

A Study of Nutritional Awareness of Jordanians' Consumers towards Functional Foods

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Abstract

The functional food industry has expanded yet research into consumer perceptions of functional foods is limited. This study was carried out to investigate consumers' awareness, acceptance and attitudes towards functional foods in Jordan. Six hundred and twenty eight Jordanian consumers were randomly recruited at shopping areas, universities and public places. 55.8% of this population sample was male and 44.2% were female, and they were aged between 18 and 70 years. A questionnaire consists of three parts was given to participants to fill it by themselves. It was shown in this study that 74.4% of participants had used olive oil, 55.6% of the participants had used herbal tea, and 37.3% of the participants had used bread with whole grain. The results show that older respondents were 4.233 times more aware of functional food than younger respondents. Also, it was shown that the female respondents were 3.176 times more aware of functional food than the male respondents. Similarly, the likelihood of respondents having awareness of functional food was 2.237 times greater among those who had a higher educational level than among those with a lower educational level. Consumers who used vitamin supplements were 1.831 times more aware of functional food than other consumers. Also, the likelihood of their awareness of functional food was 2.532 times greater among respondents who had a higher income than among those with a lower income. Participants scoring high on the reward from using functional foods were more likely to have consumed milk fortified with calcium, bread with whole grain, and olive oil than participants with low scores. On the other hand, respondents scoring high on the taste of functional foods were more likely to have consumed fruit juices fortified with vitamin C, yoghurt with probiotics, eggs with increased omega-3, breakfast cereals fortified with vitamins and minerals, and herbal tea than participants who scored low. As a conclusion, this study has shown that socio-demographic characteristics such as age, education and income levels, and prices are important indicators that influence consumers' awareness and consumption of functional food. These results suggest that this type of knowledge could affect consumers' interest in functional foods and therefore educational strategies might be necessary to encourage the consumption of functional foods.

Keywords: Functional food, awareness, acceptance, attitude, probiotics, fortified

1. Introduction

The term "functional food" itself was first used in Japan, in the 1980s, for food products fortified with special constituents which have advantageous physiological effects (Stanton et al., 2005). In 1991, the Ministry of Health introduced rules for approval of a specific health-related food category called FOSHU (Food for Specified Health Uses) which included the establishment of specific health claims for this type of food (Burdock et al., 2006). There is no doubt that the Japanese interest in functional foods has also brought awareness for the need of such products in places like Europe and the United States. Experts in these countries realized that functional food might give a commercial potential for the food industry. Eastern and Western cultures however, diverge considerably regarding the nature of functional foods. In Japan, for example, traditional functional food tends to be regarded as a distinct class of product that after approval a "FOSHU" symbol can be displayed on the food label. In the case of such products (often referred as first generation functional foods), function is superior compared to taste. In Europe and USA, the question is more about a concept and consequently the functional food means adding functionality to an existing traditional food product (often a mainstream product), and such food products do not create a separate group (Kotilainen et al., 2006). Interestingly, a food marketed as functional contains added, technologically developed ingredients with a specific health benefit (Niva, 2007).

Despite that the term "functional food" has already been defined several times (Roberfroid, 2002), but there is no unitary accepted definition for such foods (Alzamora et al., 2005). In most countries there is no legislative definition of the term and drawing a border line between conventional and functional foods is challenging even for nutrition and food experts (Mark-Herbert, 2004; Niva, 2007). Until now, a number of national authorities and academic bodies have proposed definitions for functional foods. These are ranges from the very simple to the more complex (Bech-Larsen & Grunert, 2003). The amount of intake and form of the functional food should be as it is normally expected for dietary purposes. Therefore, it could not be in the form of pill or capsule just as normal food form" (Diplock et al., 1999). On the contrary to this latter statement, since 2001 FOSHU products in Japan are shaped in the form of capsules and tablets, although a great majority of products are still in more conventional forms (Ohama et al., 2006). On the other hand, European legislation does not consider functional foods as specific food categories, but rather a concept (Stanton et al., 2005).

