

CONSUMER AWARENESS FOR FOOD SAFETY IN TURKEY

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Abstract

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The main objective of this study is to determine the level of consumer awareness about food safety in Izmir, one of the biggest provinces in Turkey. The data is obtained from a survey of 385 consumers in Izmir, between April-2004 and February-2005. According to probit models, high income and education as well as the presence of elderly individuals in the house increase the probability of having knowledge on food safety. Likewise, probability of married consumers with knowledge about food safety and high level of education, of being affected by food scandals is high. It is concluded that, increased awareness of food safety pass through informative campaigns targeting especially low- and middle-income groups and masses with low education levels, and through endeavours of improving the levels of education and welfare.

Key words: Food safety, consumer behaviour, probit model

Introduction

During the process of globalization, the borders among the markets of agricultural-food products have disappeared and technological innovations have taken their place in food sector while an increase is observed in the number of food-based illnesses. Also with the effect of the declarations of food scandals, which occur from time to time, to the whole world by means of the media, consumers have become more sensitive to food safety. On the wide mentions of such scandals in the media, many consumers have begun to lose their trust in the production system and public institutions on guaranteeing food cleanness.

The economic burden resulting from the dis-

eases caused by foods on the health systems and the productivity losses they cause are at significant levels (Gil et al., 2002; Banati, 2003). Being the most recent food safety scandal in Turkey, the Avian Influenza has had negative effects on the economy (Saghaian et al., 2007; USDA, 2005). This epidemic caused both the poultry sector to experience an economic crisis and the low-income families to be deprived of this alternative source of protein. Besides, the poultry rising in the rural areas for self-consumption has reached the point of disappearance. If the effects on health and tourism sectors and even on foreign trade are added, it is clear that the economic loss has not been low.

Other than the economic losses, consumers in Turkey, like in the world, are affected by such

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health scandals and they lose their trust in foods. Some researches, carried out in Turkey, put forth that consumers have been affected by food scandals such as BSE (Akgungor and Miran, 1997) and Avian Influenza (Goktolga and Gunduz, 2006). It is identified that consumers really begin to be more sensitive and selective about food preferences. During food shopping, consumers attach importance to the nutritional values of products and to the absence of additives rather than the price; and they think that fresh fruits and vegetables have lost reliability in terms of their tastes and health compared to the past Akgungor et al. (1999). It is possible to interpret this in the way that consumers have made certain changes in their consumption habits against the increased loss of trust.

In parallel with the increasing importance of the issue of food safety, strict food safety laws were formed in the whole world, the developed countries ranking the first, and brought into force; and auditing systems were established. Although significant progress has been achieved in Turkey legally, health problems especially resulting from poor functioning of the auditing system have a negative effect on the confidence of the consumer to food products. Researches carried out in the developed countries put forth that regaining the confidence of the consumer that is lost due to the health scandals is difficult even in the event that the fulfilment of legal requirements is followed. Awareness of the consumer about the developments in food safety may only be raised through information programmes tailored to their needs. In these countries, a flow of information is provided for both food producers and the official and civil authorities related to the issue via countless researches on the opinions and behaviour of consumers about food safety and it is endeavoured to develop strategies so as to overcome unreliability. Research reveals that, as a result of these precise efforts, confidence of the consumer might be recovered (Goodacre et al., 1999; Rohr et al., 2005).

Nevertheless, researches on food safety based

on the consumer behaviour in Turkey are quite limited. So, the issues of food safety and consumer behaviour need to be further investigated in Turkey. With this study, it is targeted to contribute in elimination of this deficit. The main objective of the study is to analyze the attitudes and behaviour of consumers in Izmir towards food safety. Within this framework, the factors affecting the level of knowledge of consumers about food safety and the degrees of their sensitivity to scandals about foods are specified.

Materials and Methods

The data obtained from a survey carried out in the period of April 2004-February 2005 in order to specify the attitudes and behaviour of consumers in Izmir, one of the three biggest provinces in Turkey, about food safety constitute the main material of this study. The households residing within the borders of Izmir Metropolitan Municipality have constituted the population. Using the census data of the Turkish Statistical Institute and assuming that an average household is composed of 4 people, it is estimated that there are 558 066 households in total at the city centre of Izmir. The number of consumers to participate in the survey is found out to be 385 by utilizing the proportional sampling method Newbold (1995). The questionnaires were filled by face-to-face interviews with consumers.

