



The Food Waste in Five-Star Hotels: A Study on Turkish Guests' Attitudes

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Abstract

That nourishment is seen as an element of pleasure, taste and entertainment beyond a physiological need is causing food waste in hotel business. The food waste in hotels can be categorized into two main dimensions as the causes of business practices and the causes of consumer behavior, and this paper focuses on the latter. The main objective of this research is to determine the Turkish guests' food waste attitudes who are offered buffet service in five-star hotels. Additionally, this study has the sub-objective of determining the relationship between demographic characteristics and personal features of participants and their food waste attitudes. This study uses quantitative research methods and the study population is consisted of Turkish guests from the five-star hotels in Alanya region, and the study sample involves 323 guests from 6 different hotels. As a result of the research, it is examined that Turkish guests have high levels of food waste, and their food waste attitudes differ statistically and significantly based on various demographic characteristics and personal features.

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Introduction

In today's world where the human beings are encouraged to consume constantly with a gratifying consumption appetite (Saad, 2012, p.13), it is significant to consider the limitations of the available resources of the world (Dölekoğlu, Gün and Giray, 2014, p. 172) and accordingly reshape the consumption culture. However, it is clearly known that 56% of the world's food produced in the developed countries and 44% in the underdeveloped countries (WB, 2016) are wasted without using (Gustavsson, Cederberg, Sonesson, Van Otterdijk and Meybeck, 2011, p. 4), which correspond to about one third of the world's food (approximately 1.3 million tons).

It is inevitable based on the relative appetite and enjoyment (Pirani and Arafat, 2014, p. 329) that there might be food waste in the hotel industry, which welcomes guests with different cultures, lifestyles and eating habits at an international level (Omidiani and Hashemi Hezaveh, 2016, p. 676). Besides, food and beverage service concepts which continually changed in the past (Beardsworth and Keil, 2011, p. 173) result in food waste in other hospitality businesses (ARAMARK, 2008, p. 4) as well as in hotel establishments (Pirani and Arafat, 2014, p. 329). Since it is impossible to have a menu suitable for all guests' taste in the hotel business (Maviş, 2008, p. 235), "open buffet" service system that is widely accepted in the world and offers wide and eye-catching options for guests (Marthinsen, Kaysen and Kirkevaag, 2012, p. 30, Lundberg, 1994, p. 164) is seen as a suitable solution in this respect. However, studies have shown that when people have a wide variety of menus, they are taking more food than usual and drink more than normal (Rolls, et al., 1981; Rolls, Rowe and Rolls, 1982; Iyengar and Lepper, 2000; Epstein, Robinson, Roemmich, Marusewski and Roba, 2010; Saad, 2012), and at the end of this consumption, significant increases in plate waste and food waste occur.

In light with this information, this research also focuses on the food waste in the open buffet concept and the consumer behavior dimension of food waste. As a result of this research which is conducted to determine the food waste attitudes of the Turkish guests who received the open buffet service from the five-star hotels in the Alanya province of Antalya and to examine the relationship between food waste attitudes and various demographic characteristics and personal features, it is concluded that the study participants exhibit an underestimated level of food waste attitude. It is also found out that participants' food waste attitudes significantly differ by their gender, marital status and age.

Conceptual Framework

The problem of food waste, which causes social injustice, environmental pollution, ecological equilibrium deterioration, climate change, and economic losses, is one of the most debated topics both in the world of science and it is studied by many international institutions to find possible suggestions and solutions (Gjerris and Gaiani, 2013, p. 6).

When these studies that are on food waste in the world examined, it seems that there is no complete consensus on what the food waste is (Schneider, 2013, p. 187) and no universally agreed definition is available (Lebersorger and Schneider, 2011, p. 1924; Gjerris and Gaiani, 2013, p. 6). While Cathcart and Murray (1939, p. 45) identify food waste by categorizing them as waste (inedible parts such as bones, skin and nerves) and garbage and/also Atwater (1895, p.16) defines food waste as "food that can be eaten but is thrown away without any reason".

Food and Agriculture Organization of the United Nations (FAO), in its 2011 report, divided food waste categories into three as in avoidable, possibly avoidable and unavoidable waste (Parfitt, Barthel and Macnaughton, 2010, p. 3073). Moreover, while Gustavsson et al., (2011, p. 2) defines losses experienced at any stage of the food supply chain such as production, harvesting, storage and processing as food losses, food losses occurring at the end of the food chain are rather called food waste, which relates to consumers' behavior. Besides, The United States Department of Agriculture (USDA) consider food waste as a subset of food loss (Buzby, Wells and Hyman, 2014).

