

ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICES OF CONSUMERS VIS-À-VIS FUNCTIONAL FOODS

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ABSTRACT

Background: Functional foods can be defined as foods, which beneficially affect one or more target functions in the body, beyond adequate nutritional effect, in a way that is relevant to either an improved state of health and wellbeing and/or reduction in risk of disease. **Objective:** To assess the Knowledge, Attitude, and Practices (KAP) of consumers for functional foods. **Methodology:** A descriptive cross sectional design was adopted for the study which was conducted in New Delhi. Non probability sampling method was adopted for sample (n= 101) of adult consumers in age range of 20-59 were studied in two age categories, adults (20-39 years) and middle adults (40-59 years). Knowledge, Attitude and Practice questionnaire was developed with regard to awareness regarding functional food. Data was analyzed on the basis of age range of subjects by frequency, percentage, mean, standard deviation, z score and correlation. **Results:** The mean \pm S.D. of knowledge scores for adult category was found to be 6.18 ± 2.49 and for middle age adults it was 5.53 ± 1.85 . Attitude score of adults was 19.59 ± 2.56 and for middle adults it was 20.07 ± 1.91 . The practice score was 3.79 ± 1.57 for adults and for middle adults it was 4.16 ± 1.13 . A significant positive correlation was seen to exist between the knowledge and attitude, attitude and practice scores of both age categories, for knowledge and practice, positive correlation was found to exist for adults. **Conclusion:** The results verified that awareness of functional foods is associated with greater knowledge about them, more favourable attitudes towards them, along with their increased consumption.

Key Words: Functional Foods, Knowledge, Attitude, Practice, Awareness, Consumer; Health Benefits.

INTRODUCTION

Functional foods refer to foods that offer additional health benefits beyond basic nutrition. These foods may contain added vitamins, minerals, or other nutrients, or may have specific bioactive compounds that have been shown to improve health outcomes. Functional foods have a long history, dating back to ancient times when people used natural ingredients to treat various health conditions. In the 19th century, scientists began to isolate and identify the active ingredients in certain foods that were responsible for their health benefits. For example, in 1893, scientists discovered that the vitamin C in citrus fruits prevented scurvy. In the 1970s and 1980s, interest in functional foods increased, and researchers began

to investigate the health benefits of various plant compounds, such as flavonoids, which are found in fruits and vegetables. This led to the development of new functional foods, such as soy products, which are high in isoflavones, and oat products, which are high in beta-glucan (Dias et al., 2012).

The term “Functional Food” was originally introduced in Japan to refer to foods with a physiological function or activity. Functional foods can be defined as food products containing biologically active compounds (such a nutrients, bioactive peptides, and phytochemicals) at levels that may confer specific health benefits (International Food

Information Service, 2009). In India, FSSAI guidelines cover eight categories of functional foods, namely Health Supplements, Nutraceuticals, Food for Special Dietary Use, Food for Special Medical Purpose, Specialty food containing plant or botanicals, Foods containing Probiotics, Foods containing Prebiotics and Novel Foods (FSSAI, 2016).

Currently, the functional food market is growing rapidly worldwide, driven by increasing consumer awareness of the relationship between diet and health, and an aging population with a greater focus on healthy aging. According to a report by Markets and Markets (2021) on Functional Food Ingredients Market Size, Trends, Analysis by 2026, the global functional food market is projected to reach USD 275.77 billion by 2025, with a compound annual growth rate (CAGR) of 7.9% from 2020 to 2025.

However, a factor to consider while studying the “healthiness” of foods, is that researchers usually study foods in isolation. Given that people usually consume a certain combination of foods during a meal, singling out a specific one to study does not reflect real human consumption. Furthermore, evidence suggests that in certain cases, co-consumption of foods actually increases the body’s ability to absorb nutrients. For example, the beta-carotene in carrot and spinach is more readily absorbed when eaten together with a source of fat such as salad dressing (Brown et al., 2004). Overall, the functional food market is expected to continue to grow as consumers increasingly seek out foods that provide additional health benefits.

