

## **BREAD AS INDICATOR OF AGE-CHANGING DIETARY HABITS AMONG YOUNG PEOPLE**

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### **Summary**

Recognized as a staple food consumed in large quantities in the Balkans region, bread is suitable for the investigation of dietary habits. This survey was conducted to gain insight into the dietary habits, related to intake and knowledge about various bread types, of the young population (14 to 26 years of age). The total number of surveyed respondents was 173 (37% males and 63% females). They were randomly selected among students from an elementary school (30), high school (45) and university (98) in the Novi Sad Municipality. A correlation between the respondents' age and the practice of "healthy food" intake was observed, as whole wheat bread consumption increased from 15% in elementary school to 26% among high school and university students. Considering gender, whole wheat bread intake among female respondents was 9% higher in comparison with male respondents. Still, white bread was most commonly consumed by all respondents (56%-69%), as a result of a habit adopted in the family. However, the obtained results indicate a strong correlation between age-changing dietary habits ("healthy" food awareness) and the impact of the environment rather than the impact of the family. Namely, the greater impact of family and tradition is noticed among elementary school pupils (54%) while among high school and university students the corresponding impact was significantly less pronounced (34%).

*Keywords:* bread intake, dietary habits, healthy diet, young population, whole wheat bread

### **Introduction**

Throughout the school-age years, an adequate food and nutrient intake to support health as well as brain development and function is critical. Healthful dietary habits formed during childhood are associated with the prevention of diseases of modern-day society (obesity, type 2 diabetes, cardiovascular diseases, obstipation and cancer) and with positive health outcomes in the later life stages (Hilger et al., 2017; Meše et al., 2017). Changes in dietary habits, coupled with insufficient physical activity, have a great influence on the increased prevalence of disease development (Lupi et al., 2015). Profound changes in dietary habits can occur in different life stages but they usually appear along with changes of social environment, like the start of elementary, high-school or university education (Bagordo et al., 2013). The food choices of indi-

viduals in these life stages are affected by many factors such as newly formed habits, study pressure, social activity as well as sufficient information and knowledge about healthy food (Meše et al., 2017). Other factors that have a major influence on populations of university students are separation from families, costs and financial resources, as well as market diversity and the availability of stores (Bagordo et al., 2013). As a consequence of adaptation to the above factors, young people often tend to negatively modify their diet in terms of fruit and vegetable consumption, diet diversity, and time and frequency of meal intake (Lupi et al., 2015). Healthy diet recommendations presented by the WHO (2016) include high intake of fruits, vegetables and whole grains combined with low intake of refined carbohydrates, saturated fats and salt. As known from the food pyramid, bread, grains or pasta are a part of every meal and one of the

main energy sources. Bread has always been widely consumed and considered as one of the major constituents of human diet due to the high content of carbohydrates (mainly starch) as well as the presence of proteins, lipids, dietary fibres and micronutrients. Furthermore, on the growing market, breads made from different grain flours (wheat, rye, barley, oat and rice), with or without the addition of other functional ingredients, are being introduced. A partial substitution of wheat flour with whole grain flour in bread formulations is of nutritional interest considering its lower glycaemic index (GI) and content of health-related compounds such as dietary fibre, minerals, vitamins and antioxidants (Conte et al., 2016). However, in order to achieve positive health outcomes, these kinds of breads have to be available, sensory acceptable and eaten by consumers.

Since bread has been recognized as a staple food consumed daily in large quantities in Serbia, it provides a good basis for monitoring the age-changing dietary habits among the young population. The respondents' subjective assessments of their intake and knowledge regarding various bread types were captured through a survey and the responses obtained were analysed and interpreted.

## Subjects and methods

### Study population

The total number of surveyed respondents was 173 (37% males and 63% females), ranging in age from 14 to 26. The respondents were selected by random sampling method among students from elementary schools (30), high schools (45) and the university (98) in the Novi Sad Municipality. Survey participation was voluntary and anonymous, and prior to filling in the survey, respondents were informed of the study's aims as well as that responses would be used only for research purposes and the given information would be treated as confidential. Once their willingness to participate was verified, instructions for completing the survey were given to the respondents. The basic characteristics of the studied population are presented in Table 1.

### Survey characteristics

Bread-related dietary habits were surveyed using a questionnaire, designed by the authors, which included two major sections: demographic, social and cultural characteristics and information on bread-eating habits. The demographic data included gender and age, while social and cultural data focused on education level (elementary school, high school or university) and degree course, place of residence (town or village) and permanency of the residence (while attending school/faculty or permanent place of residence). The second section considered the existing knowledge of the respondents and the environmental aspects in order to understand their impact on bread-related dietary habits. In this section, respondents completed the questionnaire by marking or ranking the offered responses.