Five point Likert scales (1: I am completely against; 5: I completely agree and etc.) were used for the close-ended questions concerning the attitudes and behaviour of consumers towards food safety.

The factors, which affect the levels of knowledge of consumers about food safety and their degrees of sensitivity to scandals concerning foods, were studied by the help of the *probit models*. Variables with Likert scale, which were used for measuring the attitudes and behaviour of consumers about food safety, to be used in the probit models, could create an endogeneity problem. Therefore, the relating data were turned into basic factors by the

help of factor analysis, and the factor scores, which were reduced in number, were used in modelling. The probit model is a discrete choice model, the parameters of which are nonlinear. The objective of this model is to relate the choice probability P_i , which is the dependent variable, with independent variables in such a way that P_i will be between 0-1. In the probit model, a benefit index I_i is developed for each observation (Equation 1):

$$I_i = \beta_1 + \beta_2 x_{i2} + \dots + \beta_k x_{ik} \quad (1)$$

It means that the higher I_i is, the higher the benefit to be obtained by the individual i from the choice of $y_i = 1$ will be. The general form of the probit model is presented in Equation 2.

$$P_i = F(I_i) = F(\beta_1 + \beta_2 x_{i2} + \dots + \beta_k x_{ik}) = F(x_i' \beta), \quad (2)$$

where $F(I_i)$ is the cumulative probability function of the standard normal (0,1) random variable I_i . In the probit model, estimators are obtained by ML (maximum likelihood) method Gujarati (1995).

Results and Discussion

Demographic Characteristics of Consumers

Approximately half of the consumers interviewed are of ages between 30 and 49. About 84.6 % are married and 66 % are women. While 40 % of them are primary school graduates, 23.2 % are high school graduates and 11.6 % are university graduates. A group of about 80 % has an education level between primary school and high school. The consumers interviewed are around 40 years old on average and both they and their husbands/wives received approximately eight-years of education. When the families of the consumers are examined on the basis of age groups, they are concentrated between the ages 15-29 with a share of approximately 33 % (Table 1).

The number of people residing in the house is 3.78 on average. It is found out that 25.8 % of the consumers have a monthly total income below TRY 500, and approximately half of them have a monthly total income of TRY 500-999. The average monthly household incomes of consumers and food expenses are TRY 754 and TRY 319 respectively.

Knowledge Levels of Consumers concerning Food Safety

A total of 62.3 % of the consumers, with whom the questionnaire was carried out, expressed that they know what "food safety" is; whereas the remaining 37.7 % expressed that they don't. The majority of the consumers expressing that they have knowledge about this matter said that safe food refers to healthy food. The formation of such a bond between nutrition and health shows that the information reaching consumers on food safety via various sources has to some extent reached its target, and that consumers have begun to become conscious. Healthy production environment, cleanness or hygiene, freshness or the fact that the expiry date is not over, certificate of warranty, reliable labels, standards, quality control and auditing are among the issues that consumers, who tried to define food safety, have mentioned frequently. A limited number of consumers defined food safety as products of high nutritional value, non-poisonous products, quality products, production that harmonizes with the environment, sound marketing and shopping environment, hormone-free production, reliable food, pesticide-free production, the amount of additives, ecological production, brand, being conscious of what is eaten and balanced nutrition.