Evidently, it is known that a large part of the food waste in the food supply chain occurs at the retail and consumption stage, especially in food service enterprises (restaurants, cafeterias, fast food and catering services) (WRAP, 2007; Parfitt, Barthel and Macnaughton, 2010, p. 3065; Gunders, 2012, p. 10-11). Similarly, the hospitality industry, which represents one-third of the total food consumption in the world (Marthinsen, Kaysen and Kirkevaag, 2012, p. 15), and the hotel businesses that have a large amount of hospitality capacity especially in international respect are areas of significant food waste and losses (WRAP, 2013, p. 4; Omidiani and Hashemi Hezaveh, 2016, p. 670). Nevertheless, the tourism sector should not be ignored about food waste (Pirani and Arafat, 2014, p. 322), but it is seen that there is a lack of comprehensive studies regarding both determining the quantities of food waste and the reasons that constitute food waste and urgent measures to be taken in this sector (Marthinsen, Kaysen and Kirkevaag, 2012, p. 15).

Food wastage and losses in hotels are spread over a very wide area due to the unique structure of the industry and the wide range of services offered to its guests (Mackenzie, Cheung and Law, 2011, p. 397). Food losses mainly occur at the stages of purchasing, storing, selecting and washing, chopping, cooking, while food waste basically happens at packaged but not consumed food and when customers take more food than they need or leave plate or table waste (Pirani and Arafat, 2014, p.321). Therefore, food waste in the hotel businesses can be defined as the waste of the food that the guests buy as a service (LeanPath, 2008, p. 3).

It is observed that because people are eating out and pay for what they consume, they display more insensitive behavior towards food, take pleasure and enjoyment without any responsibility, and they want to have a good time and have fun (WRAP, 2007; Beardsworth and Keil, 2011, p. 203). Other studies show that people who buy services from hotels, bars, restaurants and similar places change their daily eating habits and waste more food than usual (as cited in WRAP, 2007). Based on this data, it is suggested that guests who are offered open buffet service in all-inclusive systems, especially in holiday resorts, are wasting more food and beverages.

As in other hospitality establishments (ARAMARK, 2008, p. 4), the type of catering served in hotels is one of the important factors contributing to food waste (Pirani and Arafat, 2014, p. 329). For instance, it is basically known that the places where "À la carte" service, is used has less food waste than the ones that implement "Open buffet" service (Hackes et al., 1997 as cited in: Pirani and Arafat, 2014, p. 329). The open buffet service system in which guests can get and eat the food they desire from the buffet many times and without limit has an affordable price and rapidly started to spread all over the world (Lundberg, 1994, p. 164; Marthinsen, Kaysen and Kirkevaag, 2012, p. 30). In addition, it discussed that the nature of human beings involve the feeling of nutrient storage (Saad, 2012, p. 65) against the lack of calorie and uncertainty, and people tend to eat more food than they can with the appeal of food despite the feeling of fullness (Rolls et al., 1981, p. 220; Rolls, Rowe and Rolls, 1982, p. 409;

Iyengar and Lepper, 2000, p. 1003; Epstein et al., 2010, p. 29; Saad, 2012, p. 65) and they can only consume some of the food they get (Rolls et al., 1981, p. 215).

Each food waste occurring in open buffets that exhibit large menus created with more material input, brings significant cost to hotel operations at an additional level (Mackenzie, Cheung and Law, 2011, p. 397; Gunders, 2012, p. 23). Also, garbage resulting from food waste leads to serious environmental losses, such as greenhouse gas formation which cause climate change, land degradation and water resources pollution (WRAP, 2007; Gunders, 2012, p.14; Lipinski et al., 2013, p. 9;).

In the literature, the issue of food waste and losses is analyzed by the interested parties and different scholars through various dimensions in the scientific world. Accordingly, some of the studies carried out around the world can be listed as follows: Food Behaviour Consumer Research-Findings from the Quantitative Survey (WRAP, 2007), Food Waste within Food Supply Chains: Quantification and Potential for Change to 2050 (Parfitt, Barthel and Macnaughton, 2010), Global Food Losses and Food Waste - Extent, Causes and Prevention - FAO 2011 (Gustavsson et al., 2011), Review of Food Waste Prevention on an International Level (Schneider, 2013), Reducing Food Loss and Waste, Installment 2 of Creating a Sustainable Food Future (Lipinski et al., 2013), Food Wastage Footprint: Impacts on Natural Resources - FAO 2013 (FAO, 2013a), Food Waste Harms Climate, Water, Land and Biodiversity - FAO 2013 (FAO, 2013b), Food Wastage Footprint Full - Cost Accounting - FAO 2014 (FAO, 2014), World Bank 2016, Infographic: Food Loss and Waste (WB, 2016). Along with these studies at global context, there are also some studies at the level of regions and countries (Gjerris and Gaiani, 2013; WRAP, 2013; Themen, 2014; Buzby, Wells and Hyman, 2014). In the literature, it is also possible to find various studies (FAO, 2013a; WRAP, 2013; Buzby et al., 2014) about determining the food waste costs.

