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Ready-to-Eat Breakfast Cereal Consumption Habits of University Students in Manisa Province of Turkey

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Abstract Relationship between ready-to-eat breakfast cereal (RTEC) consumption and nutrient intake of children is extensively studied in the literature. However, little is known about the consumption habits of university students. The objective of this study was to investigate RTEC consumption and buying habits of university students in Manisa, Turkey. A cross-sectional study was conducted on 421 students chosen randomly from Celal Bayar University Muradiye Campus during the spring semester of 2014. Participants were asked to fill out a self- reported questionnaire including 28 questions on their breakfast cereals consumption and buying trends. Gender, age, education programme and place of residence were the independent variables in the study and results were analysed statistically by Pearson chi-squre test using PASW Statistics Ver.18. The main findings in the study were as follows: 43.46% of the participants consumed RTEC and the main reason to consume RTEC was to find it practical. Female participants consumed RTEC more than male participants and participants aged between 19-22 consumed RTEC more than other age groups. 61.75% of the participants consumed RTEC at breakfast, while 25.68% consumed at snack time, 4.92% at lunch and 1.09% at dinner. 66.12% of the consumers consumed RTEC with milk and 24.59% with yogurt. 75.95% of the participants did not consume RTEC with sugar. 78.14% of the consumers found RTEC nutritious and 52.45% consumed with weight reducing diet. 79.16% of the participants consuming RTEC with diet was female. This study showed that university students and especially girls were potential RTEC consumers. Studies on consumption habits of RTEC should be enhanced due to the missing literature in this field.

Keywords: *ready-to-eat cereal, breakfast cereals, consumption habits, university students, Turkey*

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1. Introduction

As it is very well known, breakfast is the first and the most important meal of the day. Ready-to-eat breakfast cereals (RTEC) became prominent as popular breakfast replacers in U.S.A and many European countries. In Turkey, they also attracted attention of children and people on diet as a result of advertisements and new developed products.

Positive effects of RTEC in terms of nutrient intake are stated in several studies. Most of the cereals are fortified with vitamins and minerals and contain dietary fiber. It is reported that children eating cereals consumed significantly less fat and cholesterol [1,2,3,4]. RTEC consumption has also been associated with improving macro and micronutrient intakes and dietary fiber [3,5,6].

Many researchers stated that RTEC consumption was associated with improved overall diet quality [7,8,9,10,11] and improved mental and physical performance [12,13]. On the other hand, regular consumption of RTEC was related with lower body weight [1,14,15,16,17].

Morgan et al. [4] found out in their study that children who consumed RTEC at breakfast 3 or more times a week consumed significantly less fat and cholesterol and more fiber, tiamine, niasin, riboflavine, iron, folacine, pridoxine, vitamines $B_{12,}$ A and D in comparison to children who did not consume RTEC at breakfast. When nutrient composition of three most consumed RTEC were investigated, they consisted 16 nutrients more, but only five nutrients less than a breakfast without cereals. Albertson et al. [1] investigated the relationship of RTEC consumption with body mass index and nutrient intake in children aged 4-12 years old. Children consuming RTEC most frequently were found to have the most appropriate age related BMI and had the lowest risk for overweight. Moreover, they had the most positive nutrient intake profiles. Authors explained the relationship between RTEC consumption and nutrient intake by nutrient fortification and low fat content of the cereals. In the same study, children who frequently consumed cereals had significantly higher intakes of B vitamins, iron, zinc, and calcium and were most likely to meet their recommended levels of these nutrients. Song et al. [18] also reported that people who consumed RTEC at breakfast had significantly higher nutrient intake in comparison to people who did not consumed RTEC at breakfast. RTEC consumption enhanced milk and Ca intake in the study which was subjected to 7403 U.S people aged 4 years and older. Similarly, many researchers [12,19,20,21,22] stated that dairy products and Ca intake increased with

increasing levels of RTEC consumption. This result is not surprising when it is taken into account that RTEC are mostly consumed with milk or yogurt. On the other hand, breakfast cereals consumption will bring a healthy life together with the fact that they will decrease pastry consumption. Thus, several researchers stated that RTEC consumption promoted a healthy life style. Gibson [23] found out that snack food consumption decreased with increasing RTEC consumption in preschool children. Crawley [19] and Bertrais et al. [22] stated that people who consumed 30 g and 40 g RTEC/day respectively consumed less alcohol.