Consumers stated that they want to be informed more and properly about the foods that are available in the market. Of all the consumers having participated in the questionnaire, 75 % stated that they were informed about food safety from television, 36 % from published materials such as journals and newspapers, 28 % from what they heard from around, 25 % from doctors and experts,

Table 1
Demographic characteristics of consumers

Demographic characteristics	Class	Number	%
Age ^a	17-24	42	11
	25-29	54	14.2
	30-39	101	26.5
	40-49	95	24.9
	50-59	57	15
	60+	32	8.4
Gender	Female	254	66
	Male	131	34
Marital status ^b	Married	323	84.6
	Single	59	15.4
Education level ^c	Illiterate	9	2.4
	Literate	8	2.1
	Primary school	152	40
	Secondary school	64	16.8
	High school	88	23.2
	University student	15	3.9
Distribution of individuals residing in houses according to age groups	University	44	11.6
	0-6	127	11.9
	Юли.14	196	18.3
	15-29	348	32.5
	30-49	238	22.2
Household Income ^d	50+	162	15.1
	Below TRY 500/month ^e	74	25.8
	TRY 500–999/month	142	49.5
	TRY 1000-1499/month	43	15
	TRY 1500-2999/month	27	9.4
	TRY 3000/month and above	1	0.3

^a Reply was not received in this question from 4 consumers.

^b Reply was not received in this question from 3 consumers.

^c Reply was not received in this question from 5 consumers.

^d Reply was not received in this question from 98 consumers.

^e Turkish Lira. As of February 2005: 1\$ = 1.3084 TRY

15 % from the radio, and 8 % did not reply this question.²

Anxiety Levels of Consumers about Food Safety and Their Behaviour Concerning this Matter

So as to understand if consumers are affected more intensively from the current food scandals, also with the contribution of the media, than they were previously; they were asked “whether they are more anxious than they were previously” about “the general safety of foods”. The majority of the consumers (72.2 %) stated that they are far more anxious about food safety than they were previously. The ones being anxious at the same level with the past are around the rate of 19.7 %. The ones, who stated that they are less anxious

than they were previously, are about 7.3 %. Three consumers did not reply this question. These rates put forth that consumers in Turkey, just like in the whole world and especially in the developed countries Hartman Group (2005); Ipsos-Reid (2000); Butler (2002) have become more sensitive to food safety than they were previously. It is possible to attribute this situation on the one hand to the food scandals, which have been declared intensively to large masses via the media for the last ten years, and on the other hand, to the increase in the demand of food safety as a result of the raised consciousness of consumers. In either case, however, the high rate of distrust points out a lack of efficient information provision to consumers on actual situation regarding food safety.

Approximately 70% of the consumers hav-

Table 2

Safety level that consumers perceive towards various processes of food production

	CU (%)	RU (%)	HOA (%)	QH (%)	VH (%)	<i>Average^a</i> <i>1: completely</i> <i>unhealthy</i> <i>5: very healthy</i>	<i>Standard</i> <i>Deviation</i>
Meat obtained from animals treated using legally allowed amounts of antibiotics (n = 379)	18.5	35.6	35.9	7.9	2.1	2.4	0.95
Meat obtained from animals treated using legally allowed amounts of hormones (n = 379)	26.4	36.1	29.8	6.3	1.3	2.2	0.95
Vegetables grown in greenhouses (n=383)	26.1	32.6	28.7	9.9	2.6	2.3	1.04
Vegetables grown on fields (n=383)	0.8	3.1	13.6	41.8	40.7	4.19	0.84
Çig kofte (n=381)	48.8	28.9	17.6	2.9	1.8	1.8	0.95
Meat cooked and frozen at a specialized plant (n=379)	5.8	21.4	38.8	19.5	14.5	3.16	1.1
Foods containing legally allowed amounts of pesticide remains (n=380)	24.2	30	33.2	6.8	5.8	2.4	1.1
Foods containing legally allowed additives and protectors (n=379)	20.1	32.2	33.5	7.9	6.3	2.48	1.09
Imported food materials (n=378)	22.5	24.3	29.6	19.6	4	2.58	1.15

CU: Completely Unhealthy, RU: Rather Unhealthy, HOA: Healthy on Average, QH: Quite Healthy, VH: Very Healthy

^a Simple average of the Likert scale scores.