Apart from these studies, there are a number of studies on food waste which are carried out at the household scale. Some of these are: food waste in homes in the UK (Wenlock, Buss and Derry, 1980), household waste in Australia (Pearson, Minehan and Wakefield-Rann, 2013), Greek households' attitudes and behaviors towards the prevention of food waste (Abeliotis, Lasaridi and Chroni, 2014), and a study on food waste occurring in households (Lebersorger and Schneider, 2011). There is also a case study on food waste in houses: Household food waste study in Ankara province in Turkey (Pekcan, Köksal, Küçükerdönmez and Özel., 2006), and Turkish Grain Board organized "Preventing Bread Waste" campaigns in 2008, 2012, and 2013. Besides, studies on bread waste on the basis of households are conducted in Adana (Gül et al., 2003), Sivas (Aydın and Yıldız, 2011), Van (Koç, 2011), Tokat (Bal, Sayılı and Gözener, 2013), and Isparta (Ertürk, Arslantaş, Sarıca and Demircan, 2015).

It is seen that various studies have been conducted in the tourism sector, especially in hotel enterprises, regarding the food waste. Some of these involve the ones done by (cited in: Pirani and Arafat, 2014; Omidiani and Hashemihazaveh, 2016), Shanklin and Pettay (1993), and Pettey (1993) about the food waste experienced in hotel businesses. Apart from these studies, some studies have been made in different countries that focus on the issue of waste in hotel operations and indicate that food wastes are in the first place among these wastes. It is found out that food wastes are in the first place among general waste types in the studies conducted in; a hotel in Toronto (Shanklin, et al.,1991), In New York hotels (Winter and Azami 1996), in 25 hotels in Los Angeles (Alexander, 2002; Evans, 2008), in more than 30 hotels in Vietnam (Do Nam Trung and S Kumar, 2003), in 138 hospitality

businesses in the UK (WRAP, 2012), and in 35 hotels again in the UK (Parfitt, et al., 2013), in 8 hotels in New Delhi, Noida, Ghaziaabad, and Gurgoan (Amar Naht, 2014). It has been determined in some studies in the literature that the focus is on the open buffet service concept (Schwartz, 2007; Kallbekken and Saelen, 2013).

However, in the literature, we could not find any previous study that focuses on the waste attitudes of the guests who are served open buffet in five star hotels. Hence, due to the objectives set forth, this study is thought to fill this gap in the literature and contribute to the practical applications in the tourism sector. Hypothesis for achieving the main and sub-objectives of the research in this respect are given in Table 1.

Table 1. Hypothesis of the Research

<i>There is no significant relationship between Turkish guests'</i>	(H ₁) genders and food waste attitudes.
	(H ₂) marital status and food waste attitudes.
	(H ₃) ages and food waste attitudes.
	(H ₄) educational levels and food waste attitudes.
	(H ₅) monthly average income and food waste attitudes.
	(H ₆) the frequency of receiving open buffet service from five star hotels (yearly) and food waste attitudes.
	(H ₇) prior experience of staying in a hotel with an open buffet service and food waste attitudes.
	(H ₈) ideas about the relationship between open buffet service and waste and food waste attitudes.

Methodology

The main objective of the study is to determine the food waste attitudes of Turkish guests who are offered service from five-star hotels. With this main objective, this study has the sub-objective of examining the relationship between participants' food waste attitudes and various demographic characteristics and personal features. The research was conducted on Turkish guests staying in five-star hotels in Alanya province in Antalya in September 2016. At the time of the study, there are 57 five-star hotels in Alanya according to the statistics of the Ministry of Culture and Tourism (statistics of certified hotels by Ministry of Culture and Tourism, 2016) . The study population is composed of Turkish guests staying at these hotels. However, it is not possible to reach a definite official statistic concerning the number of Turkish guests staying in these hotels. Therefore, the study population is regarded as a number larger than a million. According to Can (2013, p. 30), a sample that can represent a population of more than one million with a 0,05 margin of error and 0,95 confidence level needs to consist of at least 246 individuals. Questionnaire technique is used as the data collection technique in this paper, and 450 individuals are targeted in the field application of the study. As a result of the interview with the hotels in the study sample, 450 questionnaire form are sent to 6 five-star hotels with permission to conduct surveys. Nevertheless, only 349 of the questionnaires distributed to the field have returned, and 26 of these surveys are not included in the study because they are seriously incomplete and incorrect. As a result, the sample size in this study involve 323 participants. This research adopts convenience sampling method in which individuals are selected from those that are near and easily accessible to the study population (Bhattacharjee, 2012, p. 69). The main reasons for choosing this method, which is an improbable method, because there is a lack of a clear figure on the research sample and it is more cost-effective to reach the participants in this way both in terms of time and economics. In the

study, descriptive research method of quantitative research methods is used, and according to Ural and Kılıç (2011, p. 19), “*descriptive researches are usually applied researches conducted to identify current issues considering the practical benefits.*”