In the lights of mentioned studies on nutrient content of cereals, it is clear that RTEC are important food products especially for children, adolescents and teenagers. When the literature on RTEC is investigated, it is seen that it is mostly focused on children and nutrient intake. Besides children, university students are also an important target profile as they are potential RTEC consumers. However, to the best of our knowledge, there is no research on RTEC consumption habits of university students. The objective of this study was to determine the RTEC consumption and buying habits of university students in Turkey and to contribute to the missing literature in this field.

2. Materials and Methods

Randomly selected and volunteer 421 university students at Celal Bayar University, Muradiye Campus were asked to fill out a self- reported questionnaire including 28 questions on their breakfast cereals consumption and buying habits. The work was carried out during the spring semester of 2014. Including criteria for the participants were being student at Celal Bayar University Muradiye Campus and being volunteer to answer the questionnaire. Excluding criteria for the participants were not being student at Celal Bayar University Muradiye Campus and not being volunteer to answer the questionnaire.

Data collection was accomplished by having the questionnaire filled out by the participants. Before starting, they were given instructions on how to fill out the questionnaire completely and truthfully. Participants marked more than one choice in a question when necessary. There were no open-ended questions in the questionnaire. Questions related to the study were given and discussed in Results and Discussion section.

Data analysis was performed by Pearson chi-square test using PASW Statistics Ver.18 [24]. Gender, age, education programme and place of residence were the independent variables in the study and results were analysed statistically. Reported p values were on the basis of 2-sided tests and compared to a significance level of 5%; differences were considered statistically significant at $p< 0.05$.

3. Results and Discussion

In Table 1, Pearson chi-square and p values of questions in terms of demographic properties were presented.

3.1. Demographic Properties

239 female and 182 male participants from different age groups, place of residence and education programme took part in the study. Different demographic properties of participants were given in Table 2.

3.2. Investigation of Breakfast Consumption

As RTEC consumption is closely associated with breakfast, participants were firstly asked if they had breakfast or not (Q 1). 35.63% of the participants stated that they always had breakfast, while 29.45% generally and 23.75% sometimes had breakfast. However, 11.16% of the participants expressed that they never had breakfast in the morning. The relationship between breakfast habit and gender (p=0.0009) and place of residence (p=0.001) were significant, while age and education programme were not (p>0.05). 41.42% of female participants had breakfast in the mornings, while only 28.02% of female participants had breakfast. 42.64% of university students who stayed at home with parents stated that they had breakfast in the mornings. 40.00% of university students who stayed in state dormitory, 34.54% of students in private dormitory and 19.26% of students who stayed at home with friends had breakfast in the mornings. These findings show that parents and dormitories promoted breakfast consumption as expected. On the other hand, there was no difference in terms of education programme. 36.45% of formal education and 34.86% of evening education stated that they had breakfast in the mornings.

Table 1. Pearson Chi-square and p Values of 28 Questions in Terms of four Demographic Properties

