that, 84.6 percent of the respondents knew that millets contain the highest nutrient content, whereas 15.4 percent of the respondents do not know that millets were a rich source of nutrients.

Millet inclusion to dietary plans would contribute to reduction in breast cancer and enhance the existing treatments, as millets are a rich source of phytates (Shukla *et al.,* 2023).

4.3 Attitude level approach

The attitude level of the participants about millets were assessed through certain questions (from question 1 to question 8). The results are presented in Figure 7.

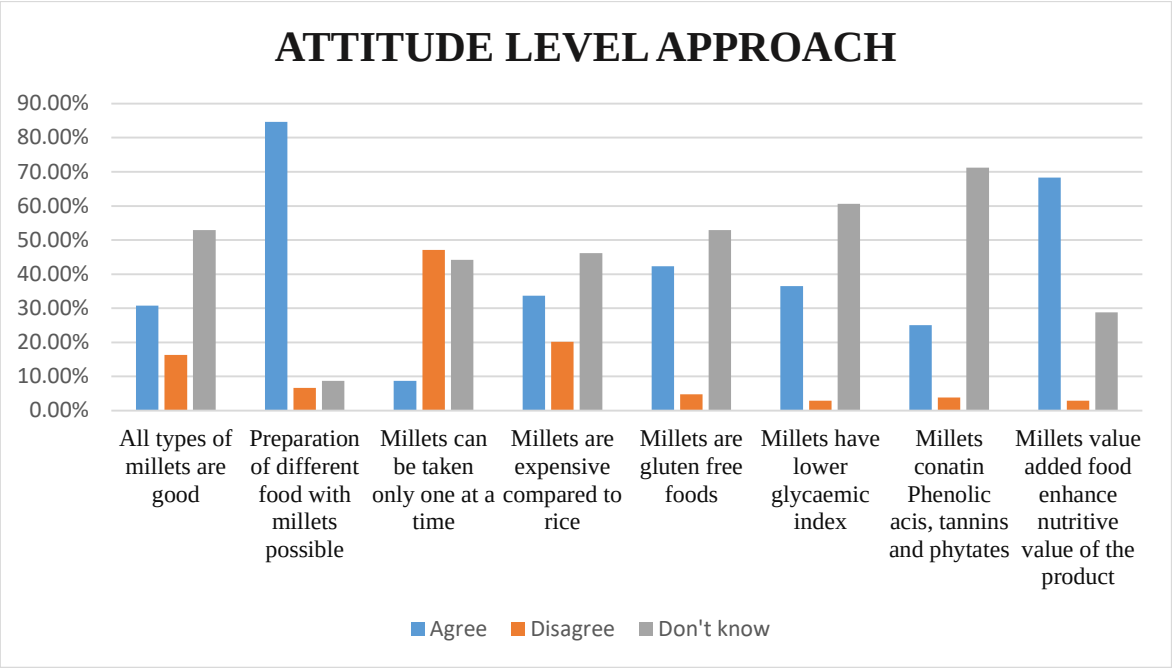

Figure 7. Attitude level approach

It has been observed from Figure 7 that 30.8 percent of the respondents agree that all types of millets are good and 16.3 percent of the respondents disagree with the same. Majority of the 52.9 percent of the respondents do not know whether all types of millets are good. It has been noted from Figure 7 that 84.6 percent of the respondents can prepare different food with the help of millets, while 6.7 percent disagree that they can use millets to prepare different food. 8.7 percent of the respondents do not know whether they can make use of millets to prepare different food.

It has been found from the study that 44.2 percent of the respondents feel that they can take only one millet at a time, while the majority 47.1 percent disagree on the same. Whereas 8.7 percent of the respondents do not know if they can consume more than one millet together as represented in Figure 7. From Figure 7, It can be noted that 46.2 percent of the respondents do not know whether millets are expensive compared to rice. 33.7 percent of the respondents agree that millets are more expensive, whereas 20.2 percent of the respondents believe rice is more expensive than millets.

