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The effect of different amounts of soluble-insoluble fibre consumption on colonic transit time in adults

Yetişkin Bireylerde Farklı Miktarda Çözünür-Çözünmez Posa Tüketiminin Kolonik Geçiş Hızı Üzerine Etkisi

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Abstract

Aim: The aim of this study is to search for the effect of different amounts of soluble-insoluble fibre consumption on colonic transit time in adults and to increase the variety of dietary fibre consumption revealing how colonic transit time changes in accordance with fibre types.
Material and Methods: The study was applied on 381 adults who were 19-65 years old and applied to Private Alanya Life Hospital, Bahar Diet Nutrition Consultation Center and Alanyaşam Nutrition Consultation Center. Socio-demographic features, anthropometric features, nutrition habits, exercise habits, dietary fibre knowledge level, frequency of dietary fibre consumption, amounts of water soluble and insoluble fibre and total fibre and the Bristol stool scale chart for determining colonic transit time of people were questioned.
Result: Average amount of daily total fibre consumption of men (24.8±14.0 g) is higher than women (21.7±9.1 g). The Average amount of daily water soluble fibre consumption of men (8.8±5.7 g) is higher than women (7.023±3.3 g). It is found that the Bristol stool score is significantly higher in groups consuming spinach more frequently then when we compare the high Bristol score with normal Bristol score (p=0.025). As a result of The One Way Anova Test to determine whether daily average fibre consumption of women according to the Bristol scale variance, we saw that there is no significant differences between groups (p=0.785). As a result of analysis to determine whether daily average fibre consumption of men according to the Bristol scale variance, we saw that there is no significant differences between groups (p=0.711). Space in the study, daily water soluble and insoluble fibre amounts and total fibre amount were compared with Bristol stool form scales; but there was no significant relationship between the amount of fibre and the scores (p>0,05).
Conclusion: When we compare Bristol stool scores between groups considering fibre types, we saw that spinach, which is a significant source of insoluble fibre type, is consumed more frequently by people having high Bristol score compared with those having normal Bristol score.

Keywords: Fibre type, fibre amount, colonic transit time, fibre consumption

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Amaç: Yetişkin bireylerde farklı miktarda çözünür-çözünmez posa tüketiminin kolonik geçiş hızı üzerine etkisini araştırmak, posanın kolonik geçiş hızı üzerinde olumlu etkilerinin olduğu bilgisinin ötesine geçerek posanın türlerine göre kolonik geçiş hızının nasıl değiştiğini ortaya koyarak posa tüketiminde çeşitliliği artırmak bu çalışmanın amacıdır.
Materyal Metod: Çalışma Özel Alanya Yaşam Hastanesi, Bahar Diyeti Beslenme Danışmanlığı Merkezi ve Alanyaşam Beslenme Danışmanlığı Merkezi'ne başvuran 19-65 yaş arası sağlıklı bireyler üzerinde uygulanmıştır. Bireylerin sosyo-demografik özellikleri, antropometrik ölçümleri, beslenme alışkanlıkları, egzersiz alışkanlıkları, posa bilgi düzeyleri, posa türleri tüketim sıklığı ve günlük suda çözünebilir posa, çözünmez posa ve toplam posa tüketimi miktarları, kolonik transit hızın belirlenmesi için Bristol dışkı formu skalaları sorgulanmıştır.
Bulgular: Erkeklerin günlük ortalama posa tüketimi ortalamaları (24.8±14.0 g), kadınların günlük ortalama posa tüketimi ortalamalarından (21.7±9.1 g) yüksek bulunmuştur. Erkeklerin suda çözünür posa tüketimi ortalamaları (8.8±5.7 g), kadınların suda çözünür posa tüketimi ortalamalarından (7.023±3.3g) yüksek bulunmuştur. Bristol skoru yüksek ve normal bireyleri kıyasladığımızda ıspanağı daha sık tüketen grupta Bristol skorları anlamlı derecede daha yüksek bulunmuştur (p=0.025). Kadın bireylerin günlük ortalama lif tüketimi ortalamalarının bristol skorlar değişkenine göre anlamlı bir farklılık gösterip göstermediğini belirlemek amacıyla yapılan tek yönlü varyans analizi (Anova) sonucunda grup ortalamaları arasındaki fark istatistiksel açıdan anlamlı bulunmamıştır (p=0.785). Erkek bireylerin günlük posa tüketim ortalamalarının bristol skorlar değişkenine göre anlamlı bir farklılık gösterip göstermediğini belirlemek amacıyla yapılan analizler sonucunda grup ortalamaları arasındaki fark istatistiksel açıdan anlamlı bulunmamıştır (p=0.711). Çalışmada günlük suda çözünen ve çözünmeyen posa miktarları ve toplam posa miktarı ile Bristol dışkı formu skalaları karşılaştırılmış; posa miktarı ve skorlar arasında anlamlı ilişki bulunmamıştır (p>0.05).
Sonuç: Posa türlerine göre Bristol skalalaları karşılaştırıldığında ise önemli bir çözünmez posa kaynağı olan ıspanağın Bristol skoru yüksek olan bireyler tarafından normal olan bireylere göre daha sık tüketildiği görülmüştür.