The relationship between nutrition and health has transformed over the past century. Focus has shifted from the ability of nutrients to prevent deficiency diseases to the ability of nutrients in the prevention of chronic disease and optimization of health (Paulionis, 2008). The identification of physiologically active compounds in some foods that have potential to lower the risk of chronic disease and promote optimal health, along with increased consumer interest in self-care, advances in food regulations and innovation in food technology have allowed for the introduction of health-promoting food products (Arvanitoyannis et al., 2005). Consumers are of the opinion that foods are closely related with their health (Mollet and Rowland 2002; Young 2000). Functional foods are demonstrated to affect beneficially one or more target functions in the body, beyond adequate nutritional effects, in a way that is relevant to either improved state of health and well-being and/or reduction of risk of disease (Hailu et al. 2009). Functional foods may improve the general conditions of the body (e.g. pre- and probiotics), decrease the risk of some diseases (e.g. cholesterol-lowering products), and could even be used for curing some illnesses. Different demographical studies showed that because of the high expensive of the medical service of the aging population, there is strong demand for these products (Siro et al., 2008). The market for such these functional foods in industrialized countries has expanded rapidly because manufacturers become able to make health claims about the health benefits of functional ingredients (Verbeke 2005; Hailu et al., 2009). Functional food industry is experiencing rapid economic and innovative expansion (Cinnamon, 2009). However, the long-term marketplace success of functional foods is almost dependent on consumer acceptance, attitudes and perceptions towards such products (Verbeke, 2005; Ares et al., 2008).

In recent years, both market and academic research have reported the rising awareness and interest of consumers in health matters and functional foods in general (Urala and Lähteenmäki, 2004). These factors are: (1) recognition of the role of food in the preservation of health (Krystallis *et al.*, 2008); (2) the increase in life expectancy; and (3) increasing costs of health care (Menrad, 2003). Another major trend that has emerged in the food markets of industrialized countries in the last decade is a growing consumer interest in food products that may alleviate the symptoms of ageing and illness (Siró *et al.*, 2008). At the same time, increasing healthcare costs in most of these countries (Ziebarth, 2011) – mainly due to major public health issues such as obesity, cardiovascular diseases (CVDs), age-related cognitive decline, metabolic syndrome, insulin resistance and diabetes (Green and van der Ouderaa, 2003) – have helped to foster the development of food products with additional health benefits based on their functional ingredients.

A problem with functional food is that awareness differs from region to region. Therefore, studies can show different results depending on the geographical region (Carrillo et al. 2013; Schutz 2011). For example, a study made by Schutz (2011) showed the general awareness level among consumers, on functional food benefits, was low. In contrary, Ozen et al. (2012) stated that it was commonly known among Swedish consumers what functional food is. Another study showed that even though consumers know what functional food is, they have trouble identifying the different types of functional foods (Spence 2006). Consumers do not think of functional foods as a homogeneous product group, and so this makes the attitudes that consumers hold differ greatly depending on what functional food product you ask about (Lähteenmäki and Urala 2007; Branderhorst et al. 2003). Based on this previous research into attitudes towards functional food and the differentiation in consumer behaviour from region to region (Carrillo et al 2013; Schutz 2011) a research gap was found, allowing for the following purpose to be defined. To date, research regarding consumer awareness and attitude toward functional foods has been limited. More studies are therefore needed for specific regions in order to get a better understanding of each regional market so that marketing efforts can be carried out with higher efficiency (Batterham 2008). The aim of this study was to investigate consumers' awareness, acceptance and attitudes towards functional foods in Jordan.

2. Methods

2.1 Participants

Data were collected through a survey with 628 Jordanian consumers between April 2016 and September 2016. Participants were randomly recruited at shopping areas, universities and public places. The study was conducted in Amman, the capital city of Jordan. Participants were given the questionnaire and asked to fill it in by themselves to minimize the influence of the interviewer. All respondents were interviewed face to face by researchers. Simple instructions explaining the purpose of the study were printed on the front of the questionnaire. The average completion time for each questionnaire was 30 min.

