

Romanian Knowledge and Attitudes regarding Dietary Fibers

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Abstract

Presently, the scientists recognize the health benefits of food fibers in the menu and also plant food sources are at high interest both for general population and food companies. The food companies are responsible for a clear nutrition labelling that will assist consumers to make informed and healthy choices and health providers has to inform the population about the benefits of fibers. The aim of our study was to evaluate the Romanian knowledge and attitudes regarding dietary fibers from food products. We made a qualitative survey based on a questionnaire applied in 2015, over a period of 6 months, over 670 Romanian consumers. It was focused on testing the attitudes and knowledge towards ingestion of foods rich in fibers. For all data analysis we used the software SPSS, from IBM Inc.

Our results showed that the knowledge about dietary fibers and also the ingestion of food products rich in fibers were low, and most of the subjects didn't have any interest to read the nutritional information from food labels. The female participants ate more whole grains and fruits than males and pay more attention to food labelling. Romanian people prefer to stay and eat home than at restaurants especially in rural areas, and the knowledge about fibers benefits was significantly related to education and urban location. We underline the needs for more efficient community interventions and proper information about the importance of dietary fibers for our health and also to improve and disseminate nutritional standards and diet recommendation among population.

Keywords: *consumption habits, dietary fibers, food safety, labelling*

INTRODUCTION

Presently, the scientists recognize the health benefits of food fibers in the menu and also plant food sources are at high interest both for general population and food companies. The food companies are responsible for a clear nutrition labelling that will assist consumers to make informed and healthy choices and health providers has to inform the population about the benefits of fibers (Anderson *et al*, 2009; Auestad *et al*, 2015). Also it is widely documented in medical and social literature that individuals can often make decisions that are not

in their best interest (in terms of their long-term health), but proper information is always important (Buil-Cosiales *et al*, 2016; Gracia *et al*, 2016; Fira-Mladinescu *et al*, 2008).

According to the World Health Organization an adult should eat 25-35 g of fibers daily, man more than women and children less than adults (EU recommendations are 14 g per 1000 kcal for all ages and 0.5 g/kg body weight for children older than 2 years) (WHO, 2013; WHO, 2014; EFSA, 2015). Despite the recommendations, worldwide and especially in Europe, the quantity of dietary fibers

in the menu is low, being influenced by urbanisation trends, preferences for eating out-home, more refined and processed types of food on the market, and lack of information on this subject. All these changes have been associated with an increase frequency of obesity and chronic diseases, and a public health burden (Murakami and Livingstone, 2016; Petrariu and Gavut, 2007; Sun, 2008).

National report (Vlad, 2013) demonstrated that Romanian consumers' average dietary fiber-consumption was below the recommended value (Graur, 2006) and also WHO estimates that the prevalence of obesity increased in the last decade in Romania, especially among men and children, data that are a health issue of big concern (WHO, 2013).

The aim of our study was to evaluate the Romanian knowledge and attitudes regarding dietary fibers from food products.

MATERIAL AND METHODS

We followed a convenient cross-sectional survey, and the data were collected using a validated questionnaire, disseminated online, upon six different Romanian counties with 57 cities selected in 2015.

The questionnaire was focused on testing the attitudes and knowledge towards ingestion of foods rich in fibers along with the socio-demographic characteristics of participants (like age, gender, and level of education).

For statistical analyses we used the IBM SPSS program, version 22.0 for Windows. The level of significance considered was 5%, exception the situations where Bonferroni correction was applied and the level of significance was set to 0.016. For comparisons of variables we applied Mann-Whitney and Kruskal-Wallis tests.

Sample characteristics: the total number of Romanian participants was 670, from which 53.4% were females, and the average age was 35.81 ± 15.61 years-old (ranging from 18 to 89). The level of education was balanced, 44.5% had a university degree, while 46.9% had completed high school and 8.5% had the lowest level of education (primary school). Most of the participants lived in an urban environment (84.8%) with better access to internet, while 15.2% lived in rural areas.

RESULTS AND DISCUSSION

We followed the attitudes and practices towards ingestion of foods rich in fibers (vegetables,

fruits and whole cereal), along with the preferences of eating out and fast-food, for Romanian consumers, distributed in the following tables by gender, age and education (Table 1-3).

Regarding total declared meals containing vegetables or salads per week, no significant differences were found among genders, $p=0.608$. Regarding consumption of whole cereals, men consume in more occasions per week, as compared to women, $U=40528$, $z=-6.165$, $p<0.001$, $r=0.24$, with a small to medium size effect. Women declared eating significantly more portions of fruits per week, as compared to men, $U=49679$, $z=-2.44$, $p=0.013$, $r=0.95$, with a small size effect. Men declared significantly more frequent eating out per week, as compared to women, $U=48282$, $z=-3.158$, $p=0.002$, $r=0.12$, with a small size effect, but women ate fast food in significantly more occasions than men, $U=47726$, $z=-4.428$, $p<0.001$, $r=0.17$, with a small size effect.

