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CONSUMPTION OF FUNCTIONAL FOOD AND KNOWLEDGE OF ITS ATTRIBUTES: A QUANTITATIVE STUDY OF CONSUMERS IN PUNJAB PROVINCE, PAKISTAN

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ABSTRACT

The different scientific studies have identified the beneficial physiological role and effects of functional foods (FFs). No doubt the knowledge of nutrition is primarily important in addressing human physical and physiological health along with human wellness. The study is planned to explore the consumers' knowledge about the different attributes of FFs and their consumption pattern. A purposive multistage random sampling design was used for the selection of 400 consumers of FFs from four major cities of Pakistan. The shopping centers and consumers were randomly selected. The analysis demonstrates that about more than 30 percent of the consumers had knowledge to a great extent of perceived quality, appearance package, organoleptic, functionality, price and brand attributes and about 40 percent of the consumers had knowledge to some extent of these attributes. Analysis reflects that from 33 to 86 percent of consumers were using often modified cereals, oats, bread, canola oil, orange juice, grape juice, modified yogurt, milk fortified with vitamins, green tea, energy drinks, ginger, and turmeric. It is suggested that creating awareness and building confidence about FFs among consumers will be useful for promotion of FFs in Pakistan. As the elder family members are more concerned about their health, they should motivate their children to adopt good food habits which are imperative to improve their quality of life. The FFs providers and manufactures should equip their R&D department with the latest development in functional foods sector through coordinating food scientists, university food experts and industrialists for manufacturing the specific food products which are beneficial for human health.

Keywords: Functional Food (FF), Product Attributes, Consumptions, Reasoned Action Theory.

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INTRODUCTION

Basic role of food is to provide enough nutrients value to fulfill the nutritional requirements of human body. There is now increasing scientific evidence supporting that some foods and food components have beneficial psychological effects on human health. Now-a-days, nutrition knowledge has shifted from the basic concepts of nutritional adequacy and avoid from nutrient deficiency towards the "positive" or "optimal" concept of nutrition for the human being wellness. The focus of the research has moved towards the identification of biological active components in such food products which have benefits of optimizing mental and physical health and may minimize the risk of getting sick/disease. It has been found that many traditional and classical food products such as vegetables, soya, fruits, milk and whole grains contain such components which have potential health benefits. Such FFs are developed which are fortified or new to enhance the beneficial components for the human health and their wellness, or to fulfill the desirable mental and physiological effects on the human body ensuring good health and wellness, known as "Functional Food" (FF) (Siró *et al*., 2008).

FFs basically have a very long history. In the region of Asia, China, Japan and other Asian countries have a number of varieties of foods which traditionally have been linked with the specific health benefits. In western countries, a globally recognized brand, Coca-Cola begins its business as the FF manufacturer in early days of 20th century. What is perhaps of current origin is the growth of nutritional science backing of FFs. During the 2nd half of twentieth century, new nutritious insights emerged which allowed for the growth of beverages and food products with health benefit claims, based on specific scientific evidence (Weststrate *et al*., 2002).

Late 1960s the Reason Action Theory was introduced by Martin Fishbein and Icek Ajze. It analyzed the attitude that pre-exist in the process of decision making. Basic concept of is that action/attitude or behavior of the consumer depends upon the intention or expectation what he receives or creates from specific output or the result of the consumption. As the analysis elaborates that, consumers act rationally and make choice according to their interest and what suits them. When

expected results of the product seem to be attained by the consumer, then consumer take specific decision. Time from the consumer decide/think to buy till the complete action, consumer has the aptitude to change her or his mind and take different decision according to the behavior. As in the present study of FFs the consumers evaluate his or her experience in terms of positive and negative effects about the food which he or she takes. He/She makes questions him/herself how and to what extent that food is beneficial for the family wellness. This evaluation which is based on cognitive analysis and process of the information about FFs available to him or her he/she makes mind or behavior towards FFs (Ajzen, 2001; Green and Salkind, 2012).