2.2 Questionnaires

The data collection questionnaire was made up of three parts. The first part asked about socio-demographic characteristics. The second part comprised questions about the experience of the participant and included items concerning the participant's experiences of functional foods. In this part, two questions were asked to the participants. The first question was: 'Have you used this product before?' Participants answers were as follows: 'I have been using this product on occasion', 'I know this product but I don't use it' or 'I do not know this

product'. We also asked the second question: 'Do you intend to use these products in the future?' This item was rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The third part deals with the participant's acceptance of functional foods. The questionnaire is a self-report inventory for which participants responded to 32 items on a 5-point Likert scale.

The questionnaire of consumer attitudes towards functional foods was developed by Özdemir *et al.* (2009). The seven dimensions scored by the questionnaire are (1) rewards from using functional food; (2) benefits of functional food; (3) confidence in functional food; (4) necessity of functional food; (5) functional food as medicine; (6) taste of functional food; and (7) information about functional food. Examples of items were: 'I get pleasure from eating functional foods' (reward from using functional food); 'Functional foods are needed by people who have specific health problems' (benefits of functional food); 'Functional foods are science-based top products' (confidence in functional food); 'Functional foods promote my well-being' (necessity of functional food); 'Functional foods are needed by people who have specific health problems' (functional food as medicine); 'I am prepared to compromise on the taste of a food if the product is functional' (taste of functional food); and 'I try to learn information about functional foods' (information about functional food). Internal consistency coefficient (Cronbach's alpha) and test-retest reliability of the questionnaire for Jordanian sample were 0.78 and 0.60 respectively. The questionnaire demonstrated good internal consistency and reliability in the sample (Cronbach's coefficient $\alpha = 0.92$).

2.3 Statistical analysis

To accomplish the objectives of this study, descriptive statistics and a binary logistic model were applied to analyse the information gathered in the questionnaires. Descriptive statistics was used to identify the respondents' socio-economic characteristics. Because the objective of the study was to investigate the extent to which Jordanian consumers are aware of functional food, a binary logistic model was used to determine to what degree selected socio-economic demographic variables and attitudes influence consumers' awareness of functional food. All of the explanatory variables have the value of 0 or 1 to show the effect of the categorical variables on consumers' awareness of functional food. Statistical analyses of the coded questionnaire data were performed using SPSS version 22.0 SPSS 22.0 (SPSS Inc., Chicago, IL, USA).

3. Results

Six hundred and twenty eight people participated: 55.8% were male and 44.2% were female. Participants ranged in age from 18 to 70 (mean 38.3 years, standard deviation 12.6 years). Table 1 shows the characteristics of the 628 consumers by age, gender, educational background, and disease status. Most (60.4%) of the consumers were aged between 25 and 40, while 61.6% had been educated to the university level or more. Around fourth of respondents were suffering from chronic diseases.

According to the results (Table 2), 74.4% of participants reported that they had used olive oil, 55.6% of the participants mentioned that they had used herbal tea, 37.3% of the participants reported that they had used bread with whole grain. A total of 60.3% of the participants reported that they had known about yoghurt with probiotics but never experienced it before. Likewise, 52.2% of participants gave the same answer for fruit juices fortified with vitamin C, 50.4% for bread with whole grain, 48.7% for milk fortified with calcium, 43.8% for breakfast cereals fortified with vitamins and minerals, 42.1% for herbal tea, and 40.4% for eggs with increased omega-3. According to the information from participants, 46.0% of them had no idea about eggs with increased omega-3, 35.6% did not know about milk fortified with calcium, and 31.4% had not heard of breakfast cereals fortified with vitamins and minerals. When we asked the participants who had never used certain products before or had no idea about them if they would use these products in the future, 12.2% of them said that they will not use yoghurt with probiotics and 11.4% of them will not use milk fortified with calcium. On the other hand, participants remained indecisive about the following products at the following rates: 43.3% of them about eggs with increased omega-3, 40.2% about yoghurt with probiotics, 37.79% about milk fortified with calcium, 24.4% about breakfast cereals fortified with vitamins and minerals, and 23.9% about herbal tea. Additionally, 33.1% of participants answered the same question as they agreed to use breakfast cereals fortified with vitamins and minerals in the future.