Throughout the study, participants are given a “demographic characteristics and personal features” form (12 items) and a “Food Waste Attitudes Scale” (FWAS) consisting of 29 items and five factors prepared by the study researchers. Because it is not possible to find any scale in the literature that measures the attitudes of the guests in a manner appropriate to the purpose of this study, FWAS is prepared by the researchers. In the preparation of this scale, firstly a literature review is conducted to clearly define the conceptual content of food waste, and then the reasons of food waste on the basis of factors are described to measure the attitudes of the people towards waste judging by data in literature. After the design of the factors, an item pool is created which constitutes the content of each factor. Both in designing the factors related to the causes of food waste and in determining the items that constitute these factors, different studies in the literature (Rolls et al., 1981; Buzby and Guthrie, 2002; Wansink, 2004; Ledikwe, Ello-Martin, & Rolls, 2005; Niemeier, 2005; Rozin, 2005; Quested and Johnson, 2009; Wansink, 2009; Parfitt, Barthel and Macnaughton, 2010; Gustavsson, et al., 2011; Mackenzie et al., 2011; Gunders, 2012; Marthinsen et al., 2012; Saad, 2012; Gjerris and Gaiani, 2013; Kallbekken and Saelen, 2013; Lipinski et al., 2013; Quested, Marsh, Stunell and Parry, 2013; WRAP, 2013; Buzby, Wells and Hyman, 2014; Dölekoğlu et al., 2014; Pirani and Arafat, 2014; Omidiani and Hashemi Hezaveh, 2016; Thyberg and Tonjes, 2016), opinions and professional experiences of sector professionals (such as Vikingen, Alaiye, Gold City, Hedef and Titan hotels), thoughts of general managers and food & beverage managers of five-star hotel businesses and academicians interested in the topic, and the personal experience of researchers are taken into account. The first draft of the scale has Five Point Likert system (1: *strongly disagree*, 3: *moderately agree*, 5: *strongly agree*) and includes 43 items and 4 factors. This draft scale is distributed to 101 Turkish guests as pilot scheme and because of the statistical analyses of the scheme, it is concluded that the scale is most efficient with 29 items and five factors. After various analyzes to achieve the requirements such as reliability, validity and internal consistency, the final draft of FWAS scale has Cronbach’s Alpha coefficient (α) of 0,944 ($>0,70$), and the total variance explained value of five factors is 63,68 ($>0,50$). All the variables shown in Table 2 have $>0,35$ factor loading (see Table 4). The final version of FWAS is presented in Appendix. The final names of the factors and factors contributing to the FWAS are presented in Table 2.

Table 2. Factors and Items of FWAS

Names of factors	Factor codes	Items
Food-based food waste causes	F	1., 2., 3., 4., 5., 6., 7.
Hygiene-based food waste causes	H	8., 9., 10., 11.
Ambiance-based food waste causes	A	12., 13., 14., 15., 16., 17.
Staff-based food waste causes	S	18., 19., 20., 21.
Personal-based food waste causes	P	22., 23., 24., 25., 26., 27., 28., 29.

Findings

Findings about Demographic Characteristics and Personal Features of Guests

The sample distribution in terms of demographic characteristics and personal features is as Table 3.

Table 3. Demographic Characteristics and Personal Features of the Sample

		f	%
Gender	Female	143	44,3
	Male	180	55,7
Marital status	Married	236	73,1
	Single	80	24,8
Age	< 21	14	4,3
	21-30	140	43,3
	31-40	88	27,2
	41-50	54	16,7
	> 50	23	7,1
Education level	Primary school	20	6,2
	High school	107	33,1
	University	165	51,1
	Postgraduate	24	7,4
Monthly average income	≤ 2.000 TL	69	21,4
	2.001-3.000 TL	82	25,4
	3.001-4.000 TL	69	21,4
	≥ 4.001 TL	81	25,1
On average how many times do you get open buffet service from five star hotels per year?	1-3 times	264	81,7
	4-6 times	39	12,1
	> 7 times	13	4,0
Have you ever stayed in a hotel with open buffet service before?	Yes	284	87,9
	No	34	10,5
Do you think open buffet system causes a lot of food waste?	Yes	213	65,9
	Not sure	61	18,9
	No	48	14,9

When demographic characteristics and personal features of 323 guests who are in the study sample are examined (Table 3), it is seen that 44% of the participants are female, and 56% are male guests. Regarding their marital status, a great deal of participants with 73% are married while %25 are single. When the distribution of participants according to their age groups is examined, it can be seen that 48% are composed of people under 30 years old and people over 51 years old is 7%. Based on participants' education level, 59% of them have university or higher education level. With relation to their monthly average income, there is a well-balanced distribution among the four income groups, which shows that 21% have 2000 TL and below, 25% have 2.001-3.000 TL, 21% have 3.001-4.000 TL, and 25% have 4.001TL and above monthly income. When the participants are analyzed according to the frequency of receiving open buffet service from five- star hotels annually, the vast majority with 82% of all express that they get open buffet service from five-star hotels 1 to 3 times per year, and in addition, participants have prior experience of staying in a hotel with open buffet service with a large majority of an 88% rate. Also, 66% of them think that open buffet system causes food waste.

