A study on the consumer awareness of food additives in packaged food and their effects on health in Abha region, Saudi Arabia.

Sachithananthan V*

Faculty of Public health, College of Applied Medical sciences, King Khalid University, Khamis Mushayat, Saudi Arabia

Abstract

Background: This study will be useful to create an awareness of consumers about the packaged food, study consumers' attitude towards packaged food and their knowledge about health problems arising from use of packaged food among Abha community and the use of this information and food labeling information in the purchasing of packaged food.

Objectives: To study the socioeconomic background of the study subjects and to study the consumer knowledge and attitude towards use of packaged food.

Methods: A validated semi structured questionnaire was prepared to elicit information on socioeconomic background, knowledge and attitude of consumers towards the use of packaged food. It was administered to 407 subjects in three different malls in Abha, Saudi Arabia. The responses were coded into SPSS 22 software and the Chi square significance was studied among different variables.

Results: Within the high income group, 90.3% of the female subjects did not like packaged food ($p<0.05$) due to the reason that they like fresh food. Also within the low income group, 87% of the female subjects within the family members did not like the packaged food, whereas (53.1%) of the male subjects liked the packaged food. The reason may be that packaged foods are expensive. A significant ($p<0.01$) majority of the subjects within the family or individual income, belonging to low (72.2%), average (89.9%) and high income group (87.2%) felt fresh food was better. Overall all the subjects felt that packaged foods are expensive. Of the total, around 25.1% of the subjects read the labels sometimes of which female constituted 18.7%. This gender difference was not due to income or educational level; but may be due to level of exposure. Of the total 89.2% of the subjects disposed while 10.8% of the subjects used the expired products. A significant ($p<0.05$)majority of subjects (54.3%) of the average income group did not find any fungus or adulterants in the packaged food, while 25.8% of the subjects of the same group found adulterants and fungus in the packaged food. From the above results it is evident that education, sex and income levels play an important part in purchasing attitudes in the use of packaged food.

Conclusion: Creating awareness and knowledge about the packaged food will go a long way to educate consumers on the use of packaged food giving significant importance to the labels.

Keywords: Consumer awareness; Packaged food; Health problems; Like or dislike

Accepted on 05 December, 2017

Introduction

Current trends show that increasing technology and consumption of packaged foods in the diets of modern society lead to increase in the use and need of food additives [1]. Food additives are substances that are used in the production, processing, treatment, packaging, transportation or storage of food [2]. It is justified that maintaining food distribution and transportation would be impossible without the use of food additives in the present rapid urbanization and increasing population [3].

Almost all the food additives currently in use have been found to cause health problems in consumers. This has raised health concerns to consumers and government. However, regardless of the increasing incidence and range of health problems of additives in packaged foodstuffs, awareness of consumers is not as such significant [4]. Despite this, the issue of consumer awareness about usage of food labeling information has attracted little research attention in developing countries [5] and little is known about consumer expectations and their response to such food label information [6].

Although law permits the use of food additives, excessive consumption of these leads to myriad side effects [7]. Increased consumption of fast food, high or rich in food preservatives and flavoring agents among adolescents has been directly correlated with obesity [8]. High levels of N-nitrosodimethylamine in diet have a possible role in high incidence of gastrointestinal cancers [9]. It has been seen that the food preservatives sodium benzoate and propionic acid and colorant curcumin suppress Th1-type immune response *in vitro* [10]. Regular soda intake independent of weight status is associated with asthma among US high school students [11]. Research has confirmed a link between attention deficit hyperkinetic disorder and food additives [12]. Children are suffering the most from food additives because they are exposed to food chemicals from infancy and human bodies are

not meant to be exposed to the degree of food chemicals and food additives that we are currently consuming. These additives may include side effects such as food allergies, increased waist lines, decreased absorption of minerals and vitamins and more [13]. With the current trends of increased consumption of packed food in the diet, the incidence and range of such ill effects has also increased [14]. Studies which explore the knowledge and perceptions of the people about these chemicals are necessary as they give inputs for planning intervention strategies [15].

Many surveys conducted have established that the consumers are unaware of the function, role and advantages of such additives and that many of them perceived the additives to be unhealthy and therefore approach them negatively [16]. Consumers with lower levels of education are more likely to trust government institutions to regulate food additives [17].

People look at food labels for different reasons. But whatever the reason, many consumers would like to know how to use this information more effectively and easily. The information about nutrition labeling and the health benefits of the food is one of the important factors that influence decision making. The modern package label has taken the responsibility for educating the consumer about the product by multitasking such as attracting, promoting and motivating at the point of purchase through the information on the label. The labels should be closely observed for nutrient content declaration on calories, fat, protein, dietary fiber, vitamins and mineral content either as percentage daily value or recommended dietary intake (RDI) or per 100 g or 100 ml or per serving size [18]. Low awareness of food labeling, low level of education, low health consciousness, products attributes, food labeling format, influence of media, perceived role of regulatory authorities and non-availability of consumer guidelines on the use of food labeling have been reported by studies from various countries as factors related to consumers not reading and using food labeling information in purchasing food [19].

While compliance with legal requirements is fundamental to food safety, consumers also have a responsibility in handling and preparing food to do what is within their own control to protect themselves. By demanding improved standards, consumers can act as a powerful influence on the food industry as a whole [20].