A binary logistic model was used to determine the extent to which selected socio-demographic characteristics (gender, education level, age) and other characteristics (status of diseases, vitamin use, income) influenced consumers' awareness of functional food. Table 3 shows the estimated logistic model for consumers' awareness of functional food. Certain selected socio-economic demographic factors and consumer attitudes were found to be relevant in explaining consumers' awareness of functional food. The results show that older respondents were 4.233 times more aware of functional food than younger respondents. Also, it was shown that the female respondents were 3.176 times more aware of functional food than the male respondents ($P < 0.05$). Similarly, the likelihood of respondents having awareness of functional food was 2.237 times greater among those who had a higher educational level than among those with a lower educational level ($P < 0.05$). Consumers

who used vitamin supplements were 1.831 times more aware of functional food than other consumers ($P > 0.05$). Also, the likelihood of their awareness of functional food was 2.532 times greater among respondents who had a higher income than among those with a lower income.

Odds ratios (OR) from the logistic regression are displayed in Table 4. Participants scoring high on the reward from using functional foods were more likely to have consumed milk fortified with calcium, bread with whole grain, and olive oil than participants with low scores. Respondents scoring high on the benefits of functional foods were more likely to have consumed yoghurt with probiotics, bread with whole grains, olive oil, and herbal tea than participants who scored low. Regarding the dimension of confidence in functional food; the participants scoring high on this point were more likely to have consumed yoghurt with probiotics and eggs with increased omega-3 than participants with low scores. On the other hand, respondents scoring high on the taste of functional foods were more likely to have consumed fruit juices fortified with vitamin C, yoghurt with probiotics, eggs with increased omega-3, breakfast cereals fortified with vitamins and minerals, and herbal tea than participants who scored low. Finally, the respondents scoring high regarding looking for information about functional foods were more likely to have consumed yoghurt with probiotics, eggs with increased omega-3, and breakfast cereals fortified with vitamins and minerals than participants with low scores.

Table 1. Some characteristics of the respondents (n=628)

	n (628)	%
Age		
<25	71	11.3
25-40	379	60.4
40-50	96	15.2
>50	82	13.1
Education		
Secondary certificate or less	241	38.4
University level or more	387	61.6
Gender		
Male	350	55.8
Female	278	44.2
Status of disease		
Yes	165	26.2
No	463	73.8

Table 2. Participant's experiences about some of the local functional foods

	I have been using this product on occasion (%) n	I know this product but I don't use it (%) n	I do not know this product (%) n	I use this product in the future (%) n				
				Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Fruit juices fortified with vitamin C	28.1 (176)	52.3 (328)	19.7 (124)	6.2 (39)	10.3 (65)	20.6 (129)	24.4 (153)	2.2 (14)
Yoghurt with probiotics	11.4 (72)	60.3 (378)	28.3 (178)	12.2 (77)	15.6 (98)	40.2 (252)	13.3 (84)	1.8 (11)
Milk fortified with calcium	15.7 (98)	48.7 (306)	35.6 (224)	11.4 (72)	14.8 (93)	37.7 (237)	14.2 (89)	4.2 (26)
Eggs with increased omega-3	13.6 (85)	40.4 (254)	46.0 (289)	6.6 (41)	18.2 (114)	43.3 (272)	21.5 (135)	3.3 (21)
Bread with whole grain	37.3 (234)	50.4 (317)	12.3 (77)	4.6 (29)	11.2 (70)	18.6 (117)	22.9 (144)	10.2 (64)
Breakfast cereals fortified with vitamins and minerals	24.8 (156)	43.8 (275)	31.4 (197)	4.6 (29)	10.9 (68)	24.4 (153)	33.1 (208)	4.6 (29)
Olive oil	74.4 (467)	23.5 (148)	2.1 (13)	1.6 (10)	3.3 (21)	14.5 (91)	4.4 (28)	0.1 (1)
Herbal tea	55.6 (349)	42.1 (264)	2.3 (15)	2.6 (16)	7.6 (48)	23.9 (150)	11.5 (72)	1.8 (11)