MATERIALS AND METHODS

Cross-sectional survey had been conducted in four cities of Punjab namely Lahore, Faisalabad, Rawalpindi and Islamabad to interview 400 shoppers/respondents/consumers. The criteria for the selection of cities were size of population and presence of major shopping centers/superstores. These cities are highly populated and have major shopping centers/superstores where a large number of consumers carry their shopping. Lahore, Faisalabad and Rawalpindi are first, second and third populous cities of Punjab, Pakistan. Islamabad is capital of Pakistan and has all the major shopping centers. The shopping centers/superstores were selected randomly from the lists of major shopping centers/super stores. From each city 100 and from each store 25 shoppers/respondents randomly selected to explore the knowledge of shoppers about the attributes of functional foods and their consumption pattern. Descriptive statistical techniques and SPSS software were used to analyze the collected data (Green and Salkind, 2012).

The attributes of functional foods are of key importance in influencing the consumers' attitude and behavior towards that food. There are number of the attributes of the functional foods such as perceived quality, label, appearance and package, Organoleptic, functionality, brand and price attributes. Each attribute is based on the number of dimensions which are described in tables 1 to 6. Kraus (2015) placed importance on quality and label, Markovina *et al*. (2011) identified the importance of appearance, Verbeke (2006) highlighted the significance of organoleptic, Tuorila and Cardello (2002) placed importance on functionality, Hirogaki (2013) found the importance of price and brand attributes of FFs in influencing the attitude and behavior of consumers.

RESULTS AND DISCUSSION

Functional Foods Product Attributes: The knowledge of the consumers about perceived quality attributes of FF have been described in broader context of human health. Table 1 reveals that 48.3, 48.5, 46.8, 35.3 and 29.5 percent of the consumers had the knowledge about different perceived quality attributes like safe food, quality product, healthy product, trust in brand name and natural product with the mean 2.43, 2.33, 2.28, 2.15, 2.08 and standard deviation 0.588, 0.733, 0.760, 0.735, 0.713 values respectively. Table also indicates that majority of the consumers had knowledge about the perceived quality attributes of FF to some extent that is 71.5 percent for pure food with mean value 2.10 and standard deviation 0.526. 65.3 percent said that it is economical in use with mean value 2.15 and standard deviation 0.571. 65.5 percent indicated that it is a high technology product with the mean value 1.90 and standard deviation 0.579. The study of perceived quality attributes for the investigation of consumers behavior has been highlighted by number of studies (Markovina *et al*., 2011; Loizou *et al*., 2013; Kraus, 2015).

Table 1: Distribution of the consumers according to the knowledge about the perceived quality attributes of FF.

Perceived Quality Attributes of FF	Not at all		To some extent		To a great extent	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Pure product	38	9.5	286	71.5	76	19.0
Safe food	20	5.0	187	46.8	193	48.3
Trust in brand name	83	20.8	176	44.0	141	35.3
Economical in use	40	10.0	261	65.3	99	24.8
Quality product	63	15.8	143	35.8	194	48.5
Part of daily nutrition	94	23.5	204	51.0	102	25.5
Healthy product	75	18.8	138	34.5	187	46.8
High technology product	90	22.5	262	65.5	48	12.0
Natural product	87	21.8	195	48.8	118	29.5

No doubt the appearance of package can influence customers' or consumers attitude whether to buy or not. The material of the package is also very important. Nice, attractive and with good material can influence the customers/consumers buying decision making process. The appearance and packaging attributes of FFs has been identified as a determinant of FFs acceptance (Fiszman *et al*., 2015; Kraus, 2015). Table 2 indicates that most of the consumers had knowledge to some extent about the different attributes regarding appearance package. 55.5 percent of the consumers reported their knowledge about package to some extent with the mean 2.11 and standard deviation 0.66 values. 55.0 percent of the consumers viewed their knowledge about practical package to some extent with the mean of 2.09 and standard deviation 0.666 values. Regarding the consumers knowledge to great extent the worth mentioning attributes are package made of glass (34.5 percent), environmentally friendly package (32.8 percent), nice package (31.5 percent). The percentage almost the same for the aspects of attributes of FFs like package size, practical package, plastic package different package than the conventional product that is about 27 percent.