Verbeke (2006) in a study on consumer willingness to compromise on taste for health with regard to functional food revealed that females and elderly readily agree to compromise on taste and the health benefit of same is considered to be the major factor. In a gap of four years however they found that the same will be risky strategic option.

KAP surveys are focused evaluations that measure changes in human knowledge, attitude and practices in response to a specific situation. KAP studies reveal what the sample population knows about a certain topic, how they feel, and how they behave. Morawska et al. (2016), conducted a study with the aim to determine the level of knowledge that university students have on functional foods. 266 students from the Poznan University of Medical Sciences, majoring in Dietetics and Pharmacy were surveyed. A short questionnaire comprising 7 closed questions was used to test their knowledge on definition, function, form or examples of functional foods. Results indicated that Dietetic students had significantly greater nutritional awareness about the

characteristics, forms and examples of functional foods, as well as they consumed a wider range of functional products, as compared to Pharmacy students. This greater nutritional knowledge in Dietetic students, seems likely to have arisen from the very nature of their studies. Thus, there is a need to promote functional foods in medical schools and universities, that not only include those studying nutrition subjects but also in other health-related areas.

Adequate knowledge about nutrition is key factor in leading people towards adopting functional foods in their daily diets for healthy eating. In his study to assess the consumption pattern of functional foods among college going girls, a structured questionnaire was prepared for data collection, and anthropometrical indices were taken. Results revealed that 60% girls were aware about functional foods whereas rest of girls had no idea. Some common functional foods such as tomato, garlic, etc. were consumed in high amount by college girls than some other functional foods like oats, barley, and beet root in daily diets poisted by Verma et al. (2018).

Markovina et al. (2011) aimed to explore the Croatian young consumers’ perception of functional food, to investigate underlying attitudes and their willingness to buy functional food in the future. Consumer survey was conducted using a self-administered questionnaire on a sample of 1,035 young consumers aged between 14 and 30 years. Findings revealed about 40 per cent of young consumers are familiar with the concept of functional food, and 27 per cent of them are regular buyers. The usual place where functional food is acquired is supermarkets and most commonly bought are functional dairy products. Three factors that explain young consumers’ attitudes towards functional food are health awareness and confidence, lack of trust for functional food and its price and quality. More than half of respondents are willing to buy functional food in the future (51.8 per cent). Female consumers aged between 19 and 30, living in smaller households with higher income are more likely to be functional food consumers in the future. One of the global nutrition target for 2025 is to improve nutrition and health of world’s population. (WHO, 2019).

On the basis of the literature review it was observed that there are studies on assessing KAP of course specific students and young consumers regarding their awareness of functional food. However, there is a paucity of data on the awareness, inclusion of functional foods and their association with age categories of adults. Thus the specific objectives of the study were:

- To examine the knowledge of consumers for functional foods.
- To assess the attitude of adult consumers for inclusion of functional foods in daily diet.
- To assess the practices of consumer for inclusion of functional food in their diet.

METHODOLOGY

Research Design: A descriptive research framework was chosen to evaluate the knowledge, attitude, and practices of the sample population.

Locale: The region of Delhi-NCR was chosen to conduct the survey. The zones covered were south zone and central zone.

Sampling Design: Non probability sampling method was applied to select the samples (n=101). The age range considered for the study was 20- 59 years which was further classified in two age brackets namely Adults (20-39 years) and Middle Adults (40-59 years).

Tools and Technique: A structured questionnaire was prepared to seek information on demographic details of the subjects in the first part followed by Knowledge, Attitude and Practice (KAP) sections for assessing subject's knowledge, attitude and practice towards functional foods. The tool was in English.

Knowledge segment of KAP comprised of 10 questions. Each question had 4 alternative responses (multiple choice questions which were close ended and comprised of only one correct response). The areas covered for assessment included food science and nutrition application in food service system and health related problems with respect to present eating habits of youth. Correct response was scored as "1" and incorrect response was scored as "0". The maximum possible score was 10 and the minimum score was 0.