Findings about Scales and Hypothesis

In this section, findings related to the scale used in the research and the hypothesis of the research are explained. The findings of the study are briefly described in this section, and more in-depth evaluations are made in the 'discussion and conclusions' section of the study.

FWAS, which is determined to be composed of 29 items and five factors as a result of the pilot scheme, is re-analyzed in terms of reliability and validity values after the actual application that constitutes the data of this study. The exploratory factor analysis reveals that the FWAS is constructed as 5 factors, but the 3 items are categorized under meaningless factors. After removing these items from the scale, it is seen that the remaining items on the scale are again categorized under 5 factors, the total variance explained value is found to be 68.8%, and the overall reliability coefficient of the scale α : ,930. Rotated component matrix, reliability and KMO coefficients of the scale is presented on Table 4.

Table 4. Rotated Component Matrix, Reliability and KMO Coefficients

Items	Factors				
	Personal-based food waste causes	Hygiene-based food waste causes	Ambiance-based food waste causes	Staff-based food waste causes	Food-based food waste causes
Item P_1	,752				
Item P_2	,752				
Item P_3	,750				
Item P_4	,715				
Item P_5	,694				
Item P_6	,665				
Item P_7	,640				
Item P_8	,412				
Item H_1		,869			
Item H_2		,860			
Item H_3		,798			
Item H_4		,760			
Item A_1			,811		
Item A_2			,778		
Item A_3			,760		
Item A_4			,636		
Item A_5			,489		
Item S_1				,837	
Item S_2				,774	
Item S_3				,727	
Item S_4				,709	
Item F_1					,818
Item F_2					,746
Item F_3					,691
Item F_4					,504
Item F_5					,452
			Total variance explained		0,688
			Overall reliability coefficient		0,930
			KMO test for sampling adequacy		0,909

At the next stage of the study, the factors that constitute FWAS and the mean values of these factors are examined (Table 5).

Table 5. Factors and Means of FWAS

Factors of FWAS	Mean
Ambiance-based food waste causes	3.01
Food-based food waste causes	2.93
Staff-based food waste causes	2.90
General food waste attitude	2.72
Personal-based food waste causes	2.61
Hygiene-based food waste causes	2.21

When participants' food waste attitudes are assessed on the basis of arithmetic means of factors, one can clearly infer that the highest average (\bar{X} : 3.01) is in “*ambiance-based food waste causes*” factor, while the lowest one (\bar{X} : 2.21) is in “*hygiene-based food waste causes*” factor. “*Ambiance-based food waste causes*” factor mainly focuses on the effects of factors such as heat, light, decoration, ventilation, and smell in the restaurant on people’s food waste attitudes. On the other hand, “*hygiene-based food waste causes*” factor basically relates to the effects of factors such as fork, spoon, knife, plate, table and armchair used while eating on individuals’ food waste attitudes. Findings in the research reveal that the hygienic factors are most influential on the food waste attitudes of the Turkish guests and the ambience factors are the least effective. In addition, it is determined that the overall mean value of FWAS is \bar{X} : 2.72. The overall FWAS mean value of less than 3¹ indicates that the participants have such a high level of food waste that cannot be underestimated.

In order to test the hypotheses presented in Table 1, the scale factors are subjected to the normal distribution test using the Kolmogorov-Smirnov method. The analysis results suggest that “*food-based food waste causes*” and “*personal-based food waste causes*” show normal distribution ($p > 0,05$; p : ,064, p : ,087), while “*hygiene-based food waste causes*”, “*ambiance-based food waste causes*” and “*staff-based food waste causes*” do not show normal distribution ($p < 0,05$; p : ,000, p : ,034, p : ,027). In line with these findings, it is decided that both parametric tests and non-parametric tests are to be used to implement the tests for the research hypotheses. To do this, Independent Samples T Test, Mann-Whitney U Test, One Way ANOVA and Kruskal Wallis H tests are used. Only the findings of statistically significant results of the tests are presented in tables (Table 6, 7, 8, and 9).

Table 6. The Relationships between Food Waste Attitude and Gender

(Mann Whitney U Test)

Factors of FWAS	Gender	Mean rank	Mann-Whitney U	Significance
Hygiene-based food waste causes	Female	148,97	11006,5	0,024
	Male	172,35		

As a result of the analysis, it is concluded that attributes regarding the “*hygiene-based food waste causes*” factor significantly differ based on participants’ genders. When the test results of “*hygiene-based food waste causes*”

¹ Because the items in the scale are positive, that factor averages are close to 5 indicates low waste attitude and close to 1 indicates high waste attitude.

factor are examined (Table 6), it is seen that the average of female participants is lower than the average of male participants. This suggests that women are more sensitive to have waste attributes than men with regards to the issue of hygiene. Based on these findings, the H₁ hypothesis of the research is rejected.