Millets have been progressively pushed out of the food chain, mostly as a result of the government starting to provide heavily subsidized basic foods like rice and wheat at significantly lower prices. Because of their increased industrial uses, continuous usage as cattle feed, and as bird food, millet and coarse grains have persevered despite policy neglect and a lack of subsidies, albeit on an increasingly smaller acreage. Millets could be the ideal

for fortification because they are more affordable than other cereals and a staple food for the general public (Thakur *et al.,* 2019).

It can be observed from Figure 7 that, 52.9 percent do not know whether millets are gluten free food, while 42.3 percent of the respondents agree that millets do not contain gluten. Minority of 4.8 percent of the respondents disagree of the same. It is found from the study that, 60.6 percent of the respondents do not know whether millets are low glycaemic foods. 36.5 percent of the respondents agree that millets have low-glycaemic index, while, 2.9 percent of the respondents do not think that millets are low glycaemic foods as observed from Figure 7.

Constipation, several non-infectious illnesses, and cervical disorders are among the diseases for which pearl millet is advised. Compared to wheat, pearl millet has 8–15 times higher amylase activity and a lower glycemic index (Nambiar, 2011).

It has been noted from Figure 7 that, 25 percent of the respondents agree that millets contain high levels of phenolic acids, tannins and phytates, whereas 3.8 percent of the respondents disagree with the same. Majority of the 71.2 percent of the respondents do not know whether millets are rich sources of these nutrients. It can also be observed from Figure 7 that 68.3 percent of the majority of respondents agree that millet value added foods can enhance the nutritive value of the product, while 28.8 percent disagree with the same. On the other hand, 2.9 percent of the respondents do not know of the same.

Phenolic chemicals, particularly folic acid and catechins, are abundant in millet. Millet grains are abundant in phytochemicals, particularly those that are phenolic. Millets contain phenolic substances in both soluble and insoluble-bound forms. (Shahidi and Chandrasekara, 2013).

4.4 Practice level approach

The practice level of the participants with regards to millets were assessed through certain questions (Question 1 to Question 8). The results are presented in Figure 8

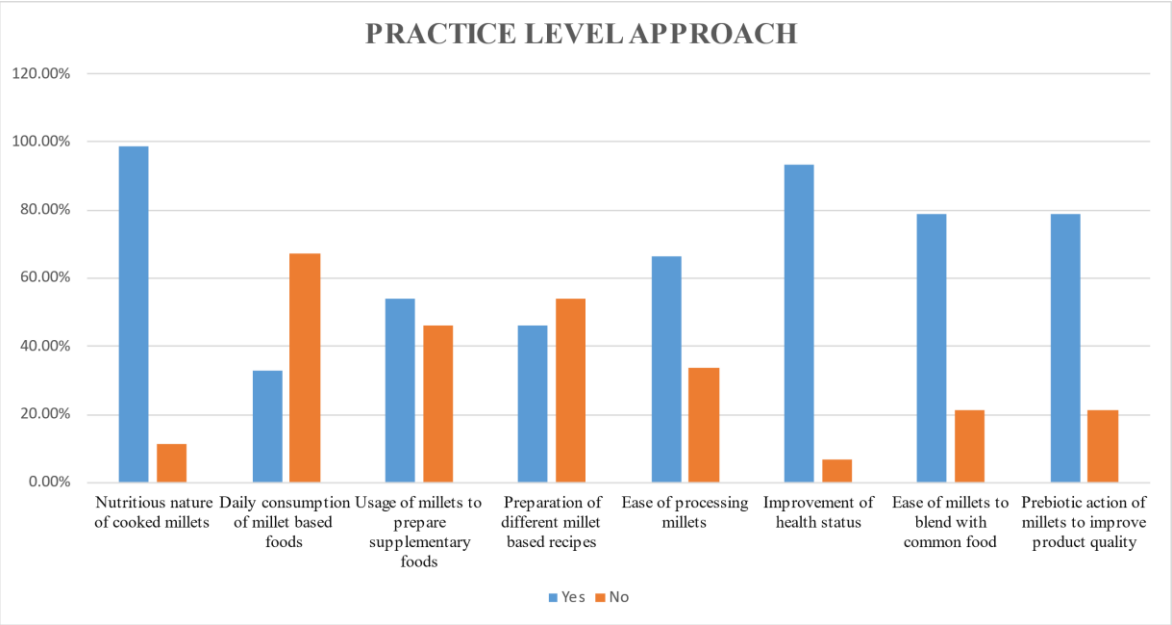

Figure 8. Practice level approach

It can be observed from Figure 8, that 88.5 percent of the respondents believe cooked millets are highly nutritious, while 11.5 percent of the respondents do not think the same. It can be concluded from Figure 8, that only 67.3 percent of the respondents consume millet based food daily. Rest 32.7 percent of the respondents do not consume millet based foods on a daily basis.