Anahtar Kelimeler: Posa türü, posa miktarı, kolonik geçiş hızı, posa tüketimi

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INTRODUCTION

Dietary fibre is the edible part of plants and carbohydrate anologs that resist digestion and absorbtion and are fermentable partially or completely in small bowel. The classification of dietary fibre in view of physiological effects can be made in two ways: soluble fibre (water soluble) and insoluble (water insoluble). Foods contain a mixture of both where a food that is a good source of soluble fibre can also contain a little insoluble fibre. For example, fruits and vegetables contain pectin (a soluble type of fibre) and cellulose (an insoluble type of fibre) . Fruits mostly contain pectin, vegetables mostly contain cellulose (1,2). Soluble fibre is in apple, sitrus fruits, carrot, oat and psyllium etc. When it contacts with water, it makes up a gel-like substancethat decreases LDL cholosterol, regulates blood sugar level and shows other benefitsof whole grains, beans, and nuts. This type of fibre provides stool transportation throughout intestine and increases stool weight. Insoluble fibre decreases diarrhea and constipation prevalance and helps weight loss and management (3). The older the peoplethe more fiber they need. 5 g fibre a day is enough for children who are older than 2 years. Adults who are older than 20 years need 25-30g fibre a day. This amount should be increased in older adults. Excessive fibre consumption doesn't provide an advantage. 35 g and more fibre consumption a day can cause a defect of other nutrients absorbtion and then deficiencies (4). Dietary fibre affectsthe whole gastrointestinal tract from mouth to anus. High fibre foods generally have less energy density and are consumed in longer time. Soluble fibre delays gastric discharge and acts as a slower passing of food materials throughout the small intestine. On the other hand, insoluble fibre creates intestinal speed (5).

Functional gastrointestinal diseases and functional defects of colon are frequently seen in society. Constipation is the second frequent gastrointestinal symptom that has ever been reported and its frequencyratio changes between 2% and 28% because of different-definitions about it. In Turkey, this frequency ratio changes between 29% and 40%. Constipation is more frequent in females and older adults in Turkey (6). Most common causes of constipation are situations like malnourishment, irritable bowel syndrome, weak bowel movements, pseudo-constipation, travelling, pregnancy, medications, colonic motility diseases, cracks and hemmoroids (7).

Colonic transit time states how long foods transit in bowel. The truest technical term is oro-cecal transit time for transit time. It is an important term, because the ratio of all foods passing in the intestinal tract determines how nutrients are absorbed effectively. The ratio of all foods passing in the intestinal tractaffects fermentation that is connected with a healthy bowel flora (8). Bristol stool scale is the gradation of stool density as visual. This scala is evaluated as an indicator of gastrointestinal transit time. It is used by Europe Clinical Microbiology and Clostridium Difficile Infection Disease Society for dierrhea definition (9). Type 1 shows that stool stays in the bowel the longest time while type 7 shows the shortest time (Figure 1). A normal stool must be like type 3 or type 4. Normal transit time depends on normal bowel habits of peoples and in normal transit time there is a defecationonce a day or at least 3 times a week (10).

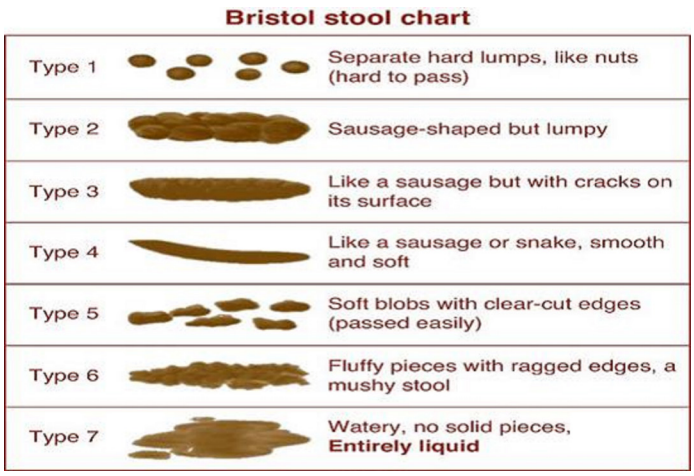

Figure 1. Bristol stool scale chart (10)