Important food hazards which affect food safety are microbial hazards, pesticide residue, misuse of additives, chemical contaminants including biological toxins and adulteration. Although microbial contamination and chemical hazards have received most attention, it is recognized that food adulteration and food fraud should not be neglected considering their role in public health [21].

Different people have different food and nutritional requirement, choices and preferences. Some people have health problems that require a certain amount of nutrients and need to avoid certain types of foods or ingredients. Some foods have specific instructions for preparation and use; some require specific storage conditions, etc. Also the production and expiry date on the label indicates the shelf life of different foods. All these suggest the need for consumers to be well informed about the above characteristics of packaged food before purchase and this information is expected to be found on the food label [22].

Rationale of the study

Findings from this study will provide information on:

The awareness of consumers of the health problems arising from use of packaged food among Abha community and the use of this information in purchasing packaged food. This information will bring to the attention of the policy makers on the need to have programs to improve consumer awareness of food labeling information as well as the use of such information in the purchase of food. Also manufactures will understand the need to improve food labeling regulations and food label formats and provide wholesome and unique packaged foods to the consumers.

Food purchasing practices and consumer behavior regarding to packaged food.

Objectives of Research

- To study the socioeconomic background of the selected subjects.
- To assess the degree of knowledge and awareness on the use of labeled packaged food.

Review of Literature

The literature for this study has been reviewed under the following headings:

- Food additives used in packaged food
- Importance of food labeling in packaged food
- Consumer awareness of food labeling in packaged food.

Food additives used in packaged food

Food additives are important for our food supply and food quality and shelf life cannot be maintained without the use of food additives [23]. Their use brings many benefits including greater safety and greater choice of food products [24]. Many food additives may produce side effects such as food allergies, increased waist lines, and decreased absorption of minerals and vitamins, cancer and more [13]. For a variety of reasons, some consumers might regard the use of food additives, especially artificial ones with suspicion and food additives are considered unnatural, unhealthy or even a public health risk [25]. Food preservatives which enhance the shelf life of various food items and flavoring agents which increase the palatability are plentiful in number. Their use in food products is increasing day by day. Some of the commonly used class II food preservatives in packed or canned foods include benzoic acid, sulphurous acid, nitrates and nitrites of sodium and potassium, methyl or propyl para hydroxy benzoates, sodium diacetates, propionates of calcium or sodium, lactic acid and its sodium, potassium and calcium salts and acid calcium phosphates [26].

In a study [27], it was found that there was a significant correlation between having sufficient knowledge about food

additives and the profession of respondents. Also a significant relationship existed between education of respondents and knowledge of food additives. In another study [15], it was found that only 40.6% of the subjects were aware of food preservatives and 49.6% had good knowledge about flavoring agents. The gaps in the knowledge need to be addressed by public awareness campaigns.

Importance of food labeling in packaged food

Nutrition labeling refers to the standardized presentation of the food. The food label is one of the most important and direct means of communicating the product information between buyers and sellers. The Codex guidelines insist that a food label should contain energy, protein, fat, transfat and carbohydrate content [18].

Consumption of packaged food has grown very fast in the recent years. When consumers need to make informed decisions when purchasing and consuming food products, food labeling becomes handy. In a study conducted in India, it was found that females gave priority to the brand (93.33%) than to the price (70%) and taste (53.33%) of the product. In the same study, it was found that the usage of the information printed on the packaged food was relatively high amongst the consumers while buying packaged food. However, increasingly more importance was given to expiry date [5].

With the change in lifestyle and consumption pattern, food safety standards, transparency in dissemination of information related to food product and legal regulations are becoming important on food labels. The expenditure on labeling will be of use only if consumers are aware of and are able to understand, comprehend and purchase based on information given in the labels [5].

In another study conducted in South India, it was found that a majority of subjects (52.5%) were aware of the food additives and their harmful effects on health. However around 38.3 per cent did not know anything about a food label [15]. The requirement of consumers to reduce additives in food products has led to the removal of artificial colors, flavors and preservatives in many food categories so as to obtain clean-label products [28].

Consumer awareness of food labeling in packaged food

In a study in supermarkets in India, it was found that 22.5% of the people had awareness about labeled food products, while the remaining 77.5% did not have any awareness about labeled food products [18]. In another study in Turkey, around 70.3% of consumers had the habit of reading the label on food products. There was a statistically significant difference between genders in reading food labels. More ladies (76.4%) and significantly less men (61.5%) had the habit of reading labels. Twenty per cent of the respondents stated that they never understood food labels in packaged food [27]. The level of consciousness about food safety of women increased with increasing education and income level [29].

In a study conducted in India, it was found that 90% of the consumers gave importance to expiry date of the products, followed by 76.7% who chose manufacturing date as important. Also nutritional information is considered very important by 56.7% of the consumers, ingredients by 53.33% of the consumers and direction of use by 53.33% of the consumers. Consumers perceived different kinds of information on the food label as important, but inspite of that they don't use this information during purchase [5].

In a study conducted in Tanzania by Samson, [29] it was found that 88% of the consumers checked for expiry dates, followed by list of ingredients (63.9%), manufacturing date (25.5%) and nutrition information (25%). Price was the least factor which was sought for in the label (2.9%). Both male and female consumers felt that food labeling provides very important information to the consumer.

