# Functional Food Knowledge Among College Students

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**Abstract**

*The Knowledge of potential health benefits is always associated with consuming functional foods. The Knowledge includes understanding how certain compounds or nutrients in functional foods may positively impact physiological functions, contribute to disease prevention, and support overall well-being. This study investigates the level of Knowledge regarding functional foods among college students and explores factors influencing their awareness and dietary choices. A diverse sample of college students from various disciplines participated in a survey to assess their understanding of functional foods, including their definitions, health benefits, and sources. Findings indicate a fair and moderate level of Knowledge of functional foods, with variations based on age and gender factors. The study is descriptive in nature and based on the survey method. A hundred college students from the Madurai District colleges were randomly selected to measure their functional food knowledge. A structured questionnaire was used to collect the information from the students. The collected data were coded, analysed and presented in frequency tables using descriptive and inferential statistics through SPSS package v.26.Social media. Educational interventions emerged as influential sources shaping students' awareness and dietary behaviours. The study found that ninety-eight per cent of the students regularly included fruits and vegetables in their daily diet. The study found that college students possess a fair to moderate level of knowledge regarding functional foods, and gender and age strongly correlate with their knowledge of available food. The study recommended that there are opportunities for further research to explore the effectiveness of various educational interventions, assess the long-term impact of improved Knowledge on dietary behaviours, and understand the influence of peer networks on the adoption of functional foods among college students.*
**Keywords: Functional food, College students, dietary habit, Madurai District**

## Introduction

Progressively more profound impacts on health, the environment, and society from dietary choices and trends in food creation and consumption. A well-balanced eating plan affects intestinal health. Irritable bowel syndrome, ulcerative colitis, Crohn's disease, and gluten therapy-resistant celiac disease are examples of gut obstacles that are tied to a particular diet and arise from overgrowth and imbalance of intestinal microbial flora. The intestinal microbiota grows after birth, with the colonization rate varied depending on factors such the manner

of birth, baby nutrition, antibiotic use, diet, and age. In particular, the gastrointestinal tract is germ-free (Bronzwaer, 2008).

The idea that food can have therapeutic benefits has been around for a while. Every culture has used food to prevent and treat illnesses for many centuries. Recent developments in science and medicine have allowed researchers to pinpoint the precise ingredients in some foods that contribute to their overall health advantages. Organic or inorganic chemicals found naturally in food that have the ability to change many metabolic pathways or processes, enhancing overall health and well-being, are known as bioactive components (Abuajah, 2015).

When consumed consistently as part of a varied diet, functional foods can be well-thought-out to be those whole, fortified, enriched, or improved meals that offer general health advantages beyond the prerequisites of important nutrients (e.g., minerals and vitamins). The "gold standard" for establishing a link between the use of functional foods or food ingredients and health claims is to use simulated, randomized, placebo-controlled intervention trials with human subjects (Clare, 2002) .

The "extra nutritional" components known as "bioactive elements" are frequently found in trace amounts in foods and plant products high in fat. Particularly beneficial effects on the human body or specific cells or tissues are attributed to bioactive chemicals. Numerous bioactive substances derived from plants and animals benefit human health. Vitamins, carotenoids, polyphenols, peptides, and long-chain polyunsaturated fatty acids (PUFA) are only a few examples of bioactive compounds. Three essential long-chain polyunsaturated fatty acids (PUFAs) include arachidonic acid, docosahexaenoic acid (DHA), and eicosapentaenoic acid (EPA) (Georganas, 2020).

**Need for the Study**

Functional foods often contain bioactive compounds that may help prevent or reduce the risk of certain diseases. These foods can contribute to developing dietary strategies for health promotion and disease prevention. Functional foods are revealed to address specific nutritional deficiencies or enhance the overall nutritional profile of the diet. Studying these foods helps identify ways to optimize nutrient intake and support overall well-being. For this reason, research on knowledge of functional foods helps educate college students about the potential health benefits associated with confident food choices. This awareness can influence dietary patterns and empower college students to make informed decisions about their food intake.

**Objectives of the Study**
1. To elicit the socio economic profile of the college students
2. To assess the knowledge level of functional food among the Students
3. To analyse the factors influencing the knowledge level of functional foods.