MATERIAL and METHODS

This study was performed on381 healthy people 220 of whom were women and 161 of whom were men. The 381 healthy people whoapplied to Alanya Life Hospital, Bahar Diet Nutrition Consultation Center and Alanyaşam Nutrition Consultation Center between 2016 and 2017. People in this study didn't haveany chronical diseases diagnose (heartdiseases, liver diseases, kidney diseases, diabetes, people with any gastrointestinal conditions which were needed to take antidiarrheal or constipation drugs, inflamatuary bowel disease (chrone, ulcerative colitis, spastic colon, diverticuler colon diseases), weren't in pregnancy term, didn't useany antibotic drugs for the last two months, didn't take any vitamin or mineral supplements, weren't a vegeterian, didn't use any prebiotic or probiotic drugs.

Data collection tools

Study datas were collected-byquestionnaire form which contained 37 questions on the purpose of determiningsocio -demographic properties, nutrition habits and bowel movements. The questionnaire form contained demograpghic properties (age, education status, social assurance etc.), nutritional habits, defecation habits, exercise habits, fibre information levels, stool consistence scale (bristol stool scale chart), the status of whether people consume different fibre types and consumption frequencies of fibre types and 3 days food consumption register.

Ethical committee

Permission that was needed for carrying out the study was taken from Acıbadem University Ethical Committee.

Statistical Analysis

While the findings were assesed obtained from the study,SPSS 24.0 Statistic Packet Programme was used. While the study datas were assesed, descriptive statistical methods (frequency, percentage, mean, standart deviation)

were used. Pearson Chisquare Test and Fisher Exact Test were used in comparison of categorical datas. Test and ANOVA were used in parameters between groups. Results were assesed in 95 % confidence interval.

RESULTS

The people's sociodemographic properties were given in Table 1. 42.3 % of them were 29 years and below, 36.2 % were 30-39 years, 14.2 % of them are 40-49 and 7.3 % of them were 50 years and over. 57.7 % of people were female, 42.3% of them were male. The people's averages of the anthropometric measures to sex was shown in Table 2. 51.4% of females were normal, 43.5% of males were overweight. This difference in body mass index was found significant in terms of statistical (p=0.000). The average fat percentage of female (28.8 %) washigher than male (21.1%). This difference between males and females was found significant (p=0,000).

Bristol stool scale of people to food consumption frequencies were shown in Table 3 and Table 4. It was compared consumption frequency of some foods with bristol stool scales. In the table, in 49% of people having a low Bristol score,spinach (is a source of insoluble fibre) consumption frequency was 1-2 times a week. In 57% of people having a middle Bristol score and 42% of people having a high Bristol scores, spinach consumption frequency was 1-2 times a week. When it was compared people having normal Bristol scores and low Bristol scores, it was shown that, in both groups, spinach consumption was the most frequent in 1-2 times a week.

Table 1. Sociodemographic properties of people

	Sociodemographic properties	n	%
	29 yearsand below	161	42.3
	30-39 years	138	36.2
Mean of age group	40-49 years	54	14.2
	50 years and over	28	7.3
	Total	381	100.0
	Female	220	57.7
Sex	Male	161	42.3
	Total	381	100.0
	Illiterate	3	0.8
	Literate	3	0.8
	Primary school graduate	50	13.1
Education level	Secondary shcool graduate	31	8.1
	High school graduate	148	38.8
	University or college graduate	146	38.3
	Total	381	100.0
	Not working/housewife	73	19.2
	Student	48	12.6
	Retired	7	1.8
	Worker	126	33.1
	Officer	40	10.5
Job	Self-employement	50	13.1
	Engineer	9	2.4
	Tourism professional	13	3.4
	Trainer	2	0.5
	Doctor/Dietitian/Physiotherapist	11	2.9
	Total	2	0.5