The organoleptic attributes[1] in terms of taste and other sensory dimensions have been investigated in different studies in the different parts of the world (Lawless *et al*., 2012; Loizou *et al*., 2013; Marina *et al*., 2014). The organoleptic attributes of FFs like aroma, taste, texture and color are very important in influencing the consumers' decision making process. Table 3 indicates that 39.3 percent of the consumers reported the knowledge to great extent about natural aroma with mean 2.18 and standard deviation 0.762 values. 43.0 percent of the consumers reported the knowledge to great extent of the nice taste attribute with mean 2.31 and standard deviation 0.675 values. 46.0 and 42.0 percent of the consumers had knowledge to great extent about the organoleptic attributes like specific texture and specific color respectively.

The importance of different attributes of FFs such as labeling has been argued in different studies (Dolgopolova *et al*., 2015; Kraus 2015; Oliveira *et al*., 2016). Table 4 shows 45.0, 50.8, 45.0, 57.3, 62.0, 36.8 percent of the consumers with mean 2.38, 2.41, 2.20, 2.50, 2.55, 2.25 and standard deviation 0.621, 0.665, 0.811, 0.633, 0.632, 0.648 values had knowledge to a great extent of different dimensions of label attributes such as information about health/functionality claims, nutritional value, quality assurance (e.g., ISO/HACCP)[2], best before date, packaging date, country of origin respectively.

The functionality attributes explored in this study are in-line with number of studies conducted in different times and at different locations (Loizou *et al*., 2013; Kraus, 2015). Functionality attributes of FF are very important because these link directly with human health. Knowledge about these attributes can enable consumers and customers to maintain their health. Table 5 shows that 41.8, 40.3, 40.0, 39.3, 39.3, 39.3, 38.8, 38.3, 37.5, 35.0, 34.8, 34.3, 31.8, 31.8 and 30.3 percent of the consumers had knowledge to great extent about the functionality attributes like necessary for personal wellbeing, added calcium, added vitamins and minerals, reduces cardiovascular disease risk, low saturated fatty acids content, removed dangerous ingredients, enforces body defense, contributes to good physical condition, antioxidant ingredients, provides more energy, provides proved health claims and low cholesterol level respectively with mean 2.28, 2.28, 2.25, 2.28, 2.23, 2.23, 2.22, 2.21, 2.26, 2.23, 2.10, 2.21, 2.13, 2.13, 2.09 and standard deviation 0.688, 0.672, 0.699, 0.651, 0.715, 0.712, 0.710, 0.716, 0.651, 0.629, 0.766, 0.660, 0.704, 0.700, 0.717 values respectively. Table also indicates that consumers' knowledge about these functionality attributes of FF to some extent ranges from 40.5 percent for antioxidant ingredients to 58.8 percent for added phosphor and contained pro-biotics.

Knowledge about Price: Knowledge about price is also important factor affecting buying behavior. It is generally accepted principle that FF of good quality with affordable price can have the positive impact on customers/consumers decision making process and the business growth of the FF. Table 6 indicates that 47.0, 42.3, 32.3 and 28.3 percent of the consumer's had the knowledge about FF attributes regarding price for value for money, price higher than the conventional product and price lower than the conventional product to great extent with mean 2.30, 2.26, 2.10, 1.94 and standard deviation 0.743, 0.718, 0.732, 0.789 values respectively. The price attributes are highlighted in the context of consumer preference and buying behavior by a number of researchers (Collins and Bogue, 2015; Ding *et al*., 2015; La Barbera *et al*., 2016).

Knowledge about Brand Attributes: The brand attributes of FFs is primarily important to win the trust of

[1] Organoleptic attributes can be defined as being perceivable by the senses, such as smell, appearance, taste and touch of the food.