²The total exceeds 100 % since the respondents could give more than one reply

Table 3**Evaluations of consumers about various measures for preventing foods from causing diseases**

	I (%)	SE (%)	EOA (%)	QE (%)	VE (%)	Average ^a 1: ineffective 5: very effective	Standard Deviation
Eating meat as "well done" (n=380)	2.1	8.2	27.1	30.8	31.8	3.82	1.04
Not buying out of season fruits and vegetables grown in greenhouses (n=380)	2.9	19.7	31.8	26.3	19.2	3.39	1.09
Peeling the skin of the fruits and vegetables (n=382)	4.7	9.4	24.6	33.8	27.5	3.7	1.11
Washing fruits-vegetables with abundant water (n=382)	-	1	18.3	30.6	50	4.3	0.8
Evaluating the safety of foods by appearance (n=382)	13.9	30.9	26.7	15.2	13.4	2.83	1.24
Using different kitchen gadgets when treating raw meat and other food materials (n=379)	3.2	24	28	24.8	20.05	3.35	1.14
Using antibacterial detergent (n=373)	2.4	8.8	22.3	31.6	34.9	3.88	1.06
Cleaning the kitchen frequently with hot water and detergent (n=382)	-	5.2	17.8	27	50	4.22	0.92

I: Ineffective, SE: Slightly Effective, EOA: Effective on Average, QE: Quite Effective, VE: Very Effective

^a Simple average of the Likert scale scores.

ing participated in the questionnaire expressed that they made changes in their food purchasing behaviour as a result of the scandals. While the consumers stating that they haven't changed their habits remain at the rate of around 23%, a group of approximately 7% (28 people) stated that they may have been affected by the scandals but they were not sure about it. When 269 consumers, who expressed to change their food purchasing behaviour as a result of the scandals, were asked how they changed their habits, 39.74% of all consumers having participated in the questionnaire stated that they began to purchase only the brands that present guarantees to them; 37.40% stated that they gave up purchasing the product or the products about which a scandal appeared; 34.81% stated that they began to read the labels more carefully and in

much detail and 19.48% stated that they changed the malls they had gone shopping.³

Opinions of Consumers Concerning the Safety Level of Foods

So as to specify the opinions of consumers in Izmir concerning the safety level of foods, they were asked to what extent various products in food market seem healthy to them. The meat obtained from animals that are treated using legally allowed amounts of antibiotics or hormones received 2.40 and 2.20 points from consumers respectively. This means that consumers do not trust the meat in the market much.

Eighty two and a half percent of the consumers in Izmir consider the vegetables grown on fields either very healthy or quite healthy. With a mean

³The percent values are calculated over 385 people having participated in the questionnaire. The total of percent values exceeds 100 since 167 consumers out of 269, who stated that they changed their food purchasing behavior as a result of scandals, have declared to make more than one behavior change.

Table 4
Variables used in the probit models

Dependent Variables	
KNOW. OF FOOD SA.	Knowledge of food safety (having knowledge=1)
RESP. TO FOOD SCAN.	Responsiveness to food scandals (changing behaviour as a result of food scandals=1)
Explanatory Variables	
<i>Demographic Variables</i>	
AGE	Age (year)
GENDER	Gender dummy (Male=1)
MARITAL	Marital Status dummy (Married=1)
NO. OF INDIVID.	Household size
FOOD EXP.	Monthly food expenses (TRY)
EDU WIFE / HUSB.	Wife's or husband's educational status (year)
INC2 ^a	Income dummy 2 (TRY 501 /month – TRY 1000 /month = 1)
INC3 ^a	Income dummy 3 (TRY 1001 /month and above = 1)
EDU2 ^b	Education dummy 2 (High school diploma=1)
EDU3 ^b	Education dummy 3 (Bachelors degree or more=1)
ELDERLY	Presence of elderly individuals in the family, dummy (at least 1 person at the age of 50 and above =1)
CHILDREN	Presence of children in the family, dummy (at least 1 person at the age of 6 and below =1)
<i>Attitude Variables (as reduced by factor analysis, and measured in factor scores)</i>	
<i>Attitudes of consumers towards the safety of foods</i>	
CONFFAC1	Demand of controlled production
CONFFAC2	Confidence about label information
<i>Attitudes of consumers towards the relation between health and nutrition</i>	
HEALTHFAC1	Finding foods healthy
HEALTHFAC2	Trust in nutrition facts information
HEALTHFAC3	Disliking processed products
<i>Attitudes of Consumers towards food prices</i>	
COSTFAC1	Expectations of low price and high quality
COSTFAC2	Individual satisfaction
<i>Attitudes of consumers towards the effect of food production on the environment</i>	
ENVFAC1	Worrying about the environment
ENVFAC2	Gladness about the environment
<i>Attitudes of consumers towards various foods</i>	
CONFAC1	Demand of control
CONFAC2	Distrusting uncontrolled products
<i>Attitudes of consumers towards precautions to take against food hazards</i>	
SENSFAC1	Sensitivity to hygiene
SENSFAC2	Measures in compliance with conditions of healthy nutrition
<i>Confidence of consumers about various rings of the food chain</i>	
TRUSTFAC1	Trusting marketing
TRUSTFAC2	Trusting storage
TRUSTFAC3	Trusting production