Table 7. The Relationships between Food Waste Attitude and Marital Status

(Mann Whitney U Test)

Factors of FWAS	Marital status	Mean rank	Mann-Whitney U	Significance
Hygiene-based food waste causes	Married	150,06	7447,5	0,004
	Single	183,41		

The analysis results suggest that attributes regarding the “*hygiene-based food waste causes*” factor significantly differ based on participants’ marital status. When the test results of “*hygiene-based food waste causes*” factor are examined (Table 7), the average of married participants is lower than the average of single married participants. This also shows that married individuals are more sensitive to hygiene and more vulnerable to food waste. Based on the results obtained, the research hypothesis of H₂ is rejected.

Table 8. The Relationships between Food Waste Attitude and Age

(Kruskal Wallis H Test)

Factors of FWAS	Age	Mean rank	Chi-Square	Significance
Ambiance-based food waste causes	< 21	176,32	12,14542	0,016
	21-30	165,35		
	31-40	151,69		
	41-50	178,9		
	> 50	104,96		

Kruskal Wallis H test result clearly shows that the “*ambiance-based food waste causes*” factor significantly and statistically differ based on participants’ age group. Considering the average sequence values of “*ambiance-based food waste causes*” factor, the highest average is in the 41-50 age group. People in the 41-50 age group do not see this as a reason for food waste, although the ambience is bad. However, when people over age 51 are examined, it is seen that they have the lowest average sequence value. It is quite difficult to explain that there is such a contradictory attitude among the participants in the two age groups that are so close to each other.

Table 9. The Relationships between Food Waste Attitude and Age

(One Way ANOVA Test)

	Sum of squares	df	Mean square	F	Significance
Between groups	9,012	4	2,253	2,782	0,027
Within groups	254,243	314	0,81		
Dependent variable	(I) Age	(J) Age	Mean difference (I-J)	Standard error	Significance
Food-based food waste causes	21-30	< 21	-0,293	0,252	0,772
		31-40	-0,108	0,122	0,903
		41-50	-0,449*	0,144	0,017
		>50	0,057	0,202	0,999

In another analysis, it is seen that the “*food-based food waste causes*” factor significantly and statistically ($p: 0,027$; $p < 0,005$: $F: 2,78$) differ based on participants’ age group. Examining the research finding in detail, one can conclude that participants in 21-30 age group and 41-50 age group have the highest awareness in the “*food-based food waste causes*” factor. This also suggests that while participants in the 21-30 age group are the most inclined group to food waste based on their answers to the questionnaire, those in the 41-50 age group are the least wasting group in this issue. Based on the results obtained for age groups, the H_3 hypothesis of the research is rejected.

Further analysis also concludes that there are no significant relationships between participants’ food waste attitudes and their education level, monthly average income levels, frequency of receiving services from five-star hotels, prior experience of staying in a hotel with an open buffet service, and their ideas about the relationship between open buffet concept and food waste. Based on these results, hypotheses H4, H5, H6, H7, H8 are accepted.

Discussion and Conclusions

When the demographic characteristics and personal characteristics of the 323 guests participating in the questionnaire are examined, 44% are female, and 56% are male guests. When the marital status of the participants is examined, it is seen that 73% are married and 25% are single. Considering the age groups of participants, it is determined that 48% of the participants are composed of individuals under the age of 30 and the percentage of the individuals aged 51 and over is 7%. While the young population has a high rate of going on holiday, this rate falls with age. In Turkey, the need for holidays for people belonging to upper age group can come after other personal needs (Avcıkurt, 2003, p. 100). In this sense, the study shows that participants are at a level of university and higher education with a significant proportion of 59%. When the participants are analyzed in terms of monthly income levels, it is concluded that 47% have 3.000 TL and below monthly income, while the other 47% have 3.001 TL and above monthly income. A very large majority of 82% of the participants get open buffet service from five star hotels at most 1-3 times a year. According to this result, the population that makes up the study sample remarkably gets service from hotels that have open buffet system at least once a year. A very large proportion of the participants, 88%, were previously served by the hotels that provided the open buffet service. In the Turkish tourism sector, especially because of the “*All Inclusive System*”, the open buffet service system has become widespread. Hence, Turkish people also started to prefer hotels that offer open buffet service during their vacations.