The second aspect of KAP was Attitude related to benefits of functional food comprising of 5 statements assessed on 5 point Likert scale. The statements were to be answered by selecting appropriate option on the scale of strongly agree (5)/agree (4)/neither agree nor disagree(3)/disagree(2)/strongly disagree (1). All the statements were positive. The maximum possible score was "25" and minimum was "5".

Similarly practice related to inclusion of functional food in daily diet was assessed by practice proforma which comprised of 5 statements. For each statement two alternative responses

(Yes/No) were given. For a sound practice "1" mark was allotted and 0 was given for unfavourable practice. The maximum possible score was 5 and the minimum possible score was "0". The total score of the designed KAP tool was 40.

Before the administration of KAP proforma pilot testing of the tool was done to remove any ambiguity. For final administration of tool subjects were approached after seeking prior appointment. Rapport development with each subject was done and then a brief introduction of the study along with instructions for questionnaire were explained. Subjects were provided with an informed consent.

Data Analysis and Statistical Analysis: For data analysis subjects were divided into two categories with respect to age namely adults (20-39 years) and middle Adults (40-59 years). The results were expressed in terms of frequency, percentage, mean, standard deviation (S.D.), z-test, Pearson's Correlation was calculated (Mahajan, 2008).

RESULTS AND DISCUSSION

Sociodemographic profile: From a sample of 101 subjects, majority were found to be males (58.42%), while the rest 41.58% were females. With respect to education, 42.47% were undergraduates, while 17.83% were graduates, and 39.6% were postgraduates. Age was the critical sociodemographic profile that was used as a basis of comparison for the 2 chosen age brackets. The two brackets chosen were adults (20-39 years), who comprised 55.44% of the respondents, while the rest 44.56 % were middle Adults i.e., 40-59 years (Dyussenbayev, 2017). Rezai et al. (2012) work on knowledge and perception of young consumers for functional food indicated positive attitude and various factors which influenced the same of which age was one of the factor.

Table 1: Sociodemographic detail of the subjects

Profile	Description	Respondents n (%)
Gender	Male	59 (58.42)
	Female	42 (41.58)
Age	Adults (20-39 years)	56 (55.44)
	Middle Adults (40-59 years)	45 (44.56)
Education	Undergraduate	43 (42.57)
	Graduate	18 (17.83)
	Postgraduate	40 (39.60)

Table 2: Mean \pm SD of KAP score of subjects

Age Category	Adults (20-39 year)	Middle Adults (40-59 years)	Z test value
Knowledge	6.18 \pm 2.49	5.53 \pm 1.85	1.49NS
Attitude	19.59 \pm 2.56	20.07 \pm 1.91	1.07NS
Practice	3.79 \pm 1.57	4.16 \pm 1.13	1.37 NS

NS: Not Significant at 5% level of significance

Knowledge: The mean knowledge score of adults was found to be 6.18 \pm 2.49, while the mean knowledge score of middle adults was found to be 5.53 \pm 1.85. Z-test was applied to the knowledge scores of both the age groups, and the value of z test value obtained was 1.49. The null hypothesis was accepted and thus no significant difference was found to exist between the knowledge scores of the two age groups at 5% level of significance.

Since the mean knowledge score of both the age groups is quite low, this suggests a lack of knowledge and awareness with regard to functional foods among the subjects, and thus limits their acceptability. Similar results were seen in the findings of Ares et al., (2008), where the results indicated that lack of nutritional knowledge might limit the acceptability of functional foods and thus the use of health claims might be necessary to assure that consumers are aware of their health benefits. According to the present study it was observed that only 55.44% of subjects knew about the conceptual definition of functional foods and its various categories. Compared to middle adults (44.44%), a larger proportion of adults (64.29) answered this question correctly. Since a major subjects of adults were hospitality students, the very nature of their studies could be the reason behind this relatively strong correct response (Morawska et al., 2016).