^a Omitted category for this group of dummy variables is the lower income group, with monthly income of TRY 500 or less.

^b Omitted category for this group of dummy variables is the less educated, with secondary school diploma or less.

response of 4.19 points on the five point scale, this group of products seem to be considered as a quite reliable one. Moreover, with a standard deviation of 0.84 points, the greatest level of agreement among consumers is achieved regarding the vegetables grown in open air (Table 2). In spite of this, consumers trust the vegetables grown in greenhouses at a rate below the average (2.30 points). Foods, which contain legally allowed amounts of pesticide remains or legally allowed additives and protectors are less trusted products with mean responses of 2.40 and 2.48 points respectively. When this last finding is combined with the reply concerning the meat, it is concluded that consumers do not generally trust food products.

As expected, the dish made of raw ground meat, pounded wheat and red pepper, which is called 'çiğ köfte', is declared to be the least reliable one among the products that are dealt with. It is possible to interpret this finding as an indicator that the consumers interviewed have a certain level of consciousness about food safety and that they could give consistent replies to the questionnaire with their opinions.

The data of disease factors in Europe, the North America, Australia and New Zealand put forth that a significant amount of food-based illnesses are caused by the applications of inappropriate food preparations in the houses of consumers and that a significant number of consumers frequently do unsafe food-treatment applications. It is put forward that the improvement in the food-treatment behaviour of consumers will decrease the risk of the occurrence of food-based diseases and it is stated that training strategies on food safety are required to be developed and applied so as to improve some food safety behaviour (Redmond and Griffith, 2003).

The consumers were asked to what extent they consider various measures taken for preventing foods from causing diseases as effective. In this way, it is tried to be understood which methods they prefer to protect themselves from the risks of food safety. Fifty percent of the consumers that

have participated in the questionnaire state that washing fruits and vegetables with abundant water and cleaning the kitchen often with hot water and detergent are very effective methods. Considering the standard deviations, these two methods are also those with higher levels of agreement across consumers. While a total of 66.5% of the consumers express that using antibacterial detergent is either a quite or a very efficient method; the same ratio is 61.3% for eating products by peeling their skins. Using different kitchen gadgets while cooking meat and other food materials (3.35 points) and not buying out of season fruits and vegetables grown in greenhouses (3.39 points) are regarded to be a little more effective than the average (Table 3).

Analysis of Factors Affecting the Levels of Knowledge of Consumers about Food Safety and the Behaviour as a Result of Food Scandals

Probit Models for Food Safety

According to considerable depot of empirical studies, demographic characteristics of consumers, especially like gender, age and levels of education and income, influence the consumer attitudes towards food safety (Wilcock et al., 2004; Tucker et al., 2006). In this study, factors that affect the levels of knowledge of the consumers on and their sensitivity to food safety are studied by the help of probit models. So, it was tried to obtain clues about on which aspects informative endeavours towards food safety are required to concentrate and further about on what types of consumer groups and which factors are required to be studied so as to reduce or eliminate the negative effects of food scandals on the perceptions of consumers. Differentiating independent variables, various model trials were carried out. Thus, the probit models, which best explain the factors affecting the dependent variables: "having knowledge about food safety" and "being affected by food scandals", are estimated. Among independent variables are the demographic variables and the variables, which are obtained by