Table 3. Estimated logit model for consumers' awareness of functional food

	B	Standard error	Significant level	Exp (B)
Age	1.220	0.249	0.000	4.233
Education	0.437	0.177	0.041	2.237
Gender	1.370	0.316	0.000	3.176
Status of disease	0.356	0.218	0.037	1.674
Vitamin use	0.326	0.182	0.318	1.831
Income	1.177	0.382	0.000	2.532

The dependent variable was split into two categories that were 'respondents are aware of functional food' coded as 1 and otherwise was coded as 0. Age (0, below 25; 1, above 26), educational level (0, secondary certificate or less; 1, university or more), Gender (0, male; 1, female), status of disease (0, no; 1, yes, vitamin use (0, no; 1, yes), income (0, high; 1, low).

Table 4. Odds ratio (OR) for the seven attitude dimensions

	Fruit juices fortified with vitamin C	Yoghurt with probiotics	Milk fortified with calcium	Eggs with increased omega-3	Bread with whole grain	Breakfast cereals fortified with vitamins and minerals	Olive oil	Herbal tea
Reward from using FF								
Low score								
High score	0.313	0.288	0.441*	0.421	0.896*	0.793	0.564*	1.111
Benefits of FF								
Low score								
High score	1.542	0.961*	0.956	0.877	1.772*	1.322	1.798*	0.697*
Confidence in FF								
Low score								
High score	1.188	1.156*	1.245	0.869*	1.012	0.802	0.977	1.016
Necessity for FF								
Low score								
High score	0.286*	0.456	0.569*	1.073	0.673	0.774	0.707	0.847
FF as medicine								
Low score								
High score	0.768	0.963*	0.729	1.312	0.823*	0.821	1.119*	0.737*
Taste of FF								
Low score								
High score	1.577*	0.796*	1.703	0.623*	4.823	1.600*	2.532	1.867*
Information about FF								
Low score								
High score	1.731	2.784*	0.641	3.112*	1.897	1.436*	1.108	1.202

CI, confidence interval; FF, functional food; OR, odds ratio, *p<0.05.

4. Discussion

Previous studies vary widely in terms of their focus (consumer awareness of the concept, attitude towards functional foods, acceptance, choice) and the methodologies used (qualitative or exploratory vs. quantitative or conclusive). From this range of studies, socio-demographic characteristics and cognitive and attitudinal factors have emerged as potential determinants of consumers' acceptance of functional foods (Verbeke, 2005). In particular, some demographic variables such as gender, age and education may have some influence on food choice behaviour and functional food acceptance (Gastón and Gámbaro, 2007).

Consumer knowledge and perceptions regarding diet and health have become crucial in view of the growing concerns about the impact of one's diet impact on overall health (Hasler, 2000). As stated by Urala and Lähtenmäki (2007), consumers might only consider consuming functional foods if they are perceived healthier

than their conventional alternatives. Thus, in order to consider consuming a food product enriched with a certain functional ingredient, consumers need to be aware of its potential health benefits. The choice and actions related to food taken by consumers have been indicated as determining factors in improving and maintaining health status. Although the predominant focus has been on broad dietary changes, the beneficial effects of functional foods in improving the state of health and/or reduction of risk of disease (Roberfroid, 2000; Menrad, 2003) have triggered interest in understanding consumer knowledge alongside attitudes and perceptions towards functional foods. In terms of acceptance criteria for functional food, among the most important are consumers' socio-demographic characteristics such as gender, education and age (Stojanovic *et al.*, 2013).