In a study in India, it was found that 86.7% of the study participants reported to read labeling information prior to purchase of packaged food. However, only one third of the consumers were very much informed about food labeling based on computed awareness scores. A majority of the respondents mentioned price of food as the factor for motivating them to read the food label before purchase of the food item. Today, consumers in one hand have more access to new food products and more information about food; on the other hand there are increasing concerns about the potential for consumers to be misled by food labels. This necessitates consumers to be enlightened with the knowledge and ability to read, understand and interpret food labeling and use such information in decision making during purchase of packaged food [30].

Materials and Methods

The study was conducted in the following steps:

- Study design
- Selection of the area
- Selection of the subjects
- Preparation of the tool
- Conduct of the study
- Analysis of the results.

Study design

This was a questionnaire based cross sectional study done online in Google forms.

Selection of the area

Abha city was selected for the study. Participants filled an online questionnaire that was made through Google forms; the Link of the questionnaire was distributed through social Apps like: (WhatsApp groups, Snapchat groups, telegram groups etc.).

Selection of subjects

Inclusion criteria: Sample will be collected electronically.

- Random sample
- Age ranged from less than 18 to above 40 years.
- Both male and female who purchase packaged food.

Preparation of the tool

A pilot survey was used to collect information on socio-demographic variables, awareness of food labeling information, format and language of food labeling information, nutritional information and product attributes such as price, appearance and packaging design. Level of awareness on food labeling was obtained by asking the respondents about their familiarity with the information on the labels and whether they read the food labels or not, and asking about the circumstances under which they skip reading labels and the difficulties they encounter in understanding food labels.

Conduct of the study

Based on the above tool, the information was collected from the respondents.

Analysis of the results

Data were uploaded on SPSS 22 platform and Chisquare was performed to assess the statistical significance between demographic variables and food labeling information variables.

Results

The results of the study are presented in the following tables and figures:

Table 1: *Age and sex wise distribution of subjects.*

Age in Year	Gender (%)		Total
	Male	Female	
Age less than 18	1.7	3.2	4.9
18-24	6.1	47.2	53.3
25-39	9.3	24.3	33.7
More than 40	3.4	4.7	8.1
Total	20.6	79.4	40.7

A majority of the subjects 53.3% were in the age range of 18-24 years followed by 25-39 years (33.7%). Of these a majority of 47.2% and 24.3% were females respectively. Only 4.9% of the subjects were less than 18 years (Table 1).

Table 2: *Age wise distribution of the subjects according to level of education.*

	Level of Education (%)				Total
	Middle School	High School	College	Higher Education	
Age less than 18	0.7	3.7	0.5	0	4.9
18-24	0.7	9.1	42.8	0.7	53.3
25-39	1.7	9.6	20.1	2.2	33.7
More than 40	1.2	2.2	2.7	2	8.1
Total	4.4	24.6	66.1	4.9	100

A majority of subjects who were educated were in the age range of 18-24 years and were educated up to college level (42.8%). Only 0.7% of the subjects in the same age group had gone up to higher education level (Table 2).

Table 3: *Age and sex wise distribution of subjects according to level of education count.*

Gender			Level of education (%)				Total
			Middle school	High school	College	Higher education	
Male	Age	less than 18	0.7	0.7	0.3	0	1.7
		18-24	0.3	0.7	5.2	0	6.1
		25-39	0.3	3.4	4.4	1.2	9.3
		more than40	0	1	0.7	1.7	3.4
	Total	1.2	5.9	10.6	2.9	20.6	

Female	Age	less than 18	0	2.9	0.3	0	3.2
		18-24	0.5	8.4	37.6	0.7	47.2
		25-39	1.5	6.1	15.7	1	24.3
		more than40	1.2	1.2	2	0.3	4.7
	Total	3.2	18.7	55.5	2	79.4	
Total	Age	less than 18	0.7	9.1	0.5	0	4.9
		18-24	0.7	9.1	42.8	0.7	53.3
		25-39	1.7	9.6	20.1	2.2	33.7
		more than40	1.2	2.2	2.7	2	8.1
	Total	4.4	24.6	66.1	4.9	100	

A highly significant ($p<0.01$) majority of the females (79.4%) were significantly more educated than the males (20.6%). In all age groups 66.1% of the total subjects were educated up to the college level (Table 3).

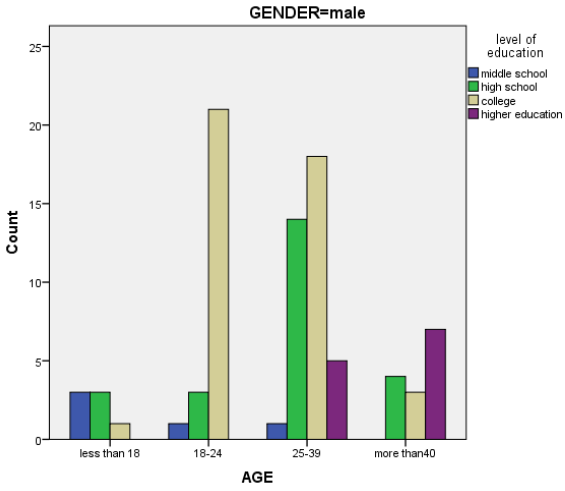

Figure 1: Age wise distribution of subjects according to level of education (Male).