[2] **ISO** Stands for International Standard and ISO standards and has been created to guarantee the safety of the global food chain

HACCP stands for Hazard Analysis and Critical Control Point System and is a food safety system that prevents food safety from being compromised.

customers /consumers if the brand has creditability. The food products of creditable brand companies like Nestle, Procter & Gamble, Unilever, National foods, Shan Foods, Fine Food, Menu have popularity in the market because of brand image and goodwill. Regarding the brand, the brand name known, producing companies and familiarity with the brand name are the key dimensions of brand attributes. Table 6 indicates that the consumers had the knowledge to great extent for these attributes, the percentages of these dimensions are 45.0, 39.5 and 50.0 percent with mean 2.32, 2.25, 2.31 and standard deviation 0.692, 0.697 and 0.769 values respectively. As it is discussed earlier the importance of brand attributes that links with the quality of the product and credibility of the manufacturers investigated also by the different scientists of FFs (Annunziata and Vecchio, 2013; Oliveira *et al*., 2016).

Table 2: Distribution of the consumers according to the knowledge about the appearance-package attributes of FF.

Appearance – Package Attributes of FF	Not at all		To some extent		To a great extent	
	Frequency	Percent	Frequency	percent	Frequency	Percent
Package size	68	17.0	222	55.5	110	27.5
Environmentally friendly package	80	20.0	189	47.3	131	32.8
Nice package	66	16.5	208	52.0	126	31.5
Practical package	72	18.0	220	55.0	108	27.0
Different package than the conventional product	92	23.0	198	49.5	110	27.5
Aluminum can package	141	35.3	177	44.3	82	20.5
Package made of glass	112	28.0	150	37.5	138	34.5
Plastic package	114	28.5	178	44.5	108	27.0
Paper package	157	39.3	148	37.0	95	23.8

Table 3: Distribution of the consumers according to knowledge about the organoleptic attributes of FF.

Organoleptic Attributes of FF	Not at all		To some extent		To a great extent	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Strong aroma	112	28.0	180	45.0	108	27.0
Natural aroma	87	21.8	156	39.0	157	39.3
Light aroma	84	21.0	186	46.5	130	32.5
Nice taste	48	12.0	180	45.0	172	43.0
Neutral taste	81	20.3	160	40.0	159	39.8
Specific texture	82	20.5	134	33.5	184	46.0
Specific color	66	16.5	166	41.5	168	42.0

Table 4: Distribution of the consumers according to the knowledge about the label attributes of FF.

Label Attributes of FF	Not at all		To some extent		Great extent	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Information about health/functionality claims	30	7.5	190	47.5	180	45.0
Nutritional value	40	10.0	157	39.3	203	50.8
Quality assurance (e.g., ISO/HACCP)	99	24.8	121	30.3	180	45.0
Best before date	30	7.5	141	35.3	229	57.3
Packaging date	30	7.5	122	30.5	248	62.0
Country of origin	46	11.5	207	51.8	147	36.8

Table 5: Distribution of the consumers according to the knowledge about the functionality attributes of FF.

Functionality Attributes of FF	Not at all		To some extent		Great extent	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Antioxidant ingredients	99	24.8	162	40.5	139	34.8
Removed dangerous ingredients	69	17.3	178	44.5	153	38.3
Fortified ingredients	50	12.5	189	47.3	161	40.3
Added calcium	44	11.0	199	49.8	157	39.3
Added vitamins and minerals	67	16.8	176	44.0	157	39.3
Added fibre	79	19.8	228	57.0	93	23.3
Added phosphor	89	22.3	235	58.8	76	19.0
Added functional ingredients	60	15.0	180	45.0	160	40.0

Low cholesterol level	87	21.8	192	48.0	121	30.3
Low saturated fatty acids content	66	16.5	179	44.8	155	38.8
Necessary for personal well being	54	13.5	179	44.8	167	41.8
Enforces body defense	46	11.5	204	51.0	150	37.5
Reduces cardiovascular disease risk	66	16.5	177	44.3	157	39.3
Provides more energy	54	13.5	209	52.3	137	34.3
Provides proved health claims	77	19.3	196	49.0	127	31.8
Contains probiotics	97	24.3	235	58.8	68	17.0
Contributes to digestion improvement	74	18.5	226	56.5	100	25.0
Contributes to vision improvement	95	23.8	210	52.5	95	23.8
Contributes to good physical condition	42	10.5	218	54.5	140	35.0
Contributes to osteoporosis prevention	75	18.8	198	49.5	127	31.8

Table 6: Distribution of the consumers according to knowledge about the price and brand attributes of FF.