Table 2. Averages of the anthropometric measures to sex

Anthropometric measures		Female n(%)	Male n(%)	p
	<25	129(58.6%)	69(42.9%)	
Body mass index (kg/m2)	≥25	91(41.4%)	92 (57.1%)	0.002
	Total	220(100%)	161 (100%)	
	Weak (<18,5 kg/m2)	16(7.3%)	2(1.2%)	
	Normal (18,5-25 kg/m2)	113 (51.3%)	67 (41.6%)	0.000
Body mass index (kg/m2)	Overweight (25-30 kg/m2)	57(25.9%)	70 (43.5%)	
	Obese(>30 kg/m2)	34(15.5%)	22 (13.7%)	
	Total	220(100%)	161(100%)	
	<80	91 (41.4%)	<94 73 (82.0)	
Waist circumference (cm)	>80	129(58.6%)	>94 88 (54.7%)	
	Total	220(100%)	381(100%)	
	<0.8	93(42.3%)	<1 132(82.0%)	
Waist/hip ratio	>0.8	127(57.7%)	>1 29(18.0%)	
	Total	220(100%)	161(100%)	
	<0.4	4(1.7%)	0(0.0%)	
	0.4-0.5	103(47.0%)	55(34.2%)	0.006
Waist/height ratio	>0.5	112(51.3%)	106(65.8%)	
	Total	220(100%)	161(100%)	
Fat percentage mean (%)		28.8±9.1	21.2±7.7	0.000
Fat mass mean (g)		20.0±9.6	17.8±8.5	0.021
Fat free mass mean (g)		45.3±5.9	62.7±7.8	0.000
Body water mean(g)		33.5±19.4	43.7±6.2	0.000

Table 3a. Bristol stool scale of people to food consumption frequency I

Food consumption frequency		Low scores (1,2)-slow transit		Middle scores (3,4)-normal transit		High sco- res(5-7)-Quick transit and impaired rectal sensivity		p
		n	%	n	%	n	%	
Rye bread	Everyday	13	44.8%	41	34.2%	6	33.3%	.953
	1-2 times a week	8	27.6%	34	28.3%	7	38.9%	
	3-4 times a week	2	6.9%	14	11.7%	2	11.1%	
	1 time in15 days	2	6.9%	12	10.0%	1	5.6%	
	1 time a month and less frequent	4	13.8%	19	15.8%	2	11.1%	
Wheat bread	Everyday	12	36.4%	41	30.4%	7	31.8%	991
	1-2 times a week	10	30.3%	46	34.1%	8	36.4%	
	3-4 times a week	4	12.1%	13	9.6%	1	4.5%	
	1 time in 15 days	2	6.1%	11	8.1%	2	9.1%	
	1 time a month and less frequent	5	15.2%	24	17.8%	4	18.2%	
Bulgur	Everyday	5	9.1%	12	5.7%	2	4.9%	.547
	1-2 times a week	31	56.4%	131	62.1%	26	63.4%	
	3-4 times a week	7	12.7%	35	16.6%	8	19.5%	
	1 time in 15 days	6	10.9%	21	10.0%	5	12.2%	
	1 time a month and less frequent	6	10.9%	12	5.7%	0	0.0%	
Cabbage	Everyday	6	11.8%	17	8.6%	4	11.4%	.697
	1-2 times a week	27	52.9%	84	42.4%	15	42.9%	
	3-4 times a week	5	9.8%	21	10.6%	4	11.4%	
	1 time in 15 days	2	3.9%	34	17.2%	6	17.1%	
		11	21.6%	41	20.7%	6	17.1%	

Table 3b. Bristol stool scale of people to food consumption frequency I

Food consumption frequency		Low scores (1,2)-slow transit		Middle scores (3,4)-normal transit		High sco- res(5-7)-Quick transit and impaired rectal sensivity		p
		n	%	n	%	n	%	
Broccoli	Everyday	1	2.3%	5	2.7%	3	10.3%	.153
	1-2 times a week	24	54.5%	95	51.6%	12	41.4%	
	3-4 times a week	8	18.2%	16	8.7%	3	10.3%	
	1 time in15 days	3	6.8%	27	14.7%	2	6.9%	
	1 time a month and less frequent	8	18.2%	41	22.3%	9	31.0%	
Cauliflower	Everyday	1	2.1%	5	2.8%	2	5.9%	575
	1-2 times a week	27	56.2%	88	49.4%	17	50.0%	
	3-4 times a week	3	6.2%	15	8.4%	2	5.9%	
	1 time in 15 days	3	6.2%	33	18.5%	5	14.7%	
	1 time a month and less frequent	14	29.2%	37	20.8%	8	23.5%	
Spinach	Everyday	5	9.4%	3	1.5%	1	2.6%	.025
	1-2 times a week	26	49.1%	117	57.6%	16	42.1%	
	3-4 times a week	7	13.2%	16	7.9%	6	15.8%	
	1 time in 15 days	10	18.9%	31	15.3%	10	26.3%	
	1 time a month and less frequent	5	9.4%	36	17.7%	5	13.2%	
Banana	Everyday	11	17.2%	51	22.0%	11	24.4%	.830
	1-2 times a week	38	59.4%	108	46.6%	19	42.2%	
	3-4 times a week	7	10.9%	31	13.4%	6	13.3%	
	1 time in 15 days	4	6.2%	19	8.2%	4	8.9%	
	1 time a month and less frequent	4	6.2%	23	9.9%	5	11.1%	