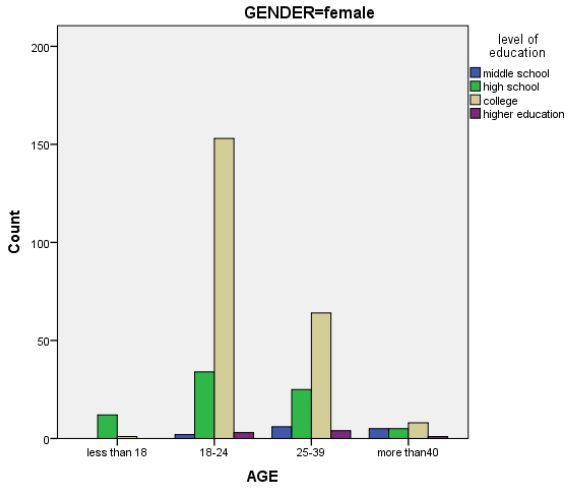

Figure 2: Age wise distribution of subjects according to type of education (Female).

Table 4: *Age wise distribution of subjects according to family income.*

			Family/individual income			Total
			Low income	Average income	High income	
Age	less than 18	Count	1	14	5	20
		% within AGE	5.0%	70.0%	25.0%	100.0%
		% within family/individual income	2.8%	4.3%	11.1%	4.9%
		% of Total	0.2%	3.4%	1.2%	4.9%
	18-24	Count	15	181	21	217
		% within AGE	6.9%	83.4%	9.7%	100.0%
		% within family/individual Income	41.7%	55.5%	46.7%	53.3%
		% of Total	3.7%	44.5%	5.2%	53.3%

	25-39	Count	17	112	8	137
		% within AGE	12.4%	81.8%	5.8%	100.0%
		% within family/individual income	47.2%	34.4%	17.8%	33.7%
		% of Total	4.2%	27.5%	2.0%	33.7%
	more than40	Count	3	19	11	33
		% within AGE	9.1%	57.6%	33.3%	100.0%
		% within family/individual income	8.3%	5.8%	24.4%	8.1%
		% of Total	0.7%	4.7%	2.7%	8.1%
Total		Count	36	326	45	407
		% within AGE	8.8%	80.1%	11.1%	100.0%
		% within family/individual income	100.0%	100.0%	100.0%	100.0%
		% of Total	8.8%	80.1%	11.1%	100.0%

In the age group of 18-24 years, a highly significant (P<0.01) majority of the subjects had high income followed by 33.3% of the individuals who had high income within age group of 40 years. Of the total a significant majority of 80.1% had an average income followed by 8.8% with low income (Figures 1, 2 and Table 4).

Table 5: *Income and sex wise distribution of subjects according to packaged food liking.*

Family/individual income				**Do your family members like packaged/ canned food**		**Total**
				Yes	**No**	
Low income	Gender	Male	Count	6	3	9
			% within Gender	66.7%	33.3%	100.0%
			% within do your family members like packaged/canned food	46.2%	13.0%	25.0%
			% of Total	16.7%	8.3%	25.0%
		Female	Count	7	20	27
			% within Gender	25.9%	74.1%	100.0%
			% within do your family members like packaged/canned food	53.8%	87.0%	75.0%
			% of Total	19.4%	55.6%	75.0%
	Total	Count	13	23	36	
		% within Gender	36.1%	63.9%	100.0%	
		% within do your family members like packaged/ canned food	100.0%	100.0%	100.0%	
		% of Total	36.1%	63.9%	100.0%	
Average income	Gender	Male	Count	13	48	61
			% within Gender	21.3%	78.7%	100.0%
			% within do your family members like packaged/canned food	19.7%	18.5%	18.7%
			% of Total	4.0%	14.7%	18.7%

		Female	Count	53	212	265
			% within Gender	20.0%	80.0%	100.0%
			% within do your family members like packaged/canned food	80.3%	81.5%	81.3%
			% of Total	16.3%	65.0%	81.3%
	Total	Count	66	260	326	
		% within Gender	20.2%	79.8%	100.0%	
		% within do your family members like packaged/ canned food	100.0%	100.0%	100.0%	
		% of Total	20.2%	79.8%	100.0%	
High income	Gender	Male	Count	4	10	14
			% within Gender	28.6%	71.4%	100.0%
			% within do your family members like packaged/canned food	57.1%	26.3%	31.1%
			% of Total	8.9%	22.2%	31.1%
		Female	Count	3	28	31
			% within Gender	9.7%	90.3%	100.0%
			% within do your family members like packaged/canned food	42.9%	73.7%	68.9%
			% of Total	6.7%	62.2%	68.9%
	Total	Count	7	38	45	
		% within Gender	15.6%	84.4%	100.0%	
		% within do your family members like packaged/ canned food	100.0%	100.0%	100.0%	
		% of Total	15.6%	84.4%	100.0%	
Total	Gender	Male	Count	23	61	84
			% within Gender	27.4%	72.6%	100.0%
			% within do your family members like packaged/canned food	26.7%	19.0%	20.6%
			% of Total	5.7%	15.0%	20.6%
		Female	Count	63	260	323
			% within Gender	19.5%	80.5%	100.0%
			% within do your family members like packaged/canned food	73.3%	81.0%	79.4%
			% of Total	15.5%	63.9%	79.4%
	Total	Count	86	321	407	
		% within Gender	21.1%	78.9%	100.0%	

% within do your family members like packaged/ canned food	100.0%	100.0%	100.0%
% of Total	21.1%	78.9%	100.0%

Within the high income group, 90.3% of the female subjects did not like packaged food, whereas 42.9% within the family members liked the packaged food ($p<0.05$). Also within the low income group, 87% of the female subjects within the family members did not like the packaged food, whereas (53.1%) of the male subjects liked the packaged food (Table 5).