Q	Gender		Age		Education Programme		Place of Residence	
	X^2	p	X^2	p	X^2	p	X^2	p
1	11.685	0.009	7.634	0.571	0.685	0.877	34.111	0.001
2	17.555	0	16.473	0.001	0.022	0.881	11.009	0.026
3	9.639	0.885	28.57	0.988	13.408	0.643	52.354	0.851
4	26.344	0.554	68.831	0.117	34.82	0.175	113.4	0.018
5	57.856	0.052	140.27	0	49.956	0.187	112.28	0.804
6	23.741	0.742	38.673	0.976	31.809	0.328	78.769	0.724
7	11.057	0.198	20.355	0.205	8.144	0.401	28.669	0.233
8	0.637	0.888	2.402	0.879	3.798	0.284	5.311	0.806
9	8.868	0.354	13.298	0.651	19.171	0.014	15.375	0.909
10	2.51	0.775	9.612	0.475	4.431	0.489	12.021	0.677
11	1.3	0.522	2.253	0.689	1.969	0.374	6.533	0.366
12	1.316	0.518	1.413	0.842	2.419	0.298	7.856	0.249
13	3.8	0.15	2.746	0.601	0.989	0.61	6.528	0.367
14	0.125	0.94	5.436	0.245	0.917	0.632	6.937	0.327
15	9.281	0.01	5.117	0.275	1.565	0.457	7.484	0.278
16	0.508	0.776	3.265	0.515	1.156	0.561	19.04	0.004
17	0.587	0.444	1.35	0.509	0.818	0.366	8.541	0.036
18	11.303	0.84	104.68	0	20.462	0.251	44.796	0.717
19	0.502	0.778	5.055	0.282	1.087	0.581	8.882	0.18
20	39.830	0.053	61.613	0.222	22.025	0.736	86.95	0.306
21	5.534	0.354	1.668	0.998	3.037	0.694	11.657	0.705
22	2.606	0.272	6.578	0.16	0.994	0.608	8.594	0.198
23	10.672	0.471	11.573	0.966	11.416	0.409	22.515	0.916
24	0.67	0.413	0.451	0.798	0.151	0.698	0.58	0.901
25	0.015	0.901	3.589	0.166	1.527	0.216	2.584	0.46
26	12.485	0.002	4.467	0.347	1.65	0.438	5.768	0.45
27	3.302	0.509	7.891	0.444	4.209	0.378	8.587	0.738
28	0.998	0.607	3.523	0.474	0.374	0.829	1.936	0.925

Q: question, X2: chi-square, p: statistical p value.

Table 2. Demographic Properties of Participants

Age Groups	n	%	Gender	n	%
<18	5	1.2	Female	239	56.8
19-22	286	67.9	Male	182	43.2
23-26	116	27.6	**Total**	**421**	**100**
27-30	14	3.3			
Total	**421**	**100**			
Education Program	**n**	**%**	**Place of Residence**	**n**	**%**
Formal education	203	48.2	At home with parents	204	48.5
Evening education	218	51.8	At home with friends	109	25.9
Total	**421**	**100**	Private dormitory	55	13.1
			State dormitory	50	11.9
			Student pension	3	0.6
			Total	**421**	**100**

3.3. Investigation of RTEC Consumption

183 of the participants answered the question 'Do you consume RTEC?' (Q 2) positively, while 238 of them stated that they did not consume RTEC. The relationship between RTEC consumption and gender was significant (p=0.00). It was recorded that female participants (68.3%) consumed RTEC more than male participants (31.7%). Similar to gender, relationship between RTEC consumption and age was significant (p=0.001). Ages between 19-22 drew attention with 75.4% among 183 RTEC consuming participants (Table 3).

Table 3. RTEC Consumption in Terms of Age

	Do You Consume RTEC?		
Age	**Yes**	**No**	**Total**
<18	3	2	5
19-22	138	148	286
23-26	42	74	116
27-30	0	14	14
Total	**183**	**238**	**421**

This shows that age is an important factor among university students in terms of RTEC consumption habits. RTEC consumption was in a significant relation (p<0.05) with place of residence (Table 1). Participants who stayed at home with their parents and friends consumed RTEC at most in comparison with participants who stayed in dormitory (Table 4). However, it was expected to find out that students who stayed in dormitory consumed RTEC as a practical breakfast choice more than others.

Table 4. RTEC Consumption in Terms of Place of Residence

	Do you consume RTEC?		
Place of Residence	**Yes**	**No**	**Total**
At home with parents	49	60	109
At home with friends	99	105	204
Private dormitory	22	33	55
State dormitory	13	37	50
Student pension	0	3	3
Total	**183**	**238**	**421**

Answers given to the question 'If you do not consume RTEC, why?' (Q 3) showed no significant relation with gender, age, place of residence and education programme (p>0.05). In Table 5, reasons not to consume RTEC in terms of gender were given.