Majority of the respondents (86.14%) correctly answered that dietary fibre is abundantly present in whole grains also majority (85.15%) knew that citrus fruits are rich in vitamin C. In both the questions, knowledge of middle adults was found to be higher than that of adults (Büyükkaragöz et al., 2014). It was also seen that only 37.62% of respondents knew salmon is a functional food due to its high quantity of omega-3 fatty acids, while only 44.55% of participants had knowledge about the health benefits of oatmeal. Interestingly, most of the respondents consumed both these items on a frequent basis, without actually realizing they fall under the category of functional foods, and impart specific health benefits (Christidis et al., 2011). In a similar descriptive study done by Chammas et al. (2019), functional food knowledge was found to be higher among young (p

= 0.005) and single individuals (p = 0.002). The highest relevance to explain consumer awareness for functional food was seen to be their motivation for health (Bornkessel et al. (2014). In a study conducted by Dadha and Deeksha (2021) and it was seen that subjects were aware of probiotic drinks like kanji, kombucha, kefir which serve the health benefits namely supporting immune system, improving digestion, preventing constipation and numerous other benefits. It was also reported that sessions on their health benefits are a part of classroom sessions which help in imparting knowledge amongst youngsters. Consumers perceive that functional food inclusion will allow them to follow a healthy and balanced diet easily and will also help in reducing the health problems however they are not sure of the benefits claimed on their food label (Karelakis et al. 2020). This highlights that approval from the government agencies and validation of such products along with increased awareness will make functional foods more consumer friendly.

Table 3: Correct responses for knowledge statements

Knowledge Items	Adults (n=56)	Middle Adults (n=45)	Total (n=101)
	n (%)	n (%)	n (%)
Functional Foods comprise which of the following..	36 (64.29)	20 (44.44)	56 (55.44)
Dietary fibre is abundantly present in..	45 (80.36)	42 (90.33)	87 (86.14)
Golden rice is fortified with..	30 (53.57)	15 (33.33)	45 (44.55)
Vitamin C is found in which of the following..	47 (83.93)	39 (86.67)	86 (85.15)
Which micronutrient is banana rich in..	42 (75.00)	30 (66.67)	72 (71.29)
Amaranth, Buckwheat, Chia, Spelt etc. are examples of..	33 (58.93)	21 (46.67)	54 (53.46)
Omega-3 fatty acids are naturally high in salmon. Therefore, Salmon can be classified as..	26 (46.43)	12 (26.67)	38 (37.62)
Yogurt, Miso, Kombucha all contain which of the following..	30 (53.57)	27 (60.00)	57 (56.43)
Which of the following is NOT an associated benefit of oatmeal..	25 (44.64)	20 (44.44)	45 (44.55)
Almond is a rich source of..	32 (57.14)	24 (53.33)	56 (55.44)

Attitude

The mean attitude score of adults was found to be 19.59 ± 2.56 , while the mean attitude score of middle adults was computed to be 20.07 ± 1.91 . Z- test was applied to the attitude scores of both the groups, and the value of z-statistic obtained was 1.07. The null hypothesis was accepted and thus no significant difference was found to exist between the attitude score of the two age groups at 5% level of significance.

From the given tables, it can be inferred that 58.93% of adults agreed that functional foods should be made a part of daily diet, while 55.56% of middle adults also agreed to the same. Similarly, 57.14% of adults agreed that supergrains such as ragi and sorghum should be consumed on a frequent basis while 40% of middle adults strongly agreed for the same statement.

Neutral response was observed for the statement 3, which said that functional foods are a marketing gimmick aimed at boosting the sale of ordinary products. This is indicative of lack of proper knowledge among the subjects. Similar results were seen in other studies, where lack of proper information among participants was primary reason behind their acceptability (Verma et al., 2018; Ares & Gámbaro, 2007).