Table 6: *Income wise classification according to which food is better packaged/fresh.*

			Packaged/canned food	Fresh food	Total
Family/individual income	Low income	Count	10	26	36
		% within family/individual income	27.8%	72.2%	100.0%
		% within witch do you feel is better packaged/canned food or fresh food	19.6%	7.3%	8.8%
		% of Total	2.5%	6.4%	8.8%
	Average income	Count	32	293	326
		% within family/individual income	9.8%	89.9%	100.0%
		% within witch do you feel is better packaged/canned food or fresh food	62.7%	82.5%	80.1%
		% of Total	7.9%	72.0%	80.1%
	High income	Count	9	36	45
		% within family/individual income	20.0%	80.0%	100.0%
		% within witch do you feel is better packaged/canned food or fresh food	17.6%	10.1%	11.1%
		% of Total	2.2%	8.8%	11.1%
Total		Count	51	355	407
		% within family/individual income	12.5%	87.2%	100.0%
		% within witch do you feel is better packaged/canned food or fresh food	100.0%	100.0%	100.0%
		% of Total	12.5%	87.2%	100.0%

A majority of the subjects within the family or individual income, belonging to low (72.2%), average (89.9%) and high income (87.2%) felt fresh food was better (Table 6).

Table 7: *Income wise classification according to feel of expensiveness of packaged food.*

			Do you feel packaged/canned food are expensive		Total
			Yes	no	
Family/individual income	Low income	Count	12	24	36
		% within family/individual income	33.3%	66.7%	100.0%
		% within do you feel packaged/canned food are expensive	8.6%	9.0%	8.8%
		% of Total	2.9%	5.9%	8.8%

	Average income	Count	108	218	326
		% within family/individual income	33.1%	66.9%	100.0%
		% within do you feel packaged/canned food are expensive	77.1%	81.6%	80.1%
		% of Total	26.5%	53.6%	80.1%
	High income	Count	20	25	45
		% within family/individual income	44.4%	55.6%	100.0%
		% within do you feel packaged/canned food are expensive	14.3%	9.4%	11.1%
		% of Total	4.9%	6.1%	11.1%
Total		Count	140	267	407
		% within family/individual income	34.4%	65.6%	100.0%
		% within do you feel packaged/canned food are expensive	100.0%	100.0%	100.0%
		% of Total	34.4%	65.6%	100.0%

In subjects within the family members' income, a majority of high (55.6%), average (66.9%) and low income (66.7%) groups state that packaged foods are expensive. Overall all the subjects feel that packaged foods are expensive (Table 7).

Table 8: *Gender wise distribution of subjects according to likeness of soft beverages including energy drinks.*

			Soft beverages (including energy drinks)		Total
			Yes	No	
Gender	Male	Count	46	38	84
		% within Gender	54.8%	45.2%	100.0%
		% within soft beverages (including energy drinks)	28.2%	15.6%	20.6%
		% of Total	11.3%	9.3%	20.6%
	Female	Count	117	206	323
		% within Gender	36.2%	63.8%	100.0%
		% within soft beverages (including energy drinks)	71.8%	84.4%	79.4%
		% of Total	28.7%	50.6%	79.4%
Total		Count	163	244	407
		% within Gender	40.0%	60.0%	100.0%
		% within soft beverages (including energy drinks)	100.0%	100.0%	100.0%
		% of Total	40.0%	60.0%	100.0%

With respect to liking of soft beverages or energy drinks, a highly significant ($p<0.01$) majority of female subjects within the soft drink group (84.4%) disliked the soft beverages, whereas 54.8% of the male within the gender group liked the soft beverages. Overall, a majority of the subjects (60%) disliked the soft beverages (Table 8).

Table 9: *Gender wise distribution of subjects according to their opinion about packaged food.*

			Do you think consuming packaged food has no human health problem		Total
			Yes	No	
Gender	Male	Count	31	53	84
		% within GENDER	36.9%	63.1%	100.0%
		% within do you think consuming packaged food has no human health problem	28.7%	17.7%	20.6%
		% of Total	7.6%	13.0%	20.6%
	Female	Count	77	246	323
		% within Gender	23.8%	76.2%	100.0%
		% within do you think consuming packaged food has no human health problem	71.3%	82.3%	79.4%
		% of Total	18.9%	60.4%	79.4%
Total		Count	108	299	407
		% within Gender	26.5%	73.5%	100.0%
		% within do you think consuming packaged food has no human health problem	100.0%	100.0%	100.0%
		% of Total	26.5%	73.5%	100.0%

A significant ($p<0.05$) majority of the females within the gender (76.2%) stated that there were no health problems with

respect to packaged food, followed by 63.1% of the males. Of the total 73.5% of the subjects within the gender group stated that they did not have any health problems with respect to packaged food (Table 9).