**Hypotheses of the Study**
- Ho: There is no relationship between the Functional food Knowledge level with gender and age
- Ha: There is a relationship between the Functional food Knowledge level with gender and age

**Methodology**

The area selected for the present study is Madurai District of Tamil Nadu. Madurai District, situated in the southernmost part of Tamil Nadu, is the second-largest and one of the most populous districts in the state. According to the 2011 census, the district boasts a total population of 3,038,252. The list of colleges in Madurai was obtained from the college directory and websites. From the list, 10 colleges were selected randomly. From that 100 college students from different steams

(Arts, Commerce, Science, and Engineering) were selected using stratified random sampling. A structured questionnaire was used to elicit the personal profile of the college students and their food habits, along with a knowledge scale, which was developed to assess the knowledge on functional foods of the students. Students filled out the questionnaire directly connected to the Google platform. Student's personal information, including names, was anonymized to maintain and protect confidentiality. The anonymous nature of the web-survey does not allow tracing in any way sensitive personal data. Therefore, the present web survey study does not require approval by the Ethics Committee. Once completed, each questionnaire was transmitted to the Google platform and the final database was downloaded as a Microsoft Excel sheet. The collected data were statistically analysed and interpreted by using appropriate statistical tools via SPSS version 26.

## Results
### Personal Profile of the Respondents
   This part deals with the main personal variables like age of students, their religion, educational level of parents and the monthly income of the families.

**Table 1 Personal Profile of the Students**

| Variables | Students (N=100) |
|---|---|
| Gender | |
| Girls | 79.0 |
| Boys | 21.0 |
| Age (in Years) | |
| 18-20 | 19.0 |
| 20-22 | 56.0 |
| 22-24 | 25.0 |
| Types of family | |
| Nuclear family | 68.0 |
| Joint family | 32.0 |
| Family size | |
| 1-4 members | 73.0 |
| Above 5 members | 27.0 |

   The personal profile of the students was shown in Table 1. Regarding the gender details 79 per cent of the students are girls and 21 per cent boys. The age of the students were selected for this study range between 18-24 years. Those who aged,18-20, 20-22 and 22-24 constituted 19 per cent, 56 per cent, 25 per cent respectively. 68 per cent of the respondents are nuclear family and 32 per cent of the respondents are joint family. 73 per cent of the respondents are reported that they have 1-4 members in their family and 27 per cent above 5 family members.

**Table 2 Socio- Economic Profile of the Students**

| Variables | Students (N=100) |
|---|---|
| Religion | |
| Hindu | 52.0 |

| | |
|---|---|
| Christian | 23.0 |
| Muslim | 22.0 |
| Others | 3.0 |
| Community | |
| General | 45.0 |
| Other Backward Class | 30.0 |
| Scheduled Caste/Tribe | 25.0 |
| Educational Status of Mother | |
| Illiterate | 2.0 |
| Primary | 18.0 |
| Upper Primary | 24.0 |
| Higher Secondary | 33.0 |
| Graduation and above | 23.0 |
| Economic status of the family | |
| Below Poverty Line | 38 |
| Above Poverty Line | 62 |

As shown in Table 2, 52 per cent of the respondents were Hindus, 23 per cent Christians and 22 per cent were Muslims. A very meager proportion three per cent respondent belonged to other religion. As per Census of India 2011, Hindus are the majority in Madurai District. The sample chosen for the study upholds a similar trend. Community wise stratification of the sample, as per Article 15(4) of Constitution of India ("Constitution of India", n.d) shows that 45 per cent of the respondents belonged to General Community and 30 per cent to Other Backward Community (OBC). The remaining 25 per cent of the respondents belonged to Scheduled Tribe (ST/SC). The educational level of the mother revealed that, up to primary, upper primary and higher secondary school levels constituted 18 per cent, 24 per cent and 33 per cent respectively. Those who parents had education at graduation and higher levels constituted 23 per cent. Those with no formal education constituted two per cent.

Poverty Line is an economic benchmark used by the Government of India to indicate economic disadvantage and to identify individuals and households in need of government assistance and aid. All families above this income limit are categorised under Above Poverty Line (APL). At the time of the survey, almost more than half (62 per cent) of the respondent's families were Above Poverty Line and the remaining 38 per cent of the respondents were Below the Poverty Line.