It has been noted down from Figure 8, that 46.2 percent of the respondents make use of millets to prepare supplementary foods, while 53.8 percent of the remaining respondents do not prepare supplementary foods using millets. It has been found from Figure 8, that different millet based recipes are prepared by 53.8 percent of the respondents and 46.2 percent of the respondents do not prepare a variety of millet based recipes.

Among the subjects, 66.3 percent of the respondents believe it easy to process millets, while 33.7 percent of the respondents do not think the same, as observed from Figure 8. It has been found from the study that, 93.3 percent of the respondents believe consumption of millets improves their health status, whereas 6.7 percent of the respondents disagree with the same as represented in figure 8.

Among the earliest foods that humans have ever eaten is millet. They are abundant in plant-based nutrients, or phytonutrients, and high in nutrients as a whole. Millet contains lignans, a phytonutrient that may help lower the risk of heart disease. Pearl millet includes phytates and polyphenols and is an excellent source of bioactive chemicals including phyates and polyphenols (Punia, 2020).

It has been noted from Figure 8 that, 78.8 percent of the respondents feel that millets can easily blend with common foods without any pronounced of flavor. It can be concluded that 21.2 percent of the respondents do not think millets can easily blend with common foods without developing noticeable flavor. Among the participants, 78.8 percent of the respondents also believe millets can act as prebiotics and improve flavor, texture and acceptability of the product, whereas 21.2 percent disagree with the same as observed from Figure 8.

Foods containing millet are categorized as possible prebiotics because they boost the viability or activity of probiotics, which has important health advantages. (Amado *et al.*, 2013).

5. SUMMARY AND CONSLUSION

"Millet is a collective term referring to a number of small seeded annual grasses that are cultivated as grain crops, primarily on marginal lands in dry areas in temperate, subtropical and tropical regions" (Singh, 2011)

During the years 2000 and 2009, India was the world's largest producer of millet, with Nigeria coming in second. Eight types of millet are regularly grown in India under rain-fed conditions: sorghum, pearl millet, finger millet, foxtail millet, kodo millet, proso millet, barnyard millet, and little millet (Tonapi *et al.*, 2017).

Globally, millets are a major food crop that have a big economic influence on developing nations. Being a crop resistant to pests and drought, millets have numerous benefits. Millets are regarded as nutrient-dense, high-energy foods that aid in managing the symptoms of malnutrition. Foods containing millet might contain probiotics and prebiotics that may have positive effects on health in the future. These grains are regularly consumed as a vital fuel to maintain health and as sources of traditional treatments (Srinivasan, 2019)

The Study was focused on the assessment of the knowledge, attitude and practice on millets among students attending college. Data collection was conducted by adopting a modified standard questionnaire. The salient features of the study are:

- General information about the subjects, including their name, gender, the course, the university at which they were pursuing their degree were collected. Few introductory questions aiming to understand whether the respondents were aware of millets, the source of awareness, and the pre-dominant type of social media which created awareness were consolidated. Majority of the subjects were female, accounting for about 93 percent. Among the respondents, 94 percent of the participants were aware of millets. Among 104 samples, 87 percent of the samples were aware of millets through their family, friends and elders, while 'Instagram' was the pre-dominant social media which created awareness about millets.
- A knowledge level approach was designed to assess the knowledge about millets among the respondents. Majority of the respondents were aware of the various properties and benefits of millets including the maintenance of body weight, blood sugar/blood pressure, reduction of colon and breast cancer and the nutraceutical and antioxidant properties with 97 percent of the participants being aware that millets are

beneficial for their health. All the participants were aware of the high fibre content in millets.