Table 4a. Bristol stool scale of people to food consumption frequency II

Food consumption frequency		Low scores (1,2)-slow transit		Middle scores (3,4)-normal transit		High sco- res(5-7)-Quick transit and impaired rectal sensivity		p
		n	%	n	%	n	%	
Apple	Everyday	17	27.0%	95	41.1%	20	44.4%	.401
	1-2 times a week	31	49.2%	79	34.2%	15	33.3%	
	3-4 times a week	10	15.9%	29	12.6%	4	8.9%	
	1 time in15 days	2	3.2%	11	4.8%	3	6.7%	
	1 time a month and less frequent	3	4.8%	17	7.4%	3	6.7%	
Pear	Everyday	6	10.2%	22	11.0%	6	16.7%	.661
	1-2 times a week	34	57.6%	98	49.0%	20	55.6%	
	3-4 times a week	6	10.2%	25	12.5%	5	13.9%	
	1 time in 15 days	2	3.4%	17	8.5%	2	5.6%	
	1 time a month and less frequent	11	18.6%	38	19.0%	3	8.3%	
Avacado	Everyday	10	20.4%	44	22.0%	5	13.9%	.529
	1-2 times a week	21	42.9%	75	37.5%	17	47.2%	
	3-4 times a week	8	16.3%	24	12.0%	6	16.7%	
	1 time in 15 days	5	10.2%	15	7.5%	4	11.1%	
	1 time a month and less frequent	5	10.2%	42	21.0%	4	11.1%	
Carrot	Everyday	12	20.3%	36	17.0%	11	25.0%	.410
	1-2 times a week	34	57.6%	101	47.6%	15	34.1%	
	3-4 times a week	5	8.5%	39	18.4%	9	20.5%	
	1 time in 15 days	3	5.1%	11	5.2%	3	6,8%	
	1 time a month and less frequent	5	8.5%	25	11.8%	6	13.6%	

Table 4b. Bristol stool scale of people to food consumption frequency II

Food consumption frequency		Low scores (1,2)-slow transit		Middle scores (3,4)-normal transit		High sco- res(5-7)-Quick transit and impaired rectal sensivity		p
		n	%	n	%	n	%	
Orange	Everyday	14	24.1%	74	33.3%	11	26.2%	.555
	1-2 times a week	33	56.9%	94	42.3%	17	40.5%	
	3-4 times a week	6	10.3%	30	13.5%	8	19.0%	
	1 time in15 days	3	5.2%	10	4.5%	2	4.8%	
	1 time a month and less frequent	2	3.4%	14	6.3%	4	9.5%	
Peach	Everyday	11	19.3%	49	24.9%	10	25.6%	.771
	1-2 times a week	27	47.4%	82	41.6%	19	48.7%	
	3-4 times a week	8	14.0%	26	13.2%	5	12.8%	
	1 time in 15 days	5	8.8%	12	6.1%	0	0.0%	
	1 time a month and less frequent	6	10.5%	28	14.2%	5	12.8%	
Apricot	Everyday	12	25.5%	35	20.6%	13	36.1%	.310
	1-2 times a week	17	36.2%	60	35.3%	12	33.3%	
	3-4 times a week	8	17.0%	25	14.7%	3	8.3%	
	1 time in 15 days	5	10.6%	10	5.9%	3	8.3%	
	1 time a month and less frequent	5	10.6%	40	23.5%	5	13.9%	
Haricot bean	Everyday	3	4.5%	7	3.0%	0	0.0%	.739
	1-2 times a week	37	55.2%	111	47.4%	22	48.9%	
	3-4 times a week	5	7.5%	12	5.1%	3	6.7%	
	1 time in 15 days	15	22.4%	77	32.9%	14	31.1%	
	1 time a month and less frequent	7	10.4%	27	11.5%	6	13.3%	

Table 4c. Bristol stool scale of people to food consumption frequency II

Food consumption frequency		Low scores (1,2)-slow transit		Middle scores (3,4)-normal transit		High sco- res(5-7)-Quick transit and impaired rectal sensivity		p
		n	%	n	%	n	%	
Lentil	Everyday	2	3.1%	18	7.6%	3	6.7%	.571
	1-2 times a week	37	57.8%	112	47.5%	24	53.3%	
	3-4 times a week	6	9.4%	23	9.7%	7	15.6%	
	1 time in15 days	12	18.8%	53	22.5%	9	20.0%	
	1 time a month and less frequent	7	10.9%	30	12.7%	2	4,4%	
Walnut	Everyday	29	42.6%	93	39.2%	19	44.2%	.345
	1-2 times a week	23	33.8%	86	36.3%	13	30.2%	
	3-4 times a week	4	5.9%	23	9.7%	6	14.0%	
	1 time in 15 days	8	11.8%	16	6.8%	0	0.0%	
	1 time a month and less frequent	4	5.9%	19	8.0%	5	11.6%	
Almond	Everyday	18	29.0%	59	28.6%	11	26.2%	.936
	1-2 times a week	27	43.5%	82	39.8%	17	40.5%	
	3-4 times a week	5	8.1%	23	11.2%	7	16.7%	
	1 time in 15 days	7	11.3%	19	9.2%	4	9.5%	
	1 time a month and less frequent	5	8.1%	23	11.2%	3	7.1%	