**Table 3 Food Habits of the Students**

| **Variables** | **Students (N=100)** |
|---|---|
| Food Habit | |
| Vegetarian | 29.0 |
| Non-Vegetarian | 71.0 |
| Food Frequency | |
| Consumed milk and dairy products | 92.0 |
| Fruits | 75.0 |

| | |
|---|---|
| Green leafy vegetables | 83.0 |
| Most preferred food | |
| Sweets | 96.0 |
| Snacks and fast food | 89.0 |
| Non vegetarian | 65.0 |
| Fruits | 60.0 |
| Least preferred food | |
| Vegetables | 98.0 |
| Rice | 66.0 |

Table 3 shows the food habits of the students. 71 per cent of the students were non vegetarians while least number of students (29 per cent) was pure vegetarians. Majority of students (92 per cent) consumed milk and dairy products daily. However fruits (75 per cent) green leafy vegetables (83 per cent) were consumed by most of the students only once a week. However higher educational level of mother or family size was not significantly associated with greater frequency of consumption of any particular food item. Sweet was most preferred food item (96 per cent), followed by snacks and fast food (89 per cent), non vegetarian (65 per cent), fruits (60 per cent). Vegetables are least preferred food (98 per cent), followed by rice (66 per cent), dal (62 per cent). Though most of the students consumed vegetables daily, it was ranked as the least preferred item.

**Knowledge level on Functional Food**

The knowledge level of functional foods refers to the depth and breadth of understanding that students have about the concept, characteristics, health benefits, and utilization of functional foods. This knowledge encompasses understanding the role of certain foods in promoting health beyond basic nutrition and recognizing their potential contributions to well-being and disease prevention. To assess the knowledge level of the college on functional food, 15 statements were considered. First, the students were asked to state their level of the agreement on a 5 point ranking scale (5: Strongly Agree; 4: Agree; 3: Undecided; 2: Disagree; 1: Strongly Disagree), 75 being the highest score of the respondents and 15 being the lowest score of the respondents. The mean score and reliability coefficient value of the college students is presented in Figure 1 and Table 4.
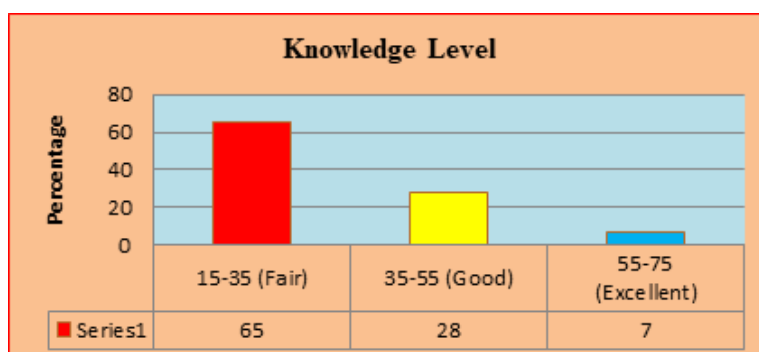


| | 15-35 (Fair) | 35-55 (Good) | 55-75 (Excellent) |
|---|---|---|---|
| Series1 | 65 | 28 | 7 |

**Figure 1 Functional food Knowledge level of College Students**

The Knowledge level on functional foods of college students is given in Figure 1. The students' overall score ranged from 17 - 53 with a mean score of 33.2. Those securing fair, good and excellent knowledge scores of functional foods constituted 65 per cent, 28 per cent and seven per cent, respectively. The analysis shows that more half of the students opined that they are unaware of functional foods. There is a need to know the potential health benefits linked to consuming functional foods. All college students need to be aware of the various sources of functional foods and how to incorporate them into their diet. This could involve recognizing specific foods, food groups, or products that are enriched with beneficial nutrients or bioactive compounds.