44.64% of adults agreed that information regarding health benefits of functional foods needs to be marketed properly in order to increase their consumption, while 51.11% of middle adults agreed to the same. Previous studies also concluded that increased awareness and knowledge were the most commonly reported factor that would promote functional food consumption (85.5%) and 63.5% of participants wanted more information about functional foods (Vella et al., 2014). Consumers find the base attribute of products like curd, yogurt as one of the major selection criteria for functional food. Customers groups also differ in their perception of functional food healthiness Annunziata and Vecchio (2013).

Table 4: Attitude of adults for functional foods

Statement	Adults (n=56)				
	n (%)				
	SA	A	NAND	D	SD
Functional foods should be made a part of daily diet	23 (41.07)	33 (58.93)	0	0	0
Super grains such as Ragi, Sorghum, Chia etc. offer countless benefits should be consumed on a frequent basis	13 (23.21)	32 (57.14)	11 (19.64)	0	0

Functional foods are a marketing gimmick aimed at boosting sales of ordinary products	5 (8.93)	10 (17.86)	21 (37.50)	16 (28.57)	4 (7.14)
Information regarding health benefits of functional foods needs to be marketed properly in order to increase their consumption	19 (33.93)	25 (44.64)	8 (14.29)	4 (7.14)	0
Foods with documented health benefits should be consumed on a regular basis	18 (32.14)	25 (44.64)	8 (14.29)	3 (5.36)	2 (3.57)

Table 5: Attitude of middle adults for functional foods

Statement	Middle Adults (n=45)				
	n (%)				
	SA	A	NAND	D	SD
Functional foods should be made a part of daily diet	19 (42.22)	25 (55.56)	1 (2.22)	0	0
Super grains such as Ragi, Sorghum, Chia etc. offer countless benefits should be consumed on a frequent basis	18 (40.00)	21 (46.67)	2 (4.44)	3 (6.67)	1 (2.22)
Functional foods are a marketing gimmick aimed at boosting sales of ordinary products	4 (8.89)	8 (17.78)	15 (33.33)	13 (28.89)	5 (11.11)
Information regarding health benefits of functional foods needs to be marketed properly in order to increase their consumption	13 (28.89)	23 (51.11)	6 (13.33)	3 (6.67)	0

Foods with documented health benefits should be consumed on a regular basis	17 (37.78)	24 (53.33)	2 (4.44)	1 (2.22)	1 (2.22)
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Practice

The mean practice score of adults was found to be 3.79 ± 1.57 , while the mean practice score of middle adults was calculated to be 4.16 ± 1.13 . Z- test was applied to the practice scores of both the groups (1.37). No significant difference at 5% level of significance was seen to exist between the practice scores of the two age groups.

It was found that majority (82.18%) of total respondents make conscious efforts to inculcate superfruits like banana, amla, grapes, pears etc. into their daily diets. Majority (91.11%) of middle adults were following this practice, as compared to only 75% of adult respondents. Of these, 90.47% of total respondents were females. These findings were in agreement with a study done in Croatia, where females with higher levels of educational attainment were found to be heavier consumers of functional foods (Brečić et al., 2014).

Majority (88.11%) of total subjects try increasing their intake of functional foods, of which adults comprised of 87.5%, and middle adults comprised 88.89%. Similar results were found in the study of Ares et al. (2008), where consumers with high nutritional knowledge were interested in consuming higher proportion on functional foods. The present study also showed that majority (76.79%) of adults and 77.78% middle adults make active efforts to shop for functional foods. Results also indicated that only 53.46% of total respondents included functional grains in their diet, of which adults were 42.86%, and middle adults 66.67%. Majority of the respondents (82.18%) were aware of the functional properties of common vegetables, and inculcate these in their daily diets. Results were similar to a study conducted in Allahabad where common functional foods such as tomato, garlic, etc. were consumed abundantly by college students (Verma et al., 2018). Contrary to this were findings of Ali and Rahut (2019) that highlighted, majority of the consumers lack in knowledge of functional foods so the frequency of their consumption is also low. Consumers who are suffering from any health related issue are more eager to consumer functional foods. Ares and Gámbaro (2007) mentioned that functional foods can be tailored for certain groups and might

not be accepted by all consumers.