Ethical approval for conducting the survey was granted by the Ethical Committee of the Faculty of Technology.

**Table 1.** Basic characteristics of the studied population

	Male		Female	
	n	%	n	%
<b>Education level</b>				
Elementary school	19	30	11	11
High school	12	19	33	30
University	33	51	65	59
<b>Place of residence</b>				
Urban	50	78	104	95.5
Rural	14	22	5	4.5
<b>Total</b>	64	37	109	63

### Data analysis

The answers provided by the survey were collected in a database using Microsoft Excel 2010. Survey results were expressed in percentages (%) of the total number of respondents based on education level and gender and presented using the Statistica 13.2 software (Dell Inc.)

## Results and discussion

University students were among the majority of the surveyed population (56%), followed by high school (26%) and elementary school (18%)

students. With respect to gender, most of the respondents were female (63%). Survey results of the studied population's dietary habits related to intake and knowledge about various bread types and with regard to education level and gender are presented using figures. Regardless of their education level, a preference for white bread was observed among all respondents since more than 55% of them reported white bread as the most commonly eaten bread type (Fig. 1a). Nevertheless, a difference of 10%

in the corresponding answer was observed between respondents with a low (elementary and high school) and a high (university students) education level. The assumption is that university students are more aware of the existence of healthier bread types since 27% of them selected whole wheat bread. Furthermore, 26% of high school students reported whole wheat bread as their choice, indicating an age-related influence on food preference (Fig. 1a).

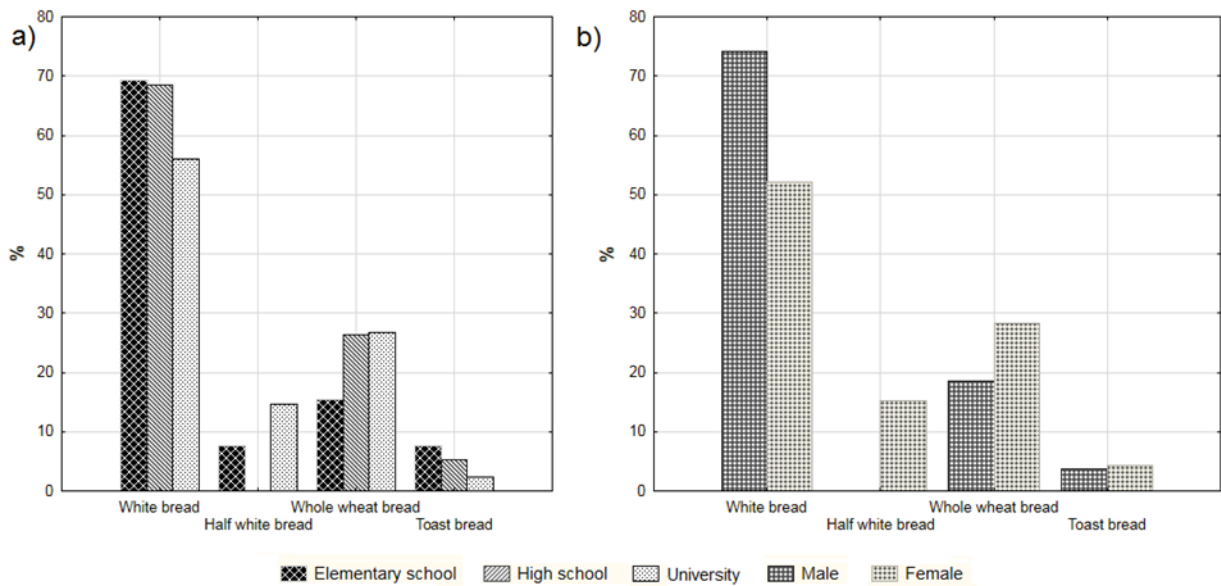


Fig. 1. Respondents' preference for bread type with regard to education level (a) and gender (b)