Table 10: *Income wise classification of subjects according to why they think packaged food did not have health problems.*

			If yes, what are the reasons you think packaged food has no human health problem			Total
			Packed food prepared carefully	I have not heard about problem related food additives in packed food	I don't think It has any human health problem	
Family/individual income	Low income	Count	9	5	22	36
		% within family/individual income	25.0%	13.9%	61.1%	100.0%
		% within if yes, what are the reasons you think packaged food has no human health problem	19.1%	8.6%	7.3%	8.8%
		% of Total	2.2%	1.2%	5.4%	8.8%
	Average income	Count	34	47	245	326
		% within family/individual income	10.4%	14.4%	75.2%	100.0%
		% within if yes, what are the reasons you think packaged food has no human health problem	72.3%	81.0%	81.1%	80.1%
		% of Total	8.4%	11.5%	60.2%	80.1%
	High income	Count	4	6	35	45
		% within family/individual income	8.9%	13.3%	77.8%	100.0%
		% within if yes, what are the reasons you think packaged food has no human health problem	8.5%	10.3%	11.6%	11.1%
		% of Total	1.0%	1.5%	8.6%	11.1%
Total		Count	47	58	302	407
		% within family/individual income	11.5%	14.3%	74.2%	100.0%
		% within if yes, what are the reasons you think packaged food has no human health problem	100.0%	100.0%	100.0%	100.0%
		% of Total	11.5%	14.3%	74.2%	100.0%

Within the family income group, a significant ($p<0.01$) majority of the subjects in the low (61.1%), average (75.2%) and high income (77.8%) groups, stated that there were no health problems with respect to packaged food (Table 10).

Table 11: *Gender wise distribution of subjects according to knowledge about reading of labels in packaged food.*

			Do you know how to read the label on packaged/ canned food (ingredients+nutritional value)		Total
			Yes	No	
Gender	Male	Count	48	36	84
		% within Gender	57.1%	42.9%	100.0%
		% within do you know how to read the label on packaged/canned food (ingredients+nutritional value)	17.8%	26.1%	20.6%
		% of Total	11.8%	8.8%	20.6%
	Female	Count	221	102	323

	% within Gender	68.4%	31.6%	100.0%
	% within do you know how to read the label on packaged/canned food (ingredients+nutritional value)	82.2%	73.9%	79.4%
	% of Total	54.3%	25.1%	79.4%
Total	Count	269	138	407
	% within Gender	66.1%	33.9%	100.0%
	% within do you know how to read the label on packaged/canned food (ingredients+nutritional value)	100.0%	100.0%	100.0%
	% of Total	66.1%	33.9%	100.0%

A majority of the subjects within male gender knew how to read the labels on the packaged food (42.9%), whereas only 31.6% of females within female gender were able to read the labels (Table 11).

Table 12: *Income wise distribution of subjects according to opinion about incidence of diabetes due to packaged food.*

			Diabetes		Total
			Yes	No	
Family/individual income	Low income	Count	11	25	36
		% within family/individual income	30.6%	69.4%	100.0%
		% within diabetes	7.1%	9.9%	8.8%
		% of Total	2.7%	6.1%	8.8%
	Average income	Count	119	207	326
		% within family/individual income	36.5%	63.5%	100.0%
		% within diabetes	77.3%	81.8%	80.1%
		% of Total	29.2%	50.9%	80.1%
	High income	Count	24	21	45
		% within family/individual income	53.3%	46.7%	100.0%
		% within diabetes	15.6%	8.3%	11.1%
		% of Total	5.9%	5.2%	11.1%

Within family income group, a significant ($p<0.01$) majority of the subjects in all levels of income felt that packaged food will not cause diabetes (low-69.4%, average-63.5%, high-46.7%) (Table 12).

Table 13: *Gender wise distribution of subjects according to reading of labels before purchasing packaged food.*

			During shopping have you stopped to read the content of the product before purchasing it				Total
			Yes	No	Sometimes	I do not know how to read it	
Gender	Male	Count	17	31	29	7	84
		% within Gender	20.2%	36.9%	34.5%	8.3%	100.0%
		% within during shopping have you stopped to read the content of the product before purchasing it	21.3%	24.4%	15.8%	43.8%	20.6%
		% of Total	4.2%	7.6%	7.1%	1.7%	20.6%
	Female	Count	63	96	155	9	323

	% within Gender	19.5%	29.7%	48.0%	2.8%	100.0%
	% within during shopping have you stopped to read the content of the product before purchasing it	78.8%	75.6%	84.2%	56.3%	79.4%
	% of Total	15.5%	23.6%	38.1%	2.2%	79.4%
Total	Count	80	127	184	16	407
	% within Gender	19.7%	31.2%	45.2%	3.9%	100.0%
	% within during shopping have you stopped to read the content of the product before purchasing it	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	19.7%	31.2%	45.2%	3.9%	100.0%

A majority of the female subjects (56.3%) did not read the labels on the packaged food, followed by 43.8% of male subjects did not read the labels (Table 13).