When the other frequency status were examined, it was shown that 19% of people having slow bristol score consumed spinach 1 time in 15 days, 17% of people having normal Bristol score consumed spinach 1 time a month or less. When it was compared, people having normal and high Bristol scores in both group, spinach consumption was 1-2 times a week mostly. When we examine the next majority of frequences, 17% of people having normal Bristol score consumed spinach 1 time a week, 26% of people having high bristol score consumed spinach 1 time in 15 days. Difference between groups found significant in terms of statistical (p=0.025).

Comparison of male' and female's bristol scores to status of fibre consumption sufficiency was shown in Table 5. It was shown that the comparison of male,and female's bristol scores status of fibre consumption sufficiency. While 21% female people consuming insufficient amount of fibre had low bristol scores, 19% of female people consuming sufficient amount offibre had low bristol score. This difference between groups wasn't significant statistically (p=0.824).

5% of male consuming sufficient amount fibre had low bristol score, while 17% of insufficient amount fibre had low bristol score. This difference wasn't found significant statistically p=0.426).

Comparing daily average total, insoluble and soluble fibre amounts and bristol scores by grouping temper to people's boy mass index were shown in Table 6 and Table 7.

The daily average fibre consumption of people whose body mass index was 25 kg/m^2 and over (25.4 g±12.47585) was found significantly higher than people whose body mass index was 25 kg/m^2 (20.6 g±10.10302) below (p=0.01).

Table 5. Comparison of male' and female's bristol scores to status of fibre consumption sufficiency

FEMALES		25 g and below		25 g and over		p
		n	%	n	%	
Bristol Scores	Low scores (1,2)-slow transit	33	21.0%	12	19.0%	.24
	Middle scores (3,4)-normal transit	103	65.6%	44	69.8%	
	High scores(5-7)-High sco-res(5-7)-Quick transit and impaired rectal sensivity	21	13.4%	7	11.1%	
		38 g and below		38 g and over		p
		n	%	n	%	
Bristol Scores	Low scores (1,2)-slow transit	25	17.5%	1	5.6%	.426
	Middle scores (3,4)-normal transit	99	69.2%	14	7.8%	
	High scores(5-7)-High sco-res(5-7)-Quick transit and impaired rectal sensivity	19	13.3%	3	1.7%	

The average insoluble fibre consumption of people whose body mass index was 25 kg/m^2 and over (15.2 g±8.10010) was significantly higher than the average insoluble fibre of people whose body mass index was 25 kg/m2 below (11.5 g±5.80687) (p=0.001).

Comparison of whole people's Bristol scores temper to their total, soluble and insoluble fibre amount was shown in Table 8. Differences of total, soluble and insoluble fibre amount between groups temper to Bristol scores variable weren't found significant (p>0.05).

Table 6. Comparing daily average total, insoluble and soluble fibre amounts and bristol scores by grouping temper to people's boy mass index I

	Bristol scores	BMI group	Average	Sd.	n	p
Daily average total fibre (g)	Low scores (1,2)-slow transit	25 kg/m² below	19.4217	6.47714	41	
		25 kg/m² and over	25.9770	17.67542	30	
		Total	22.1915	12.80779	71	
	Middle scores (3,4)-normal transit	25 kg/m² below	20.8160	10.73253	136	
		25 kg/m² and over	26.1876	11.62804	124	.199
		Total	23.3778	11.46638	260	
	High scores(5-7)-Hi- gh scores(5-7)-Quick transit and impaired rectal sensivity	25 kg/m² below	22.3252	11.73735	21	
		25 kg/m² and over	21.8497	8.83355	29	
		Total	22.0494	10.04373	50	
	Total	25 kg/m² below	20.6874	10,10302	198	
		25 kg/m² and over	25.4656	12.47585	183	01
		Total	22.9824	11.54021	381	

Table 7. Comparing daily average total, insoluble and soluble fibre amounts and bristol scores by grouping temper to people's boy mass index II