Regarding total declared meals containing vegetables or salads per week and portions of fruits consumed per week, no significant differences were found among age groups, $p=0.233$, respectively $p=0.391$. For the frequency of whole grains consumption per week significant differences were found between age categories, $H(2)=8.35$, $p=0.015$. We investigated further this result and applied Bonferroni correction for multiple comparisons and the level of significance was set to 0.016. Significant differences were found between young adults and middle age adults, the latter having a higher frequency of whole grains per week, $U=22145$, $z=-6.571$, $p<0.001$, $r=0.29$, with a small to medium effect size. Older adults eat significantly more often whole grains products per week compared to young adults, $U=14585$, $z=-6.158$, $p<0.001$, $r=0.28$, with a small to medium effect size. Between middle age adults and older adults no significant difference was found regarding the frequency of whole grains products consumption, $p=0.627$. For the frequency of eating out per week significant differences were found between age categories, $H(2)=60.05$, $p<0.001$. We investigated further this result and applied Bonferroni correction for multiple comparisons and the level of significance was set to 0.016. Significant differences were found between young adults and middle age adults, the latter having a higher frequency of eating out, $U=29310$, $z=-2.449$, $p=0.014$, $r=0.11$, with a small effect size. Middle age adults

Table 1. Preferences for food rich in fibers, distributed by gender

Foods and practices	Gender	No.	Mean Rank	Mean	SD	Sig
Salads	Female	358	339.06	8.5	4.594	-
	Male	312	331.41	8.1	4.443	-
	Total	670	-	-	-	0.608
Fruits	Female	358	352.73	10.0	5.310	-
	Male	312	315.73	8.8	4.954	-
	Total	670	-	-	-	0.013
Whole Cereals	Female	358	292.71	4.6	4.879	-
	Male	312	384.60	7.7	6.415	0.000
	Total	670	-	-	-	-
Out	Female	358	314.37	1.4	1.841	-
	Male	312	359.75	1.7	1.895	-
	Total	670	-	-	-	0.002
Fast Food	Female	358	358.19	0.5	0.909	-
	Male	312	309.47	0.4	1.364	-
	Total	670	-	-	-	0.000

Table 2. Preferences for food rich in fibers, distributed by age

Foods and practices	Age	No.	Mean Rank	Mean	SD	Sig
Salads	18-29 years	319	348.10	8.5	4.133	-
	30-59 years	209	319.27	7.9	4.849	-
	over 60 years	142	331.09	8.4	4.853	0.233
	Total	670	-	-	-	-
Fruits	18-29 years	319	345.79	9.6	4.804	-
	30-59 years	209	329.40	9.3	5.823	-
	over 60 years	142	321.36	9.1	4.985	0.391
	Total	670	-	-	-	-
Whole Cereals	18-29 years	319	275.14	4.0	4.129	-
	30-59 years	209	386.88	7.7	6.457	-
	over 60 years	142	395.47	8.2	6.631	0.000
	Total	670	-	-	-	-
Out	18-29 years	319	325.79	1.4	1.662	-
	30-59 years	209	365.43	1.9	2.190	-
	over 60 years	142	313.25	1.3	1.741	0.015
	Total	670	-	-	-	-
Fast Food	18-29 years	319	342.84	0.5	1.228	-
	30-59 years	209	328.98	0.4	1.306	-
	over 60 years	142	328.61	0.2	0.494	0.443
	Total	670	-	-	-	-

Table 3. Preferences for food rich in fibers, distributed by education

Foods and practices	Level of education	No.	Mean Rank	Mean	SD	Sig
Salads	Primary school	57	358.17	9.1	5.346	-
	Secondary school	314	295.43	7.4	4.604	-
	University degree	298	372.26	9.1	4.108	0.000
	Total	669	-	-	-	-
Fruits	Primary school	57	336.75	9.3	4.548	-
	Secondary school	314	306.67	8.6	4.999	-
	University degree	298	364.52	10.3	5.338	0.001
	Total	669	-	-	-	-
Whole Cereals	Primary school	57	300.34	5.1	5.295	
	Secondary school	314	348.44	6.5	6.150	
	University degree	298	327.47	5.6	5.591	0.146
	Total	669	-	-	-	-
Out	Primary school	57	361.83	1.9	2.165	-
	Secondary school	314	305.56	1.2	1.592	-
	University degree	298	360.89	1.8	2.035	0.001
	Total	669	-	-	-	-
Fast Food	Primary school	57	398.45	.8	1.584	-
	Secondary school	314	307.06	.2	0.592	-
	University degree	298	352.30	.6	1.418	0.000
	Total	669	-	-	-	-

eat significantly more often out compared to older adults, $U=12609.5$, $z=-2.478$, $p=0.013$, $r=0.13$, with a small effect size. Between younger adults and older adults no significant difference was found regarding the frequency of eating out, $p=0.459$. No significant differences were found between age groups regarding the frequency of fast-food consumption per week, $p=0.443$.