**Table 4 Functional food Knowledge Mean score of College Students**

| Statements | M | SD | r | Reliability |
|---|---|---|---|---|
| Functional food promoting health, well-being and preventing diseases. | 1.9055 | 1.80012 | 1.000 | |
| Probiotics can promote a healthy balance of gut microbiota | 1.8466 | 1.07337 | .155 | |
| Fatty acids support heart health, and reduce inflammation. | 2.5656 | 1.65896 | .124 | |
| Fruits and vegetables help neutralize free radicals in our body | 3.3288 | 1.62137 | -.029 | |
| Antioxidents are potentially reducing the risk of chronic diseases | 3.2994 | 1.24856 | -.086 | |
| Calcium and Vitamin D-fortified Foods | 3.4368 | 1.31729 | -.039 | |
| Omega-3s may support cognitive function | 3.5485 | 1.29060 | -.013 | |
| Omega-3 fatty acids improve cholesterol levels | 3.5190 | 1.21591 | -.027 | |
| Potassium and magnesium may contribute to the regulation of blood pressure | 3.5288 | 1.19637 | -.043 | 0.720 |
| Omega-3 fatty acids and B vitamins may help to maintain positive mental well-being | 3.5472 | 1.28109 | -.035 | |
| Omega-3 Fatty Acids are rich in fish, flaxseeds, and walnuts | 3.5926 | 1.14370 | -.087 | |
| Fiber-Enriched Foods can support to weight management | 3.6540 | 1.22446 | -.040 | |
| Functional Beverages like green tea, which contains rich antioxidants | 3.5975 | 1.21315 | -.117 | |
| Fatty fish and turmeric may help reduce inflammation | 3.5558 | 1.19026 | -.072 | |
| Vitamin C in citrus fruits contributes to overall immune system health | 3.5472 | 1.23619 | -.035 | |

The reliability and validity of the items were also tested to confirm the scale of the items selected for the study. Cronbach's alpha. It is generally accepted by the researcher to have a coefficient of above 0.6 as appropriate, above 0.7 as good, above 0.8 as very good, and 0.9 as excellent. It can be seen from Table 4 that all the statements have satisfied the norms of internal consistency as the reliability coefficient is more than 0.6. The reliability coefficient of 0.720 verifies that the statements taken under each variable contribute to the total variance of the respective factor.

## Relationship between Functional food Knowledge with Age and Gender

Knowledge level may vary based on cultural and regional factors. Efforts to promote awareness should take into account cultural preferences, dietary habits, and local availability of functional foods to effectively reach diverse populations.

**Table 5 Relationship between Functional Food Knowledge level with Gender and Age**

| Role of Nutrition | Functional food Knowledge | | | $x^2$ | df | Sig. |
|---|---|---|---|---|---|---|
| | Fair | Good | Excellent | | | |
| Gender | | | | | | |
| Girls | 3.69 | 3.41 | 3.85 | 13.048 | 3 | .005* |
| Boys | 3.08 | 2.97 | 3.13 | | | |
| Age in Years | | | | | | |
| 18-20 | 3.18 | 3.06 | 3.00 | 11.160 | 3 | .011* |
| 20-22 | 4.07 | 3.98 | 3.61 | | | |
| 22-24 | 3.66 | 3.44 | 3.37 | | | |

## Hypothesis 1

- H0: There is no significant relationship between gender and functional food knowledge
- H1: There is a relationship between gender and functional food knowledge

The low level of the p-value from Table 5 ($p < .05$) for the gender reveals that the respective null hypothesis is rejected at a 5% level of significance, and it is concluded that functional food knowledge varies between boys and girls. The mean score 3.85 reveals that girls have excellent knowledge on functional food compared with boys.

## Hypothesis 2

- H0: There is no significant association between age and functional food knowledge
- H1: There is an association between age and functional food knowledge

The low level of p-value from the Table 4.5 ($p < .05$) for the food frequency reveals that the respective null hypothesis is rejected at 5% level of significance and it is concluded that the functional food knowledge varies between by their age group.

## Conclusion

Functional foods often contain bioactive compounds such as antioxidants, probiotics, prebiotics, omega-3 fatty acids, and phytochemicals. The mentioned beneficial food compounds have been linked to various health benefits, including reduced oxidative stress, improved gut health, and enhanced cardiovascular function. Studies show that incorporating functional foods into the diet may contribute to the prevention and management of chronic diseases. The study shows that college students possess a fair to moderate level of knowledge regarding functional foods. There is often diversity in awareness, with some students demonstrating a solid understanding of functional foods while others may have limited knowledge. Educational factors influence the level of knowledge about functional foods. Students majoring in nutrition and home science tend to exhibit higher knowledge levels than those in other disciplines. The result highlights the role of formal education in shaping awareness. The study suggested that social media and various information sources significantly shape students' knowledge of functional foods. Awareness campaigns, educational materials, and influencers on platforms like Instagram and YouTube can contribute to disseminating

information and influencing dietary choices. The study recommended that there are opportunities for further research to explore the effectiveness of various educational interventions, assess the long-term impact of improved knowledge on dietary behaviours, and understand the influence of peer networks on the adoption of functional foods among college students. This research contributes valuable insights for health educators and policymakers seeking to enhance nutritional awareness and promote healthier lifestyles among college populations.

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