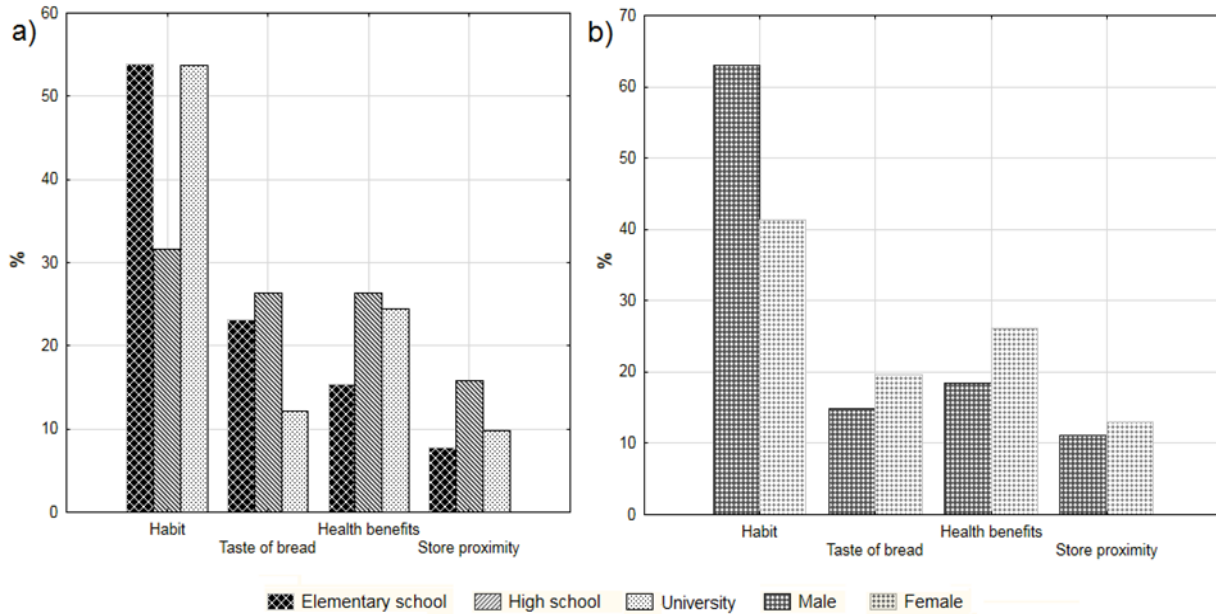
The connection between age, and thus education level, and whole grain products consumption was previously confirmed since lower whole grain intake was associated with younger age groups whereas the opposite was seen for white bread (Lang and Jebb, 2003; Sandvik et al., 2014). In the study of Simovska-Jarevska et al. (2012) conducted in Macedonia, only 20% of the surveyed population confirmed the consumption of whole grain bread, especially participants older than 50, while 76% consumed white and/or half-white bread. Looking at the consumption of bread in Turkey, the study of Meşe et al. (2017) showed that 47.8% of respondents ate white bread daily, while 47% of the respondents responded in the negative regarding whole wheat bread intake. Results reported in these studies addressing whole grain

bread intake lead to the conclusion that the young population in Serbia is more aware of "healthy food" practice. Gender appeared to influence the preference of bread type (Fig. 1b). Females demonstrated to consume more whole wheat bread (28%) compared with males (19%), probably because they are better informed about the nutritional value of the corresponding bread type or simply because they are more attentive to weight control.

The results obtained concerning the impact of different factors on the respondents' choice of bread are graphically illustrated in Fig. 2. The participants were asked to rank the impact of the following factors, from the most important (1<sup>st</sup>) to the least important (4<sup>th</sup>): habit adopted in family, taste of bread, health benefits provided by bread consumption, and store proximity. The

results indicate that “habit adopted in family” is ranked first, regardless of education level, although some differences are noted (Fig. 2a). Namely, more than 52% of elementary school and university students reported “habit adopted in family” as having the strongest influence on their bread choice, compared with only 32% of

high school students. “Taste of bread”, “health benefits” and “store proximity” were ranked second, third and fourth, respectively, by elementary and high school students, indicating that they are still under the influence of family and tradition.



**Fig. 2.** Factors influencing respondents' bread choice with regard to education level (a) and gender (b)

“Health benefits provided by bread consumption” was ranked second by university students, and followed by “taste of bread” and “store proximity”, revealing their greater familiarity with the positive outcomes provided by the consumption of different bread types. Food preferences, unconsciously and unintentionally learned and established in childhood, have been shown to be important in predicting preferences in the later life stages (Köster, 2009). Moreover, the cultural and socioeconomic environments are playing one of the primary roles in creating preferences for particular sensory experiences (Mela, 2001). Regardless of gender, the primary factor influencing the respondents' bread choice was “habit adopted in the family”, followed by “health benefits”, “taste of bread” and “store proximity” (Fig. 2b). However, female respondents seem to pay more attention to health benefits and the taste of the consumed bread, in comparison with their male counterparts, indicating their greater awareness. When the question addressed the level of bread intake, 66% of university students and 53% of high school students stated that they consume 100 g of bread daily (Fig. 3a).