- An Attitude level approach was adopted to assess the attitude on millets among the respondents. This section received mixed responses from the participants with about half of the subjects agreeing to the supposed benefits and cost-effectiveness of millets and the remaining samples disagreeing to the same. A small portion of the subjects did not know whether millets were low glycaemic or gluten-free foods or whether millets could be used to prepare varieties of food.
- A practice level approach was designed to understand the practice of the subjects in regard to millets. Although 88 percent of the samples believed cooked millets are nutritious only 67 percent of the subjects consumed millets daily. More than half of the subjects, 54 percent of the subjects use millets to prepare various millet based recipes. It was observed from the study that millet consumption improved the health status of 93 percent of the respondents.

It can un be understood from the study that more than half of respondents who attended the survey were aware of the specific properties and health benefits of millets. It is also noted that millet consumption improved the health status of more than 90 percent of the respondents. Some of the participants were not aware of the significance of millet as a 'Nutri-cereal'. It is also observed that although majority of the subjects knew about the rich nutrient content in millets, it is not regularly included in the diet. Considering the fact that millets can enhance immunity, reduce metabolic disorders like diabetes mellitus, reduce the occurrence of cancers and cardiovascular diseases and can easily be grown in drought conditions, it can be effectively used to address malnutrition and aid in boosting the health status of the population. Enhanced awareness to the general public and promotion of millet based healthy recipes is therefore crucial. Hence, it can be concluded that promoting the inclusion of millets in the diet can be beneficial for maintaining the health status of the population.

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APPENDIX

QUESTIONNAIRE

GENERAL INFORMATION

1. Gender

- Female
- Male
- Other

2. Are you aware about millets?

- Yes
- No

3. Source of awareness.

- Just heard of it (Through family, friends, elders etc.)
- Exclusive organic shop
- Organized retail outlet
- Other

4. Pre- dominant type of social media which created awareness.

- Whatsapp
- Instagram
- Facebook
- Twitter
- Food and informative blogs
- Youtube
- Other

KNOWLEDGE ABOUT MILLETS AMONG STUDENTS

1. Millets are good for your health.

- Yes

- No

2. Millets contain high fibre content.

- Yes
- No

3. Millets are easily digestible foods.

- Yes
- No

4. Millets help to maintain body weight.

- Yes
- No

5. Consuming millets help control blood sugar/B. P Levels.

- Yes
- No

6. Millets are good sources of magnesium.

- Yes
- No

7. Millets reduce the risk of colon and cancer.

- Yes
- No

8. Millets have nutraceutical and antioxidant properties.

- Yes
- No

9. Millets contain the highest nutrient content.

- Yes
- No

ATTITUDE OF MILLETS AMONG STUDENTS

1. All types of millets are good.

- Agree
- Disagree
- Don’t know

2. You can prepare different food with the help of millets.

- Agree
- Disagree
- Don’t know

3. You can take only one millet at a time.

- Agree
- Disagree
- Don’t know

4. Millets are expensive Compared to rice.

- Agree
- Disagree
- Don’t know

5. Millets are gluten free foods.

- Agree
- Disagree
- Don’t know

6. Millets have lower glycemic index.

- Agree
- Disagree
- Don’t know

7. Millets contain high phenolic acids, tannins & phytates.

- Agree
- Disagree
- Don’t know

8. Millets value added foods enhance the nutritive value of the product.

- Agree
- Disagree
- Don’t know

MILLET PRACTICES AMONG THE STUDENTS

1. Cooked millets very highly nutritious.

- Yes
- No

2. You are consuming millet based foods daily.

- Yes
- No

3. You are using millets to prepare supplementary foods.

- Yes
- No

4. Do you prepare different millet based recipes.

- Yes
- No

5. It is easy to process millets.

- Yes
- No

6. Millet consumption improves your health status/

- Yes
- No

7. Millets can blend very easily with common foods without any pronounced of flavours.

- Yes
- No

8. Millets act as prebiotics and improve flavour, texture and acceptability of the product.

- Yes
- No