The percentage of those who say “no” to the question of “*Do you think the open buffet service system is causing too much food waste?*” is only 15% indicates that Turkish holidaymakers think that the open buffet service is “*causing too much food waste*”. Due to the nature of the tourism sector, it is inevitable that hotel enterprises are experiencing food waste a result of hosting guests with a variety of different cultures, different lifestyles and different eating habits (Omidiani and Hashemi Hezaveh, 2016, p. 676). The fact that the right of food choice in the open buffet system is left to the guests causes more waste compared to other service requests (WRAP, 2013, p. 36). Moreover, the frequent intervals of the meals for the customer satisfaction in the hotel enterprises and the abundance of the food variety due to the structure of the open buffet service, and environmental and psychological factors (Rolls et al., 1981, p. 215) lead people to take more than they can eat, and this may lead to an increase in food waste. Also, being unable to package food left on guests' plates is among the reasons of waste in the open buffet service.

When participants' food waste attitudes are assessed, it is clearly seen that the highest average (\bar{X} : 3.01) is in “*ambiance-based food waste causes*” factor, while the lowest one (\bar{X} : 2.21) is in “*hygiene-based food waste causes*” factor. With its lowest average, hygiene seems to be the main point where Turkish guests are most sensitive and cause food waste. Based on this, negative perceptions about hygiene in the open buffet constitute the most important cause of food waste of the population that makes up the study sample. As in FWAS, when encountered with hygienic problems such as dirty or stained tables, cutlery, and plates or unclean seats, Turkish guests do not consume all of the food on their plates, so they might exhibit food waste attitudes. In general, it is seen that the food waste rate has a mean of \bar{X} : 2.72. The fact that the mean is not over 3 suggests that Turkish guests have food waste attitudes on a moderately high level in the open buffets of the hotel enterprises.

When the relationships between participants' food waste attitudes and their gender are examined, it is determined that women have a tend to waste food due to hygiene-based reasons regarding the “*hygiene-based food waste causes*” factor. It is thought that this situation, in real life, overlaps with the general view that women are more rigorous than men in matters such as hygiene and cleaning. It is also known that in all cultures women are more prone to kitchen work. Accordingly, it is thought that women are more aware of the hygienic problems that can occur in the kitchen or in the food, they behave more carefully toward hygiene issues. On the other hand, this gender-based finding is similar to those of WRAP's study of the "Love Food Hate Waste" in the hospitality industry. In that study, it is also found that women (59%) are more likely to waste the food on their plates than men (41%). Additionally, Koivupuro et al., (2012, p. 188) find out that women living alone make more waste than men.

When the relationships between food waste attitudes and marital status of participants are examined, it is again seen that there is a difference in the factor of “*hygiene-based food waste causes*” factor, and it is determined that married participants exhibit more food waste attitudes than single participants. This finding indirectly contradicts with the study finding of Koivupuro et al., (2012, p. 188) which claims that bachelors or those living alone make more food waste. In addition, various researches (Baker, Fear and Denniss, 2009, p. 8; Williams, Wilkstrom, Otterbring, Lofgren and Gustavsson, 2012, p. 13) conclude that the average number of food wastes per person decreases with the increase of the number of individuals in the family.

When the relationships between participants' food waste attitudes and the age group they are in are examined, participants in the 21-30 age group have relatively the highest food waste level than the other age groups, while the group that exhibits the least food waste attitude in this regard is in the 41-50 age group regarding the “*food-based food waste causes*” factor. The result of younger guests making more food waste than the older seems to overlap with different studies in the literature (Hamilton, Denniss and Baker, 2005; Qusted and Johnson, 2009; Pearson, Minehan and Wakefield-Rann, 2013).

In the study, it is quite striking that there are no significant differences between participants' food waste attitudes and their education level, monthly average income levels, frequency of receiving services from five star hotels, prior experience of staying in a hotel with an open buffet service, and whether they think that the open buffet service system is causing too much food waste.

These findings suggest in terms of food waste attitude that:

- There is no difference between the advanced and the least educated individuals. In other words, high level of education does not make a significant difference in terms of waste attitude.
- There is no difference between the individuals in the high-level income group and the individuals in the low-income group. While this finding overlaps with some of the studies in the literature (Wenlock, Buss and Derry, 1980; Koivupuro et al., 2012), it also contradicts with some others (Atwater, 1895; Cathcart and Murray, 1939; Cox and Downing, 2007; Baker, Fear and Denniss, 2009; Parfitt, Barthel and Macnaughton, 2010).
- There is no difference between individuals with too many open buffet and five-star hotel experience and those with less experience in the same regard.
- Finally, there is no difference between individuals who think that the open buffet service is causing too much food waste and those think opposite.