Table 5. Reasons not to Consume RTEC in Terms of Gender

	Female (%)	Male (%)
I do not find delicious	20.8	21.4
I do not find healthy and nutritive	15.2	12.1
I do not find economical	2.4	4.3
I did not hear about it	1.6	2.1
It is not filling	13.6	16.4
I am not accustomed	46.4	43.6

As seen from the table, mostly given answer in female and male participants was 'I am not accustomed' which shows us that RTEC consumption is a real habit.

Ongoing survey questions were directed to 183 RTEC consuming participants. Answers given to the question 'Why do you consume RTEC?' (Q 4) showed significant relation with place of residence (p=0.018), while gender, age and education programme did not (p>0.05). The common answer 'I find it pratical' among female and male participants drew attention with the highest percentage. It can be said that the main reason for the university students to consume RTEC was to find it practical.

The answers to 'Which variety of RTEC do you prefer?' (Q 5) was significantly related with age (p<0.05), while gender, education programme and place of residence were not (p>0.05). Among the answers, red fruits and mixed fruits were the highest with a percentage of 16.0%. The reason of this may be to add flavor to the neutral flavor of breakfast cereals with dried fruits.

Answers to the question 'Why do you prefer that breakfast cereal' (Q 6) were not related with gender, age, education programme and place of residence (p>0.05). 42.5% of female consumers found that RTEC delicious, while 22.5% found it healthy and nutritious, 10% believed it was filling, 8.8% consumed due to low calorie, 4.4% consumed to meet fruit need, 3.8% because of high fiber content, 3.1% to meet dessert need, 2.5% as an advice and 2.5% because it was popular. Percentages of the answers for male consumers were 31.4%, 28.6%, 12.9%, 4.3%, 4.3%, 4.3%, 2.9%, 5.7% and 5.7% respectively. It is seen from the answers that the main factor affecting RTEC variety choice was flavor, while health and nutrient intake were ranked second.

Answers to the question 'When do you consume RTEC?' (Q 7) were not related with gender, age, education programme and place of residence (p>0.05). 61.75% of the participants consumed RTEC at breakfast, while 25.68% at snack time, 4.92% at lunch, 1.09% at dinner and 1.64% every meal. 5.45% of the participants reported that they consumed RTEC in two meals a day.

Frequency of consumption (Q 8) was not related with gender, age, education programme and place of residence (p>0.05). As seen from Table 6 female participants consumed RTEC more frequently than male participants. Similar to RTEC consumption habits, participants aged between 19-22 years represented the majority (76.92%) of every day RTEC consumers.

Table 6. Frequency of RTEC Consumption in Terms of Gender

	How often do you consume RTEC?				
Gender	**Every day**	**Every other day**	**Several times a week**	**Time does not matter**	**Total**
Female	19	13	35	58	125
Male	7	5	16	30	58
Total	26	18	51	88	183

Answers to the question 'When do you generally prefer RTEC?' (Q 9) were significant for education programme (p=0.014); while they were not for gender, age and place of residence (p>0.05). 41.6% of female participants reported that the time did not matter, 26.3% consumed RTEC when they were on a diet, 24.8% when they had limited time, 7.3% when nobody prepared a breakfast for them. On the other hand, 56.7% of male participants stated that the time did not matter, 25% consumed RTEC when they had limited time, 13.3% when they were on a diet and 5% when nobody prepared a breakfast for them. As expected, female participants preferred RTEC as a diet meal alternative more than males.

Answers to the question 'How do you consume RTEC' (Q 10) were not significant for gender, age, education programme, place of residence (p>0.05). Participants generally (66.12%) consumed RTEC with milk. Yogurt was the second most preferred dairy product (24.59%). 5.46% of the participants consumed RTEC plain, 1.09% with cream, 2.19% plain or with milk, 0.55% with milk or yogurt.