Table 5
Probit model 1
Dependent variable: to have knowledge on food safety (those who have knowledge=1)

Independent variables	Coefficient	St. error
GENDER	0.0278	0.1656
AGE	-0.0003	0.0005
MARITAL	0.1493	0.5177
NO. OF INDIVID.	-0.0058	0.0519
FOOD EXP.	7.93E-06	4.13E-05
EDU WIFE / HUSB.	-0.0295	0.0647
INC2	0.1152	0.1591
INC3	1.0289***	0.5971
EDU2	0.6144*	0.2097
EDU3	0.7551**	0.3482
ELDERLY	0.2997***	0.1696
CHILDREN	-0.2341	0.1661
C	-0.0183	0.6871
McFadden R ²	0.0753	

*, ** and *** indicate the significance levels of 1%, 5% and 10%, respectively

factor analysis from likert-scale questions measuring the attitudes of consumers towards food safety. As it can be viewed on Table 4, demographic data in the models are either continuous series or dummy variables; whereas the attitude variables are the factor scores estimated through factor analysis from the attitude data.

Factors that Affect the Probability of Having Knowledge

In the models, the variables of income (groups of low, middle and high incomes) and education (primary and secondary school, high school and higher school) are each categorized into 3 groups and they are each represented by 2 dummy variables. There aren't any differences between the middle-income group and the low-income group in terms of having knowledge about food safety.

However, it is more probable that an individual in the high-income group has knowledge about food safety. From this, it is understood that the activities of consciousness-raising about food safety should be especially directed towards low- and middle-income groups. Consciousness-raising activities to be carried out in settlements of low- and middle-income groups will provide opportunity for reflecting the increased sensitivity to food safety on consumption habits. As expected, the model reveals that the higher the education category gets, the higher the probability of having knowledge gets (Table 5). The fact that the consumers with a high level of income and, who are educated, are more knowledgeable regarding food safety points out that the target audience in the education of food safety should be the masses with low income and education levels. Another effective variable presented by the Probit model 1 is the presence of elderly individuals (at the age of 50 and above) in the house. It is possible to infer that the families believe that elderly individuals should be nourished more carefully due to their health problems. In spite of this, it is thought-provoking that there isn't a high level of sensitivity to food safety in the houses where there are children. It may be thought that highlighting the health problems of the family members as a whole instead of only the health problems of the elderly people would increase the consciousness of food safety.

From Probit model 2, it is understood that the consciousness of food safety has an opposite relation with the demand of controlled production (Table 6). This finding corroborates the findings of the risk analysis research, which proves that risk situations that are understood by individuals are less likely to create fear or panic. Because when the people have knowledge, they are able take precautions and avoid negative impacts (Pidgeon and Beattie, 1998; Miles et al., 1999; Tucker et al., 2006). Thus, it is expected that the people, who are confident about the food with pesticide remains, hormones and antibiotics as long as it is controlled, have less knowledge about food safety.

Table 6
Probit model 2
Dependent variable: to have knowledge on food safety (those who have knowledge=1)

Independent Variables	Coefficient	St. Error
GENDER	0.0075	0.212
AGE	0.0095	0.0099
MARITAL	-0.7511	0.6325
NO. OF INDIVID.	0.0415	0.066
FOOD EXP.	1.00E-05	5.10E-05
EDU WIFE / HUSB.	-0.0475	0.0908
INC2	-0.0887	0.2521
INC3	0.0296	0.2751
EDU2	0.6995*	0.2717
EDU3	0.9618**	0.4546
ELDERLY	0.2144	0.2223
CHILDREN	-0.0659	0.2207
CONFFAC1	-0.2514**	0.1234
CONFFAC2	0.0003	0.0997
HEALTHFAC1	-0.0249	0.1184
HEALTHFAC2	0.3315*	0.1031
HEALTHFAC3	0.2597*	0.0983
COSTFAC1	-0.2989*	0.113
COSTFAC2	-0.0272	0.1188
ENVFAC1	0.0733	0.1031
ENVFAC2	0.1106	0.1093
CONFAC1	-0.1287	0.0995
CONFAC2	-0.0864	0.1186
SENSFAC1	0.0741	0.1014
SENSFAC2	0.1385	0.1113
TRUSTFAC1	-0.3256*	0.1128
TRUSTFAC2	-0.1083	0.093
TRUSTFAC3	0.0732	0.1092
C	0.6175	0.8709
McFadden R ²	0.2116	