The literature shows that female consumers are more promising target group for functional foods than men (Urala, 2005). Similarly, bivariate analyses point towards a higher probability of acceptance of functional foods among female consumers. Also, in the current study, older consumers were more aware of functional foods than younger consumers. Concerning age, Poulsen (1999) mentions that relatively older participants in his research (i.e. older than 55 years) showed a greater intention to buy functional foods. Bhaskaran and Hardley (2002) further suggest that individuals of older age show different attitudes with regard to health claims and the type of 'functionality' compared with younger consumers. Urala (2005) also supports the idea that elderly consumers put more emphasis on the results of food consumption relevant to the prevention of a disease than do younger consumers. This fact is also supported by Bogue and Ryan (2000), who argue that elderly consumers pay greater attention to health claims like a decreased probability of cancer, while younger consumers pay more attention to claims about increased energy levels. Of the socio demographic explanatory variables affecting consumers' frequency consuming functional foods, education and the economic standard of the household have a significant influence. Consumers with a higher educational level and higher income bought functional foods more often in our study, which supports some of the previously published data (Hilliam, 1996; Verbeke, 2005). In our study, having a higher educational level, higher income level and being a woman increased both the purchase and awareness of functional foods. According to Niva (2006), high levels of education can explain the consumption of certain products.

In our study, respondents who perceived the use of functional foods as personally rewarding and as beneficial in general had an interest in olive oil, bread with whole grain, and milk fortified with calcium. Results from a recent Finnish study (Urala and Lähteenmäki, 2007) showed that consumers with a general interest in health have a positive attitude towards functional food and perceive the foods as necessary, rewarding to consume and health promoting. An excellent explanation for high consumption of olive oil and bread with whole grain in Jordan is that high percentage of Jordanian people is at risk of having diabetes and other chronic diseases. For example, in Jordan high prevalence of type II diabetes mellitus was found by Ajlouni *et al.* (1998), in which the overall prevalence was 13.4% in males and 12.5% in females of the age group ≥ 25 years. The prevalence of impaired glucose tolerance was 9% in males and 10.3% in females of the age group ≥ 25 years. However, the overall incidence of type 2 diabetes among Jordanians (≥ 25 years) was reported as 6.8% in 1996 (MOH/HKJ, 1996). Organoleptic attributes, especially taste, are some of the most important factors that affect consumers' choice of functional foods (Krystallis *et al.*, 2008). In the current study, participants scoring high on taste were more likely to have fruit juices fortified with vitamin C, yoghurt with probiotics, eggs with increased omega-3, breakfast cereals fortified with vitamins and minerals, and herbal tea than participants who scored low. Tuorila and Cardello (2002) reported that the off-flavour severity of a functional product decreases the likelihood of its consumption, irrespective of any persuasive claims about the advantages of its consumption. Recently, the potential role of functional foods and nutraceuticals as a means of reducing the risk of certain diet related diseases has been recognized (American Dietetic Association, 2004). In our study, participants scoring high on the use of functional food as medicine were more likely to have yoghurt with probiotics, bread with whole grain, olive oil, and herbal tea. Apparently, consumption and acceptance of functional food is more likely if there is illness in the family or among relatives (Verbeke, 2005). This indicates that the use of functional food, at least for some consumers, is not for the purpose of prevention or reduction of disease risk but rather for the medicine-like or therapeutic abilities claimed by some functional foods (Landström, 2008).

5. Conclusions

This study has shown that socio-demographic characteristics such as age, education and income levels, and prices are important indicators that influence consumers' awareness and consumption of functional food. From this point of view, companies should perform informative and demand-stimulating marketing strategies. The most important goal of functional food manufacturers should be to teach and educate consumers about their products, the ingredients used in them and their corresponding health benefits. These results suggest that this type of knowledge could affect consumers' interest in functional foods and therefore educational strategies might be necessary to encourage the consumption of functional foods. As a result of this, manufacturers can increase sales while also helping consumers take better care of them. Working with expert/doctors could also affect the preference of consumptions of functional foods by giving accurate and efficient information related with specific

health issues – for example, in relation to digestion – can alleviate their symptoms with the use of functional foods. Furthermore, as well as their health effects of functional foods, packages and taste are important change the consumption rate of functional foods. Food engineers play a part of the improving taste and texture of functional foods. As a result of these functional manufacturers invest into research and development studies and also follow technical and scientific developments.

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