Recommendations

Various suggestions are developed and suggested below regarding both the studies on food waste and the data from the literature, and the findings obtained in this study:

- Awareness facilities should be done to raise awareness of the society about food waste with the cooperation of hotel enterprises and other stakeholders (public institutions, universities, and NGOs)
- Measuring the waste occurring after open buffet services in terms of quantity, cost and environmental impact and sharing the figures with the public could help and contribute to the increase of awareness. For these measurement facilities, it should be constituted an cooperation organization between Ministry of Culture and Tourism, hotel associations and other NGO's.
- Appropriate curriculum updates should be made in the education in order for individuals to be trained on food waste starting early from primary school level. Students studying tourism and gastronomy in secondary education institutions and universities providing tourism and gastronomy education should take courses about the economic, ecological and social dimensions of the waste.
- It is thought that the presentation of written and visual information can positively affect the consumers to kindly warn them about food waste in the place where the open buffets are located.
- Some of the foods offered at open buffets can be a kind of food that is not suitable for the palatal delight of the guests. This type of food can be taken as plateful by the guests, often by curiosity, and in case of not meeting the taste of the mouth, the food is wasted as garbage. To prevent this, it is regarded more appropriate that serving small quantities of food to each guest, which are also called tester, can help decrease the level of unnecessary food waste.
- As the example cases can be seen in various countries like USA and Norway, reducing the size of services such as plates, cups and ladles in open buffets can be helpful for guests to have self-control while taking foods from the buffet.

- Determining the amount of plate waste occurred as a result of food waste in open buffets and analyzing the resulting wastes can inform hotel businesses about guests' food tendencies and attitudes. According to the obtained results, it is considered that the service of menus in accordance with the guest profile can be beneficial in avoiding food waste.
- Instead of the open buffet service system, A la carte service can be widespread in order to avoid food waste in hotel businesses that provide services in the All-inclusive system.

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Appendix - Food Waste Attitudes Scale (FWAS)

Factor code & Item		Strongly disagree	Disagree	Moderately agree	Agree	Strongly agree
	For each of the following statements, please tick only one which best suits you from the next column.					
F1	Although the food that needs to be cold is warmed up, I consume all the food on my plate.	1	2	3	4	5
F2	Although the food that needs to be hot is cold, I consume all the food on my plate.	1	2	3	4	5
F3	Although I find the presentation of the food not interesting, I consume all the food on my plate.	1	2	3	4	5
F4	Although I take more food than I can eat, I consume all the food on my plate.	1	2	3	4	5
F5	Although I do not know about the content of the food, I consume all the food on my plate.	1	2	3	4	5
F6	Although I take more food than I can consume, I consume all the food on my plate.	1	2	3	4	5
F7	Although I find the look of the food not attractive, I consume all the food on my plate.	1	2	3	4	5
H1	Although the hygiene of the cutlery that I use to eat disturbs me, I consume all the food on my plate.	1	2	3	4	5
H2	Although the hygiene of the plate that I use to eat disturbs me, I consume all the food on my plate.	1	2	3	4	5
H3	Although the hygiene of the seat that I sit to eat disturbs me, I consume all the food on my plate.	1	2	3	4	5
H4	Although the hygiene of the table on which I eat disturbs me, I consume all the food on my plate.	1	2	3	4	5
A1	Although the restaurant is very noisy, I consume all the food on my plate.	1	2	3	4	5
A2	Although the heat conditions in the restaurant disturb me, I consume all the food on my plate.	1	2	3	4	5
A3	Although the music playing in the restaurant disturb me, I consume all the food on my plate.	1	2	3	4	5
A4	Although the ventilation conditions of the restaurant are insufficient, I consume all the food on my plate.	1	2	3	4	5
A5	Although the smell in the restaurant disturbs me, I consume all the food on my plate.	1	2	3	4	5

A6	Although the comfort of my seat that I sit while eating disturbs me, I consume all the food on my plate.	1	2	3	4	5
S1	Although the staff at the restaurant have inadequate interest, I consume all the food on my plate.	1	2	3	4	5
S2	Although the communication between the staff at the restaurant is disturbing, I consume all the food on my plate.	1	2	3	4	5
S3	Although the communication of the staff at the restaurant with me is disturbing, I consume all the food on my plate.	1	2	3	4	5
S4	Although the service quality of the staff in the restaurant is insufficient, I consume all the food on my plate.	1	2	3	4	5
P1	Although I take more food than normal due to the variety in the open buffet, I consume all the food on my plate.	1	2	3	4	5
P2	Although I bring more food I can eat so as not to go back to the open buffet repeatedly, I consume all the food I get.	1	2	3	4	5
P3	Although my psychological condition negatively affect my appetite, I consume all the food on my plate.	1	2	3	4	5
P4	Although the food that attracts my attention in the first place hesitates me after taking to my table, I consume all the food I get.	1	2	3	4	5
P5	Although I know that having too much of food will cause me digestion problems, I consume all the food on my plate.	1	2	3	4	5
P6	Although the food I take with the advice of others does not fit my appetite, I consume all the food on my plate.	1	2	3	4	5
P7	Although the food I take being influenced by other guests does not fit my appetite, I consume all the food on my plate.	1	2	3	4	5
P8	Although I often have meals during the holidays, I always consume all the food on my plate.	1	2	3	4	5