* and ** indicate the significance levels of 1% and 5%, respectively

Here exists the trust of consumers to auditing institutions. To some extent, the idea of throwing their individual responsibilities on these institutions

prevails. Consciousness-raising among consumers will play a role in fulfilling their duty that fall upon them especially in the field that the country is the weakest about food safety, namely, about controlling activities.

On a parallel line, the probability of the ones, who trust the food information presented to them concerning foods, of having consciousness of food safety is higher. Therefore, it can be concluded that the consciousness-raising about food information would also bring about the consciousness of food safety. In other words, the beliefs of consumers, who do not have knowledge about food safety, in the reliability of firms are scarce. The endeavours towards the elimination of these two deficits would support each other.

The ones, who dislike processed products, are more likely to have knowledge about food safety. This means that the distinguished individuals with high levels of education and income having knowledge about food safety are at the same time selective about foods. From this perspective, it can be expressed that food firms need to concentrate on programs of product development and promotion towards gaining conscious consumers.

The probability for consumers, thinking that more expensive foods are of higher quality, of being conscious of food safety is lower. Consumers regard more expensive foods as foods of higher quality and characterize these foods as more reliable foods. Consumers should be informed that more expensive foods and the foods which appear as higher quality with respect to certain quality aspects may not always be complying with food safety.

Conversely to the optimistic bias effects Miles et al. (1999), for the consumers, who trust the marketing ring of the food chain and, within this scope, the processes of transport and packing, it is less probable to be conscious of food safety. The level of trust in the processes of food production and storage does not seem to be effective on being conscious about food safety. The insensitivity concerning marketing may be thought to be

Table 7
Probit Model 3
Dependent Variable: Respond To Food Scandals
(To Be Affected=1)

Independent Variables	Coefficient	St. Error
KNOW. OF FOOD SA.	0.3676*	0.1657
GENDER	-0.1386	0.1734
AGE	-0.0095	0.0089
MARITAL	1.3516**	0.5891
NO. OF INDIVID.	-0.0189	0.0498
FOOD EXP.	-6.26E-05	4.00E-05
EDU WIFE / HUSB.	0.001	0.0637
INC2	-0.1453	0.1719
INC3	0.5611	0.5542
EDU2	0.0237	0.2224
EDU3	0.3944	0.3584
ELDERLY	0.4643*	0.1989
CHILDREN	-0.0172	0.2021
C	-0.3652	0.7583
McFadden R ²	0.0636	

* and ** indicate the significance levels of 1% and 5%, respectively

caused by the fact that the consumers, who do not have much knowledge about food safety, are not aware of the risks existing at this stage of the production chain. Accordingly, the endeavours of consciousness-raising among consumers should especially include information about food safety along the marketing chain. Because, like in other issues, the elimination of defects existing in food marketing in terms of safety would be possible by the fulfilment of the auto-control responsibilities by the consumers.

Effects of Scandals on Behavioural Changes

Food safety scandals are mentioned frequently in written and visual media. The probit model 3 is estimated in order to specify the characteristics of

the individuals who are more intensively affected by the media, which is an important means for attracting attention of individuals to food safety (Table 7).

It is understood that the people, who have knowledge about food safety, are more likely to be affected by food scandals. Consumers expressing to have a certain level of knowledge about food safety are more intensively effected by food scandals or consciousness-raising campaigns that may come from external sources will be more effective for them (Table 7). As the structure of the study doesn't provide us with the information on the level of knowledge these consumers possess, it can only be inferred that it may not be a level high enough to avoid panic in case of food scandals. In any case, this finding points at a lack of fast and effective provision of information, even to the consumers with certain level of knowledge on food safety, on food scandals.

Married individuals also seem to be more sensitive to this matter. This may be thought to be a result of their family responsibility. The presence of elderly people in the house increases the sensitivity to food scandals. From this, it is understood that the circles with such characteristics will be affected first by massive information campaigns concerning food safety.