When the question 'Do you add fresh fruit to your RTEC?' (Q 11) was asked, 57.3% of the consumers answered never, 38.9% sometimes and 3.8% always. Fresh fruit addition was not related with gender, age, education programme and place of residence (p>0.05).

Answers to the question 'Do you add dried fruit to your RTEC?' (Q 12) were not significant for gender, age, education programme and place of residence. Only 1.09% of the consumers answered always, while 36.06% answered sometimes and 62.85% never.

Participants were asked if they added nuts, walnut or almond to RTEC (Q 13). Like dried fruit consumption, 58.47% of the consumers did not add nuts to RTEC, while 38.25% sometimes added and 3.28% always added nuts to their RTEC.

Answers to the question "Do you consume RTEC with sugar?" (Q 14) were not significant with age, gender, education programme and place of residence (p>0.05). Surprisingly, 75.95% of the participants denied consuming sugar with RTEC. On the other hand, when RTEC consumption with honey was asked (Q 15) participants were less against honey consumption with a percentage of 56.29%. It was observed that participants preferred honey as a natural sugar source rather than refined sugar. This shows us that consumers are more conscious about their nutrition and health. Honey consumption was significantly related with gender (p=0.010). 44.82% of the male participants and 61.60% of the female participants did not consume RTEC with honey.

Participants were asked if they thought that they met their milk need with RTEC consumption (Q 16) and results were significant with place of residence (p=0.04) while they were not significant with age, gender and education programme (p>0.05). 30% of the participants answering positively stayed at home with friends and 58.0% of them stayed at home with parents. 50.8% of the RTEC consuming participants believed that they met their milk need while 49.2% believed the opposite. As seen from the results, participants were unstable in this regard.

3.4. Investigation of RTEC Buying Habits

Participants were also asked some questions to determine their buying habits. Answers to the question (Table 7) 'Do you find RTEC economical?' (Q 17) were significantly related with place of residence (p=0.026). 79.23% of the university students reported that they found RTEC economical.

Participants were asked what they mind while buying RTEC (Q 18). Answers were significantly related with age (p<0.05). However, gender, education programme and place of residence were not related (p>0.05). Brand and variety were the most marked answers rather than price, popularity, label and habits.

Table 7. Answers to the Question 'Do You Find RTEC Economical?' in Terms of Place of Residence

Place of residence	Do you find RTEC economical?		
	Yes	No	Total
At home with friends	36	13	49
At home with parents	86	13	99
Private dormitory	14	8	22
State dormitory	9	4	13
Total	**145**	**38**	**183**

Answers to the question 'Do you mind label information in RTEC?' (Q 19) were not significant with previously mentioned variables (p>0.05). 66.12% of the consumers minded label information and 74% of this percentage was aged between 19-22 years. Participants who answered yes in the previous question were asked what they minded in the RTEC label (Q 20). Answers were also not significant with previously mentioned variables (p>0.05). Answers were given in Figures 1 and 2. Male participants mostly minded ingredients followed by nutritive value, production and expiry dates. Female participants mostly minded production and expiry dates and ingredients. It was surprising to find out that female participants did not care nutritive value in comparison to male participants.