An equivalent percentage of elementary school students reported that they consume 100 g and 200 g of bread daily. Considering that bread is a staple food traditionally present as a part of each meal in Serbia, an unexpected result was that only 8%-16% of respondents, across all education levels (the majority being from high school), consume 300 g of bread daily (Fig. 3a). Furthermore, none of the surveyed respondents replied affirmatively about bread consumption higher than 300 g per day. These findings go against the trend regarding frequency of bread consumption reported in a recent study by Lošić and Čačić Kenjerić (2015) conducted among a young population in Bosnia and Herzegovina. A decrease in bread consumption among young people in Serbia is noticed, probably due to the greater exposure to and influence of advertisements and market trends. The observed trend is not desirable in view of the importance of bread in diet as one of the major sources of carbohydrates. Approximately two-thirds ( $\geq 55\%$ ) of the

respondents, regardless of gender, consumed 100 g of bread daily (Fig. 3b). However, a slightly higher percentage of male respondents,

in comparison with female respondents, consumed 200 g and 300 g of bread daily.

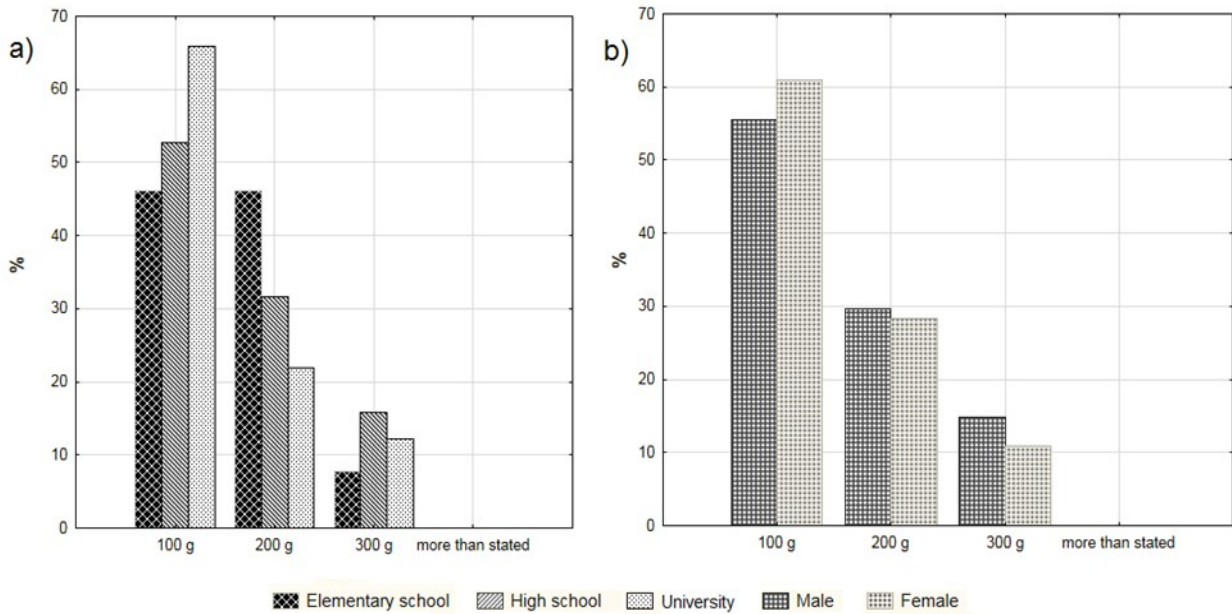


Fig. 3. Respondents' bread intake with regard to education level (a) and gender (b)

Figure 4 presents responses given to the question regarding preference of fresh bread or toast bread. The majority of high school and university students (53%-68%) selected fresh bread rather than toast, while 54% of elementary school students demonstrated no preference in their

choice (Fig. 4a). In comparison with elementary school students, a higher percentage of high school and university students (>20%) selected integral toast. These choices may be attributed to the lack of knowledge among the elementary school students as well as to family dependence.