		BMI group	Average	Sd.	n	p
Daily average total fibre (g)	Low scores (1,2)-slow transit	25 kg/m² below	11.0629	4.00712	41	
		25 kg/m² and over	16.1963	9.58503	30	
		Total	13.2320	7.33204	71	
	Middle scores (3,4)-normal transit	25 kg/m² below	11.5211	5.95121	136	
		25 kg/m² and over	15.5474	8.09508	124	.199
		Total	13.4413	7.32400	260	
	High scores(5-7)-High scores(5-7)-Quick transit and impaired rectal sensivity	25 kg/m² below	13.1286	7.60757	21	
		25 kg/m² and over	13.0200	6.07898	29	
		Total	13.0656	6.68895	50	
	Total	25 kg/m² below	11.5967	5.80687	198	
		25 kg/m² and over	15.2533	8.10010	183	01
		Total	13.3530	7.22854	381	
	Bristol scores	**BMI group**	**Average**	**Sd.**	**n**	**p**
Daily average total fibre (g)	Low scores (1,2)-slow transit	25 kg/m² below	6.4117	2.61960	41	
		25 kg/m² and over	8.2737	6.22822	30	
		Total	7.1985	4.56615	71	
	Middle scores (3,4)-normal transit	25 kg/m² below	7.3650	4.91639	136	
		25 kg/m² and over	8.5099	3.97023	124	.324
		Total	7.9110	4.51805	260	
	High scores(5-7)-High scores(5-7)-Quick transit and impaired rectal sensivity	25 kg/m² below	8.1100	4.87814	21	
		25 kg/m² and over	7,4834	4.57532	29	
		Total	7.7466	4.66609	50	
	Total	25 kg/m² below	7.2466	4.53952	198	
		25 kg/m² and over	8.3085	4.49340	183	.182
			7.7567	4.54265	381	

Table 8. Comparison of whole people's bristol scores temper to their total, soluble and insoluble fibre amount

Bristol scores	Low scores (1,2)-slow transit		Middle scores (3,4)-normal transit		High scores(5-7)-Quick transit and impaired rectal sensivity		F	P
	Average	Sd.	Average	Sd.	Average	Sd.		
Daily average total fibre (g)	23.043	17.982	25.369	13.410	23.872	12.112	0.342	0.711
Daily average insoluble fibre (g)	13.417	9.621	13.976	7.917	13.006	7.979	0.154	0.857
Daily average soluble fibre (g)	8.057	6.414	8.865	5.542	9.041	5.877	0.241	0.786

DISCUSSION

The aim of this study is to determine the effect of different amounts of soluble-insoluble fibre consumption on colonic transit time in adults, beyond dietary fibre positive effects on colonic transit time and to increase the variety of dietary fibre consumption revealing how colonic transit time changes in accordance with fibre types. In studies performing about colonic transit time, foods quering to determine of which fibre types are consumed is restricted. In our study, foods were questioned in detail. In our study, the relations- hip between soluble-insoluble and total fibre amount and colonic transit speed was also questioned.

In a study that was a randomise cross-sectional performing by Lybus et al. (1983), they wanted to anaylise the effects of dietary pectin (12 g/day), cellulose (15 g /day) and lignin (12 g/day) on stool properties. Consequences of the study; it was shown that, pectin didn't show any effect on average stool pH, transit time and 24 hour wet stool mass; cellulose decreased average stool pH from 6.38 to 6.25, it decrased transit time 27% and increased wet stool mass 57%; lignin decreased stool pH from 6.34 to 6.25, it decrased stool transit time 20% and increased wet stool mass 27%, but these changes weren't significant statistically (13). In our study, it was compared insoluble fibre sources containing much cellulose with Bristol scores. When people having normal and high Bristol scores were compared, in both groups, spinach (contains high cellulose) consumption frequency was mostly seen in 1-2 times a week. When we examine the other majorities, it was shown that 17% of people having normal Bristol scores consumed spinach 1 time or less a month, 26% of people having high Bristol scores consumed spinach 1 time in 15 days. This difference between groups was found significant statistically. In view of this consequence, when it was compared, people having high and normal Bristol scores, in groups consuming spinach more frequent, Bristol scores were significantly higher. When it was compared, people having normal and high colonic transit time, it can be stated that colonictransit speed increases by increasing insoluble fibre consumption. Meier et al. (1993), had a study that they wanted to see the effects of the liquid diet that was added soluble and insoluble fibre on intestinal transit and cholecystokinin releasing in. According to the result of this study, adding 21g soluble fibre to a liquid diet didn't affect orocecal transit time. In addition, when fibre added diet compared with liquid diet (39 hours) and normal diet (30 hours) , colonic transit time was prolonged (55 hours) and stool frequency and consistency weren't affected in fibre added diet (14). In our study, Bristol scores of people whose consumption of soluble fibre most were found higher (9 g±5.8). This situation was shown that soluble fibre increases colonic transit time. However this result wasn't found statistically significant. This result may be based on people's error statement of foods consumption amounts, or may be based on wrong or deficient answers to the bristol scores. It is known that bristol stool scale isn'tonly the factor determining colonic speed. So, the result may also be nonsignificant for this reason. Cummings et al., (1976) performed a study they wanted to observe changes on fecal composition and colonic function in view of grain fibre consumption in. As a result, they reported that increasing dietary fibre from 17 g/day to 45 g/day increased fecal weight and decreased transit time (15). In our study, it was compared toseveral foods that contain grain with Bristol scores and it was found, there wasn't any differences between the groups. Sung IK et al. (2000), performed a study that they aimed to evolute the effects of dietary fibre on normal bowel habit and transit time in healthy people. The result of the study was that, decreasing dietary fibre consumption was related toincreased transit time and the result was statistically siginficant (16). In our study, it examined the effects of total, soluble and insoluble dietary fibre amounts andeffects of the dietary fibre types on colonic transit time.