Table 14: *Gender wise distribution of subjects according to reading of labels.*

Count					**Total**
		Do you read production and expiry date and act according			
		No	Yes	sometimes	
Gender	Male	2.7	11.5	6.4	20.6
	Female	3.2	57.5	18.7	79.4
Total		5.9	69	25.1	100

A significant majority ($p<0.05$) of the female subjects (57.5%) read the production and expiry date on the labels of packaged food. Only 11.5% of the male subjects read the labels. Of the total around 25.1% of the subjects read the labels sometimes of which female constituted 18.7% (Table 14).

Table 15: *Education wise distribution of subjects according to usage of expiry date foods.*

		Do you dispose of expired products or you think they are safe to use		**Total**
		Yes I dispose them	**No I use them**	
Level of	middle school	3.9	0.5	4.4
education	high school	22.1	2.5	24.6
	college	59.7	6.4	66.1
	higher education	3.4	1.5	4.9
Total		89.2	10.8	100

A significant majority ($p<0.05$) of college going subjects (59.7%) disposed of expired foods while only 0.5% of middle school subjects used expired foods (Table 15).

Table 16: *Income wise distribution of subjects according to usage of expiry date foods.*

		Do you dispose of expired products or you think they are safe to use		**Total**
		Yes I dispose them	**No I use them**	
family/individual income	low income	7.4	1.5	8.8
	average income	73.7	6.4	80.1
	high income	8.1	2.9	11.1
Total		89.2	10.8	100

A highly significant ($p<0.01$) majority of the subjects (73.7%) belonging to average income group disposed of expired foods, whereas 6.4% of them used the products. Of the total 89.2% of the subjects disposed while 10.8% of the subjects used the expired products (Table 16).

Table 17: *Income wise distribution of subjects according to finding of fungus or adulterants in packaged food.*

		Did you at any time find any fungus or damages or adulterants in the package		**Total**
		No	**Yes**	
Family/individual income	low income	4.7	4.2	8.8
	average income	54.3	25.8	80.1
	high income	5.7	5.4	11.1
Total		64.6	35.4	100

A significant ($p<0.05$)majority of subjects (54.3%) of the average income group did not find any fungus or adulterants in

the packaged food, while 25.8% of the subjects of the same group found adulterants and fungus in the packaged food (Table 17).

Discussion

There are no reported studies from Abha with which the findings of this study can be compared. In this study majority of them had awareness about the presence of 'Food Preservatives' and 'Flavouring Agents' in the packed foods that they buy. But they lacked any specific knowledge about the effects of these chemicals. Similar results have been reported from South Korea [31]. One study from USA reported low levels of consumer awareness cannot be compared with our study as they explored the consumer awareness attitudes on genetically modified foods, irradiated foods, chemical & microbiological contamination [32].

Within the high income group, 90.3% of the female subjects did not like packaged food ($p<0.05$) due to the reason that they like fresh food. Also within the low income group, 87% of the female subjects within the family members did not like the packaged food, whereas (53.1%) of the male subjects liked the packaged food. The reason may be that packaged foods are expensive. A majority of the subjects within the family or individual income, belonging to low (72.2%), average (89.9%) and high income (87.2%) felt fresh food was better. Overall all the subjects feel that packaged foods are expensive. Overall, a majority of the subjects (60%) disliked the soft beverages, canned juices, canned soups etc.

Of the total 73.5% of the subjects within the gender group stated that they did not have any health problems with respect to packaged food. A majority of the subjects within male gender knew how to read the labels on the packaged food (42.9%), whereas only 31.6% of females within female gender were able to read the labels. Of the total, around 25.1% of the subjects read the labels sometimes of which female constituted 18.7%. This gender difference was not due to income or educational level; but may be due to level of exposure. Within family income group, a significant ($p<0.01$) majority of the subjects in all levels of income felt that packaged food will not cause diabetes (low-69.4%, average-63.5%, high-46.7%). A significant majority ($p<0.05$) of college going subjects (59.7%) disposed of expired foods while only 0.5% of middle school subjects used expired foods. A highly significant ($p<0.01$) majority of the subjects (73.7%) belonging to average income group disposed of expired foods, whereas 6.4% of them used the products. Of the total 89.2% of the subjects disposed while 10.8% of the subjects used the expired products. A significant ($p<0.05$)majority of subjects (54.3%) of the average income group did not find any fungus or adulterants in the packaged food, while 25.8% of the subjects of the same group found adulterants and fungus in the packaged food. From the above results it is evident that education, sex and income levels play an important part in purchasing and using of packaged food. Also illiteracy about packaged food holds back a significant majority of people from enjoying the benefits of packaged food.

Conclusion

An awareness program about the benefits of packaged food is the need of the hour. Also the product expensiveness should be brought down so that all strata of the population can enjoy packaged food due to its palatability, safety and time saving features.

Recommendations

Especially in the case of working women, knowledge about packaged food should be popularized. It is the knowledge about packaged food which will lead to better usage of the product. Also awareness on reading food labels before purchasing packaged food is important and is the need of the hour.