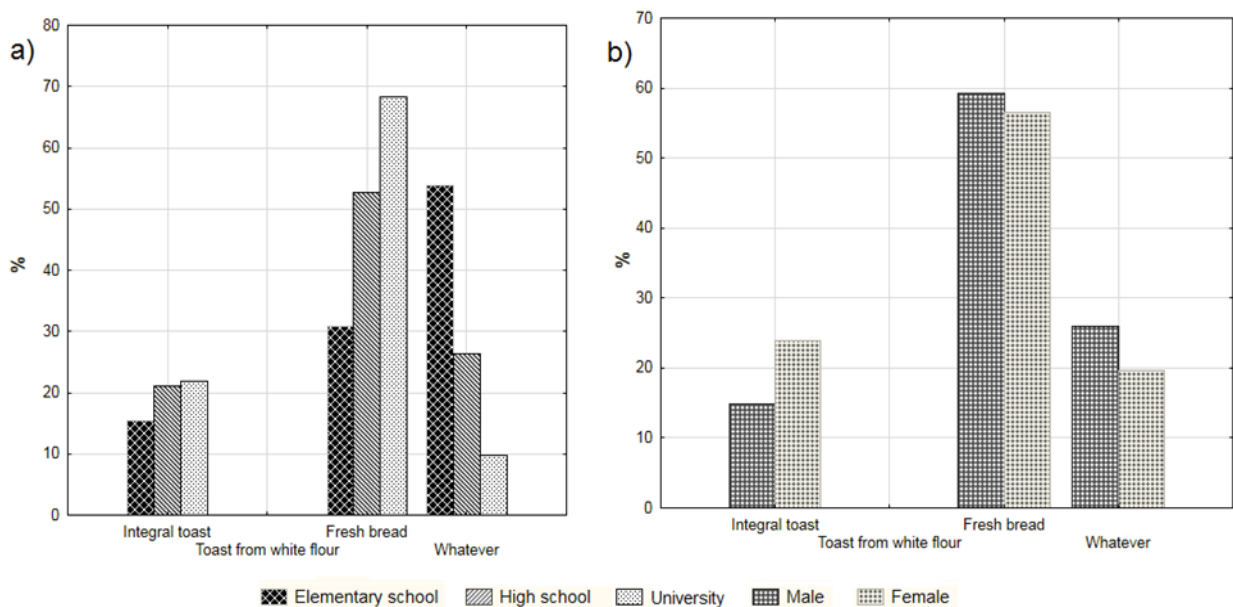


Fig. 4. Respondents' preferences for fresh bread or toast bread with regard to education level (a) and gender (b)



Consumption of fresh bread was confirmed by more than 50% of respondents regardless of gender. Males reported slightly higher consumption of fresh bread (59%), compared with females. However, 27% of them showed no preference in their choice (Fig. 4b). Furthermore, a high percentage of females (24%) confirmed consumption of integral toast, implying greater awareness of improvement in health status associated with components in whole grains.

## Conclusions

White bread was most commonly consumed by all respondents, elementary school students in particular, as a result of family impact and tradition. As their education level rises, the young population becomes more aware of health-related benefits provided by whole grain products consumption. Female respondents appeared to be more interested in healthy diet practices, in comparison with males. A discouraging observation is the decrease in bread consumption among the young population since bread is one of the main sources of energy which is crucial for their further development. Further education about healthy food choices should be provided to the young population because only a well-informed population can take advantage of the health benefits provided by the intake of such food.

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## KONZUMACIJA KRUHA MEĐU MLADIMA KAO INDIKATOR PROMJENA PREHRAMBENIH NAVIKA S ODRASTANJEM

### Sažetak

Kruh je često konzumirana hrana na Balkanu te je samim time pogodan za istraživanje prehrambenih navika. Cilj ovog rada je istražiti prehrambene navike populacije mladih (14-26 godina) obzirom na konzumaciju različitih vrsta kruha. Ukupno je u istraživanje bilo uključeno 173 ispitanika (37% mladića i 63% djevojaka), nasumično odabranih među učenicima osnovne škole (30), srednje škole (45) i fakulteta (98) sa područja Novog Sada. Uočen je porast konzumacije kruha od cjelovitih žitarica od 15% među učenicima osnovne škole do 26% među učenicima srednje škole i studentima. Obzirom na spol, konzumacija kruha od cjelovitih žitarica je bila 9% veća među djevojkama u usporedbi sa mladićima. Svi ispitanici su pod utjecajem obiteljskih prehrambenih navika najviše konzumirali bijeli kruh (56-69%). Dobiveni rezultati pokazuju povezanost promjena prehrambenih navika sa odrastanjem i jači utjecaj okoline nego obitelji. Najveći utjecaj obitelji i običaja je uočen među osnovnoškolcima (54%) dok je među srednjoškolcima i studentima bio slabije izražen (34%).

*Ključne riječi:* kruh od cjelovitih žitarica, mladi, pravilna prehrana, prehrambene navike, unos kruha