For the frequency of meals containing vegetables or salads per week we have found significantly differences between levels of education, $H(2)=25.259$, $p<0.001$, like other studies (Ruffell, 2016; Seal *et al.*, 2016). We investigated further this result and applied Bonferroni correction for multiple comparisons and the level of significance was set to 0.016. Significant differences were found between participants with a university degree and graduates of secondary school, the university graduates having a higher frequency of meals with a vegetable or a salad component per

week, $U=36011$, $z=-4.950$, $p<0.001$, $r=0.20$, with a small effect size. The differences between university graduates and primary school graduates and secondary school graduates and primary school graduates are not statistically significant, $p=0.642$, respective $p=0.026$.

For the frequency of portions of fruits per week we have found significantly differences between levels of education, $H(2)=13.804$, $p=0.001$. We investigated further this result and applied Bonferroni correction for multiple comparisons and the level of significance was set to 0.016. Significant differences were found between participants with a university degree and graduates of secondary school, the university graduates having a higher frequency of fruit portion consumption per week, $U=38744$, $z=-3.692$, $p<0.001$, $r=0.15$, with a small effect size (Sterrett *et al.*, 2015; Sun, 2008). The differences between university graduates and primary school graduates and secondary school graduates

and primary school graduates are not statistically significant, $p=0.286$, respective $p=0.250$.

No differences were found between levels of education regarding whole grains consumption frequency, $p=0.146$.

For the frequency of eating out per week we have found significant differences between levels of education, $H(2)=14.954$, $p=0.001$. We investigated further this result and applied Bonferroni correction for multiple comparisons and the level of significance was set to 0.016. Significant differences were found between participants with a university degree and graduates of secondary school, the university graduates having a higher frequency of eating out, $U=39008$, $z=-3.717$, $p<0.001$, $r=0.15$, with a small effect size. The differences between university graduates and primary school graduates and secondary school graduates and primary school graduates are not statistically significant, $p=0.928$, respective $p=0.038$.

For the frequency of fast-food consumption per week we have found significant differences between levels of education, $H(2)=27.983$, $p<0.001$ (Murakami and Livingstone, 2016; Szczytko *et al*, 2015). Significant differences were found between participants with a university degree and graduates of secondary school, the university graduates having a higher frequency of eating fast food per week, $U=40484$, $z=-4.044$, $p<0.001$, $r=0.16$, with a small effect size. Primary school graduates report a frequency consumption per week of fast food higher than secondary school graduates, $U=6478.5$, $z=-4.847$, $p<0.001$, $r=0.25$, with a small to medium effect size. The differences between university graduates and primary school graduates are not statistically significant, $p=0.045$.

Compared to men, women agree significantly more frequent that fibers in appropriate amounts can prevent or treat diseases ($p<0.001$, $r=0.18$) like cardio-vascular diseases, cholesterol, bowel cancer, breast cancer, constipation, and diabetes, but with no differences regarding the deficiency of vitamins and minerals ($p=0.774$) or obesity ($p=0.399$).

Guineet *al.* (2016), showed that comparing to other countries evaluated, Romania had the highest level of knowledge about Dietary Fibers definition followed by Portugal, Turkey and Hungary, but the lowest regarding the fibers importance for health (dietary recommendation, food composition and interest for nutritional information on food labels)

after Macedonia, Turkey and Latvia. The highest score for overall knowledge about fibers was obtained by Portugal and the lowest score was for Italy, Croatia, Latvia, Macedonia and Romania, countries with different cultures, lifestyle, climate and economical level (Guineet *al*, 2016a,b).

Our results showed that the knowledge about dietary fibers and also the ingestion of food products rich in fibers were low, and most of the subjects didn't have interest to read the nutritional information from food labels related to fibers, like similar studies (Graciaet *al*, 2016; Zugravuet *al*, 2011). The female participants ate more whole grains and fruits than males and pay more attention to food labelling, the Romanian people prefer to stay and eat home than at restaurants especially in rural areas, and the knowledge about fibers benefits was significantly related to education and urban location.

The indepth analysis of factors that are able to influence Romanian's knowledge and attitudes towards food fibers, defined the social profile of the respondents with interest on dietary fiber intake, which is: young females, with at least high school education, that considers internet and television like main sources of information regarding fibers, like similar european studies underlined too (Maćkowiaket *al*, 2016; Peralta *et al*, 2016).

CONCLUSIONS

Our study revealed that the knowledge about dietary fibers and especially the ingestion of food products rich in fibers are low in Romania, that's why we sustain the needs for more efficient strategy and community interventions programs based on proper information about the importance of dietary fibers for our health especially among young population.

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