In contrast to the findings of similar studies (Tomazic et al., 2002; Napier et al., 2004; Tucker et al., 2006), education and income levels are not found to be influential on the attitude to food scandals. Neither the presence of children in the family is found to have any effect on the sensitivity of the consumers as identified in other studies (Bennett, 1999; Reilly, 1999; Dosman et al., 2001; Tucker et al., 2006). Considering the relation between education and the level of knowledge on food safety detected in the previous model, and the expected positive correlation between the level of income and the other two, it can be deduced that the influence of education and income are partly represented by the influence of the level of knowledge which is found to be influential with respect

to the attitudes to food scandals. Nevertheless, no explanation is derived regarding the insignificance of the variable concerning the presence of children in the household. Even if the findings of the studies in the area of food safety attitudes are varied Wilcock et al. (2004), and there is said to be a trend where socio demographic variables as a whole are becoming less relevant on the perceptions of the consumers regarding the safety level of the foods (Gil et al., 2001; Weatherell et al., 2003), this finding should be evaluated cautiously.

Conclusion

Upon the liberalization of international trade, the cross-border movement of foods has increased and food-based diseases have begun to spread more easily. Over time, food scandals have increased the sensitivities of consumers to food safety and food safety has become an issue that is now being dwelled upon more and more. With this study, it is aimed at making a contribution to the limited number of studies carried out on the attitudes and behaviour of consumers in Turkey towards food safety.

In this study, levels of knowledge and sensitivities of consumers towards food safety are examined and the factors that affect them are investigated by means of probit models. So, some findings, which official and private decision-makers concerning the issue may use, are obtained. When the relation of the knowledge about food safety with the categories of income and education is analyzed, it is found out that there aren't any differences between the middle-income and low-income groups in terms of having knowledge about food safety and that high-income group is more likely to be knowledgeable about the subject. From this, it is understood that consciousness-raising activities about food safety need to be directed especially towards low- and middle-income groups. The higher the category of education gets, the higher the probability of having knowledge gets. The fact that consumers with high income level and who

are educated are more likely to have knowledge on food safety as expected points out that the target audience in the education of food safety is the masses with low levels of income and education. According to this, the way leading to an increase in food safety awareness passes from the endeavours of increasing the levels of education and welfare.

The presence of individuals at the age of 50 and above in the house increases the probability of having knowledge about food safety. It can be expressed that elderly individuals are nourished more carefully due to their health problems and experiences and so the presence of an elderly individual in the house increases the level of knowledge about and sensitivity to food safety among the family. The sensitivity to food safety was expected to be high in houses where there are small children; however, the coefficient concerned was not found significant. This finding raises question marks about to what extent families could play a role in developing habits of consuming safe foods in children. It is clearly understood that the issue needs to be dealt with by the public institutions, and that education activities need to be carried out towards consumers at their childhood and adolescence periods, during which especially responsible food consumption habits may be formed.

The probit model, in which the factors that affect the responsiveness of the consumers to food scandals are examined, have put forth that the people having knowledge about food safety are more likely to be affected by food scandals. As the knowledge levels of consumers about food safety are increased, the number of people that take precautions against food scandals would increase and the effect of consciousness-raising campaigns would be higher. Instead of waiting for food scandals, it is necessary to put proper informing campaigns about food safety on the agenda. The probability of being affected by food scandals is affected by marital status. It may be considered that married consumers, who seem to be more sensitive about this matter, turn negative

information from external sources into protectionism as required by their family responsibility. The presence of elderly individuals in the house increases sensitivity to food scandals. It is understood that circles with such characteristics would be affected first by massive informing campaigns concerning food safety.

It is required to apply for well-organized informing campaigns in the short term so as to eliminate the knowledge deficit of consumers about food safety. It can be stated that the levels of education and welfare should be increased in the medium and long term and that especially the low- and middle-income groups and masses with low education levels should be targeted.

Regarding food scandals, information campaigns aiming at recovery of consumer trust should also be directed to consumers with a certain level of knowledge on food safety.

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