References

1. Diehl JF (2002) Some established facts and some new concepts in food toxicology- A review. Acta Alimentaria 31: 355-369.
2. Abdulmumeen HA, Risikat AN, Sururah AR (2012) Food: Its preservatives, additives and applications. International Journal of Chemical and Biochemical Sciences 1: 36-47.
3. Seetaramaiah K, Smith AA, Murali R, et al. (2011) Preservatives in food products- Review. International Journal of Pharmaceutical and Biological Archives 2: 583-599.
4. Legesse A, Muluken A, Getasew A (2016) A survey on awareness of consumers about health problems of food additives in packaged foods and their attitude toward consumption of packaged foods: A case study at Jimma University. International Food Research Journal 23: 375-380.
5. Kaur VP, Kaur N, Qumar N (2016) Assessment of consumer awareness about usage of food labels and its impact on food buying behaviour. International Journal of Research-Granthaalayah 4: 10-19.
6. Wang G, Fletcher SM, Carley DH (2008) Consumer utilization of food labeling as a source of nutrition information. The Journal of Consumer Affairs 2: 368-380.
7. Brian G, Wilson Sami LB (2005) Adverse reactions to food additives: Review Article. Annals of Allergy, Asthma and Immunology 95: 499-507.
8. Niemeier HM, Raynor HA, Lloyd-Richardson EE, et al. (2006) Fast food consumption and breakfast skipping: predictors of weight gain from adolescence to adulthood in a nationally representative sample. J Adolesc Health 39: 842-849.
9. Keszei AP, Goldbohm RA, Schouten LJ, et al. (2013) Dietary N-nitroso compounds, endogenous nitrosation, and the risk of esophageal and gastric cancer subtypes in the Netherlands Cohort Study. Am J Clin Nutr 97: 135-146.
10. Maier E, Kurz K, Jenny M, et al. (2010) Food preservatives sodium benzoate and propionic acid and colorant curcumin suppress Th1-type immune response in vitro. Food Chem Toxicol 8: 1950-1956.

11. Park S, Blanck HM, Sherry B, et al. (2013) Regularsoda intake independent of weight status is associated with asthma among US high school students. J Acad-Nutr Diet 113: 106-111.
12. McCann D, Barrett A, Cooper A, et al. (2007) Food Additives and hyperactive behavior in 3 year old and 8-9 year old children in the community: A randomized double blinded, placebo controlled trial. The Lancet 370: 1560-1567.
13. Boga A, Binokay S (2010) Food additives and effects to human health. Archives Medical Review Journal 19: 141-154.
14. Stuckler D, McKee M, Ebrahim S, et al. (2012) Manufacturing epidemics: the role of global producers in increased consumption of unhealthy commodities including processed foods, alcohol, and tobacco. PLoS Med 9: e1001235.
15. Harsha HN, Jha AK, Taneja KK, et al. (2013) A study on consumer awareness, safety perceptions and practices about food preservatives and flavoring agents used in packed/ canned foods from South India. Natl J Community Med 4: 402-406.
16. Aoki K, Shen J, Saijo T (2010) Consumer reaction to information on food additives: evidence from an eating experiment and a field survey. Journal of Economic Behavior and Organization 73: 433-438.
17. Wu L, Zhang Q, Shan L, et al. (2013) Identifying critical factors influencing the use of additives by food enterprises in China. Food Control 31: 425-432.
18. http://www.pharmatutor.org/articles/consumer-awareness-nutritional-labelled-foods
19. Coveney J (2007) Food and trust in Australia: building a picture. Public Health Nutrition 11: 237-245.
20. Food safety authority of Ireland (2003) Consumer attitudes to food safety in Ireland, p. 5.
21. FAO/WHO expert consultation (1986) Food protection for urban consumers. Food and Agriculture Organization, Rome, pp: 1-17.
22. Al-Tamimi and Company (2004) Standardization and classification in the UAE: Centre for Food Safety-2006, Benefit of Nutrition information on Food Labels.
23. Emerton V, Choi E (2008) Essential guide to food additives. Leatherhead Publishing, Cambridge, UK.
24. Tomaska LD (2014) Food additives: food additives-general encyclopedia of food safety. Hazards and Diseases 2: 449-454.
25. Bearth A, Cousin M, Siegrist M (2014) The consumer's perception of artificial food additives: Influences on acceptance, risk and benefit perceptions. Food Quality and Preference 38: 14-23.
26. http://fssai.gov.in/portals/0/pdf/15manuals/food additives.pdf
27. Kayisoglu S, Coskun F (2016) Determination of the level of knowledge of consumers about food additives. IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT).
28. Brockman C, Beeren CJM (2011) Additives in dairy foods, consumer perceptions of additives in dairy products encyclopedia of dairy sciences, pp: 41-48.
29. Angis S, Oguzhan P (2008) Su Ürünlerinde Kullanılan Katkı Maddeleri Türkiye 10. Gıda Kongresi, Mayıs, Erzurum, pp: 21-23.
30. Dutta S, Patel D (2017) Study of consumer awareness on food labelling and use of pack information for purchase of pre-packaged food products. International Journal of Indian Psychology.
31. Soon-Mi S, Sun HS, Youngja L, et al. (2011) Consumers' knowledge and safety perceptions of food additives: Evaluation on the effectiveness of transmitting information on preservatives. Food Control 22: 1054-1060.
32. Brewer MS, Rojas M (2012) Consumer's attitude towards issues in food safety. Food Science and Human Nutrition Department, University of Illinois.

***Correspondence to:**

Sachithananthan V

Faculty of Public health

College of Applied Medical sciences

King Khalid University

Khamis Mushayat

Saudi Arabia

Tel: 00966 553243155

E-mail: dr_vedavalli@yahoo.com