Knowledge about Price						
Attributes	**Not at all**		**To some extent**		**To a great extent**	
	Frequency	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Value for money	68	17.0	144	36.0	188	47.0
Same price with conventional products	89	22.3	182	45.5	129	32.3
Price higher than the conventional product	64	16.0	167	41.8	169	42.3
Price lower than the conventional product	137	34.3	150	37.5	113	28.3
Knowledge about Brand Attributes						
Brand name attributes	52	13.0	168	42.0	180	45.0
Promotion campaign	58	14.5	243	60.8	99	24.8
Known producing company	60	15.0	182	45.5	158	39.5
Familiarity with the brand name	75	18.8	125	31.3	200	50.0

Cha *et al*., (2010), Henry, (2010) and Cornish, (2012) highlighted the importance of consuming FF in the context of human health. Table 7 reveals that majority 86.3, 56.3, 68.0, 55.0, 77.8 and 67.3 percent of the consumers' families consumed frequently bread, canola oil, orange juice, green tea, and ginger. The next category of the consumers less than 50 percent who reported modified cereal, oats, soybean oil, grape juice, modified yogurt, milk fortified with vitamin D and energy drinks and their percentages respectively were 36.8, 33.0, 24.0, 44.8, 43.3, 47.8 and 34.5 percent.

Table 7: Distribution of the consumers according to the FFs that consume most often.

Food Items	**Yes**		**No**	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Modified cereals	147	36.8	253	63.3
Oats	132	33.0	268	67.0
Bread	345	86.3	55	13.8
Rapeseed	24	6.0	376	94.0
Canola oil	225	56.3	175	43.8
Soybean oil	96	24.0	304	76.0
Orange juice	272	68.0	128	32.0
Grape juice	179	44.8	221	55.3
Modified yogurt	173	43.3	227	56.8
Milk fortified with vitamin D	191	47.8	209	52.3
Green tea	220	55.0	180	45.0
Energy drinks	138	34.5	262	65.5
Ginger	311	77.8	89	22.3
Turmeric	269	67.3	131	32.8
Others (vegetables, fruits, dry fruits, fish)	358	89.5	42	10.5

Conclusion and Recommendations: The overall knowledge of the consumers of different attributes of functional foods such as perceived quality, appearance and package, label, organoleptic, functionality, price and brand is encouraging. As each attribute of functional foods has number of dimensions and knowledge of these dimensions of functional foods attributes is also very reasonable. The sensory attributes like taste, texture, and aroma which are key dimensions in relation to acceptance of function foods, their knowledge is also encouraging.

The functionality attributes are linked with human health and its knowledge plays a pivotal role and shaping customers' attitude and behavior that influences their decision to use or not to use the functional foods. The knowledge of especially the dimensions like anti-oxidant ingredients, fortified ingredients, added calcium, vitamins and minerals, fibers, low saturated fatty acids contents, minimizing cardiovascular diseases is worth mentioning. A substantial number of the consumers were consuming functional food keeping in view its physical and physiological health benefits. It is can be said that the use of FF really can change the life style of the consumers shifting to the healthy eating style. The findings of the research are in line with the theory of reasoned action. Consumers made up their mind and develop attitude to learn about FF keeping in view their interest in the health benefits of that food. Finally, they have taken action to use or consume FFs.

It is suggested that building confidence and creating awareness about FFs will be useful for the promotion of functional food in Pakistan as the role of functional foods in minimizing the risk of a number of chronic diseases such as heart disease, cancer, diabetes, hypertension, arthritis, immunity, bone health/osteoporosis, eye health, bowel health/constipation with empirical support has been advocated. As the elder family members are more concerned about their health so they should motivate their children to adopt good food habits which is imperative to improve their quality of life. The FFs providers and manufactures should equip their research and development department with the latest development in FF sector through coordinating with food scientists, university food specialists and industrialists for manufacturing the specific food products which are beneficial for human health.

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