Sharma and Jain (2021) assessed knowledge, attitude and practices of chefs towards healthy food preparation where they found favourable practices reported by chefs in selection of fruits and vegetables, encouraging use of healthy fat, referring to nutritional components of food items for planning menu, providing low calorie options in menu, incorporation of high fibre foods in menu. This is all possible when our today's consumers reflect self interest for their healthy living and thus curators become more responsible for their consumer overall health.

Table 6: Practices followed by consumers for functional food

Practices	Adults (n=56)	Middle Adults (n=45)	Total (n=101)
	n (%)	n (%)	n (%)
I make conscious efforts to inculcate superfruits like banana, amla, grapes, pears etc. into my daily diet	42 (75.00)	41 (91.11)	83 (82.18)
I would increase my intake of foods with documented health benefits	49 (87.50)	40 (88.89)	89 (88.11)
I make active efforts to shop for foods offering health benefits	43 (76.79)	35 (77.78)	78 (77.22)
I include grains like Ragi, Sorghum, Amaranth, Chia etc. in my diet	24 (42.86)	30 (66.67)	54 (53.46)
I encourage my friends and family to increase their intake of vegetables with specific benefits like pumpkin, bell peppers, cauliflower, carrots, brinjal etc.	45 (80.36)	38 (84.44)	83 (82.17)

On analyzing the correlation between KAP scores a positive correlation was seen to exist between knowledge and attitude scores ($r = 0.29$; $p = 0.03$) significant at 5% level of significance, attitude and practice ($r = 0.05$; $p = 0.69$), and between knowledge and practice ($r = 0.13$; $p = 0.33$) of adults which was found not to be significant at 5% level.

For middle adults, positive correlation was observed between knowledge and attitude scores ($r = 0.12$; $p = 0.43$), attitude and practice scores ($r = 0.14$; $p = 0.34$). however, since value of $p \geq 0.05$, the correlational scores are not significant at 5%

level of significance and negative correlation was observed between the scores of knowledge and practices ($r = -0.07$; $p = 0.64$). This negative value implies that there is an inconsistency between the knowledge and practices of middle adults. The relatively high practice score denotes that though the subjects are consuming functional foods, they don't have adequate knowledge about them, their potential health benefits and the sources. Thus, it can be seen that awareness of functional foods is associated with greater knowledge about them, more favourable attitudes towards them, along with increased consumption of them (Jeyasekaran, 2015). Hence awareness of consumer should be increased with the help of various channels of education and with the help of mass media.

Table 7: Correlation between knowledge, attitude and practice scores

Parameters	Correlation (r)	
	Adults (20-39 years)	Middle Adults (40-59 year)
Knowledge and Attitude	+ 0.29	+ 0.12
Knowledge and Practice	+ 0.13	- 0.07
Attitude and Practice	+ 0.05	+ 0.14

CONCLUSION

From a theoretical perspective, the current study extends our understanding of functional foods by empirically examining the subjects' knowledge, attitude, and practices. The findings indicated that present knowledge regarding functional foods among the sample population is quite low, and information regarding the health benefits of such foods needs to be marketed properly to boost their consumption. The results can be used to link the growing demand for functional foods in today's population with food & beverage outlets, to curate a specific menu highlighting various functional foods. This underexplored facet has promising further scope in the ever-growing body of literature. Finally, to build on this study, future research could conduct an empirical study to evaluate factors that influence the purchase and consumption of functional foods. Another tangent of research could be exploring the influence of sociodemographic factors in the consumption of functional foods. From a hospitality perspective, the sale of items highlighting functional foods in restaurants could also be studied to investigate the popularity

of functional foods in restaurant menus. As more consumers are opting for healthier food options without wanting to compromise on taste, the findings would be of particular interest to chefs and restaurant managers.

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