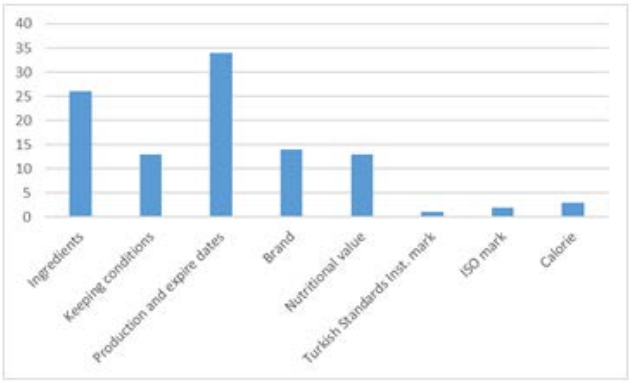

Figure 1. Factors female participants minded in the RTEC label

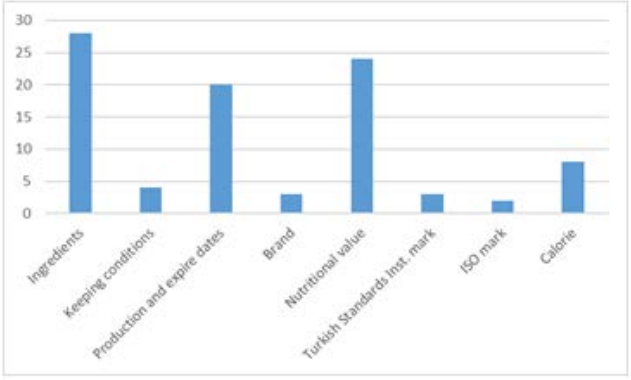

Figure 2. Factors male participants minded in the RTEC label

Answers to the question "Where do you buy RTEC?" (Q 21) were not significantly related with age, gender, education programme and place of residence (p>0.05). 82.51% of the consumers bought RTEC from supermarkets, while 4.91% supplied it from grocery. 12.02% of the consumers stated that the place to buy RTEC did not matter.

Participants were also asked if they bought unpackaged RTEC (Q 22). Answers were not related with the previously mentioned variables (p>0.05). Only 7.11% of the consumers stated that they preferred unpackaged RTEC. This shows that consumers mostly prefer packaged and branded products.

Participants were asked how they decided to buy RTEC (Q 23). As seen from Table 8, participants were mostly affected by TV advertisements followed by market sale. In recent years, TV advertisements about RTEC towards children and people on diet increased considerably and the effect of advertisement in the case of RTEC purchasing is clearly seen in the present study.

Table 8. Factors Affecting Consumer's Decision to Buy RTEC

	Female (%)	Male (%)
TV Advertisement	44.7	38.1
Friends, relatives	12.1	15.9
Newspaper, magazine	2.8	3.2
Internet	7.8	11.1
Market	32.6	31.7

Participants were asked if they minded calorie value while buying RTEC (Q 24). Answers were not related with the previously mentioned variables (p>0.05). Consumers minding calorie value were 47.54%. 71.26% of that percentage was female participants which was not surprising when RTEC consumption with weight reducing diet was considered. Moreover, in the question 26, it was stated that 79.16% of participants who consume RTEC with weight reducing diet was female.

78.14% of the consumers found RTEC nutritious (Q 25) and 52.45% consumed with weight reducing diet (Q 26). Answers to the question 'Do you consume RTEC with weight reducing diet?' were significantly related with gender (p=0.02). 79.16% of the participants consuming RTEC with diet was female and this showed that RTEC was mostly preferred by female participants in the case of weight reducing diet.

When the reason to consume RTEC with weight reducing diet was asked (Q 27) answers were not related with the previously mentioned variables (p>0.05). 41.3% of the female participants consumed RTEC due to low calorie, 37.5% believed it was filling, 13.8% as dietitian's recommendation and 7.5% to meet their daily sugar need. The percentages for the male participants were 33.3%, 33.3%, 28.6% and 4.8% respectively.

The last question which was asked to participants who consumed RTEC with weight reducing diet involved how often they consumed RTEC with diet (Q 28). Answers were not significantly related with the variables mentioned above (p>0.05). 64.5% of the female participants consumed RTEC once a day, 31.6% twice a day and 3.9% three times a day. On the other hand, 71.4% of the male participants consumed RTEC once a day and 28.6% twice a day.

4. Conclusion

Breakfast is a very important meal of the day. Breakfast cereals are common breakfast choice in the U.S.A and European countries. Although traditional Turkish breakfast is still popular among Turkish people, breakfast cereal consumption increased as a result of developing breakfast cereal market in the recent years in Turkey. This study showed that RTEC is popular among university students and especially girls. Practical consumption was the first reason to prefer RTEC. As university students are potential RTEC consumers, more nutritional RTEC varieties must take place in the markets in order to contribute to the physical and mental improvement of rising generation and studies on consumption habits of RTEC should be enhanced due to the missing literature in this field.

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