As a result, it was seen that people consumed the most amount of total fibre had normal Bristol score. This result wasn't statistically significant. If there was a significant result, we could say,the more people consume total fibre, the more they had colonic transit time.

It is seen that studies about the effect of fibre type and amount on colonic transit speed are limited. Additionally, foods quering in studies were limited also. In our study, consumption frequency of foods containing soluble and insoluble fibre was widely queried with “Food Frequency Quesitonnaire”. The amount of soluble and insoluble fibre consumption was obtained with 3 days food consumption registered.

When a normal Bristol score and a low Bristol score were compared, spinach consumption was the most frequent in 1-2 times a week. Therefore, performing the comparison with the other frequency status' and it was shown that 19% of people havinga low Bristol score consumed

spinach 1 time in 15 days, 17% of people having a normal Bristol score consumed spinach 1 time a month or less. When it was compared people having a normal and a high Bristol score in both groups, spinach consumption was 1-2 times a week mostly. When the next majority of frequencies were examined, it was shown that 17% of people having normal Bristol scores consumed spinach 1 time a week, 26% of people having a high Bristol score consumed spinach 1 time in 15 days. Difference between the groups was found significantly in terms of statistical. With reference to this result, when it was compared people having high and normal Bristol scores, the Bristol scores were statistically higher in groups that consumed spinach more frequently.

In other words, we can say the more frequent consumption of insoluble fibre the faster colonic transit time it causes, when we compare people having normal and high colonic transit speed, we can say the more insoluble fibre consumption the more colonic transit speed it causes for spinach (a source of insoluble fibre).

In the study, foods like rye and whole wheat bread, bulgur, banana, apple, orange, apricot, pear, avacado, carrot, haricot, cabbage, cauliflower, broccoli, asparagus, almond, walnut,lentil were compared with Bristol scores but the results weren't found satistically significant. One of the most important causes of limited significant datacould be the difficulty oftheir amount and frequency of their food consumption when they have completed the food consumption record and food frequency questionnaire. In addition, the next missing aspect of the study is that the amount of foods were not asked in a day on food frequency questionnaire. For this reason, taking frequency as a criteria only is also one of a missing aspect of the study.

One of the hypothesis of the study was "the more it is consumed variety fibre, colonic transit speed shows variety too". The second hypothesis was "the more it is consumed, amount fibre,the faster colonic transit consists". When the findings are studied, colonic transit speed changes depending on fibre variety but the results aren't statisticially significant (Table 3 and Table 4). The second hypothesis' findings are seen in Table 6. In the table, the more it is consumed total daily fibre amount, not the more it hasn't been colonic transit speed. It was seen that people having maximum daily total fibre consumption didn't have a high bristol score (5,7), they had a normal Bristol score (3,4). This result indicates the fibre makes normal colonic transit speed. As specified in the literature, fibre increases slow colonic transit; and it normalises fast colonic transit (17).

It is known that effects of dietary fibre on people health. Prospective cohort studies about fibre show that high levels fibre consumption decreases especially type 2 diabetes and coroner hearth disease risk. Similar epidemiological evidences also show that dietary fibre is protective against gastrointestinal diseases depending on effects of fibre on bowel transit time, stool weight, bile acid metabolism, intraluminal pressure and fermentation by colonic microflora (18).

Even though fibre divides to species as soluble and insoluble, both have partner contributions to metabolism. It is difficult to say soluble-insoluble fibre benefits seperately by looking only fibre amounts of foods. For increasing wastable of this useful functional food, it must be awareness studies.It was performed that useful effects of fibre differ key to its types with studies. This study remarks that in addition to fibre consumption amount, it must also be cared fibre types beyond dietary fibre is just a useful functional food.

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