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Knowledge about dietary fibre and its health benefits: A cross-sectional survey of 2536 residents from across Croatia

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ABSTRACT

This cross-sectional study is aimed at identifying the level of understanding of the health benefits of dietary fibre in the prevention of disease, as well as the association between that understanding and fibre consumption in the Croatian population. We believe that nutritional knowledge is important for the consumption of healthy food which includes also a positive reflection on food habits and health. Only well-informed consumers can shop effectively for food rich in dietary fibre and thereby derive the health benefits that fibre can offer. We suppose the association between that understanding and fibre consumption in the Croatian population. However, this knowledge is not the only important determinant; food purchases are influenced by socioeconomic and demographic factors. Our hypothesis is that the level of knowledge about fibre and fibre consumption varies with age, gender, education level and urban or rural environment. It is our assumption that life styles, environmental conditions and education can affect the level of knowledge and perception about healthy eating habits. If this assumption is accurate, targeted education campaigns to educate and sensitise the population about fibre-rich foods and the health benefits of fibre is a priority. Public health programmes are urgently needed, particularly in rural areas, to sensitise the population to fulfill the recommended fibre intake, high-fibre food sources and the mechanisms by which fibre can help prevent disease.

Background

Dietary fibre is defined as edible plant components, analogous to carbohydrates, that are resistant to digestion and absorption in the small intestine and that undergo complete or partial fermentation in the large intestine [1,2]. The chemical bonds in dietary fibre are not hydrolysed by human alimentary enzymes [1]. Sources of dietary fibre include plant products such as cereals, legumes, vegetables, fruit and seeds [1]. The recommended daily intake of dietary fibre depends on age, health requirements and the overall state of health [3]. Both the World Health Organisation (WHO) and Food and Agriculture Organisation recommend a daily intake of at least 25 g [1,2]. Croatian foodbased dietary guidelines recommend at least 400 g of fruit and vegetables (without potatoes) i.e. five or more servings per day in order to reach an adequate dietary fibre intake [4].

Preventive effects likely reflect the biological activity of dietary fibre, which shows anticancerous, antibacterial, anti-inflammatory, anti-oxidative and anti-apoptotic effects [5]. Studies have demonstrated the ability of dietary fibre to reduce cholesterol, triglycerides, systolic blood pressure, glycaemia and insulin sensitivity [6,7] and as a result, foods rich in dietary fibre can serve as non-pharmacological treatments [8]. Dietary fibre can help regulate body weight, influence immune function and contribute to diabetes control and prevent gastrointestinal disease, including gastroesophageal reflux, duodenal ulcus, irritable bowel syndrome, diverticulitis, constipation, and haemorrhoids [2,9].

People with more knowledge about food and its components, such as dietary fibre, may be able to make appropriate decisions about fibre consumption [10,11]. Only well-informed consumers can shop effectively for foods rich in dietary fibre and thereby derive the health benefits that fibre can offer [12]. Lack of

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awareness may be an important barrier to the development of promoting healthy food habits [13].

Despite the existing studies that confirm the associations between higher nutrition knowledge and dietary intake [12,14,15], some studies confirm the requirement for well-designed, high quality and contemporary research on the application of validated instruments to measure the nutritional knowledge and influence on dietary intake [11,12,15].

Hypothesis

This study is motivated by the idea that a certain level of nutritional knowledge is important for healthy food consumption, including also a positive reflection on food habits and human health. In the present work, we wanted to examine the level of understanding of the health benefits of dietary fibre as well as the association between that understanding and fibre consumption in the Croatian population. Our hypothesis is that the level of knowledge about fibre and fibre consumption vary with age, gender, education level and urban or rural environment.

Evaluation of the hypothesis

Nutrition knowledge has an important effect on food attitudes and behavior, as well as on health and disease prevention. Food behavior covers a multiplicity of distinct consumer behaviours including food choice, shopping, preparation and dietary intake [16]. This type of knowledge is best acquired by nutritional education. It is also crucial to look at how people interpret and use the information, as well as how it affects their behavior [16,17]. Moreover, people's perception and food types assessment are the most important mediators of the dietary intake [18].

Education and knowledge is significantly associated with healthy eating. Educated people are more likely to consume the recommended intake of healthy food, for example fruits and vegetables or food with less fat [16,17]. Knowledge about healthy food can significantly influence food purchases [15–17,19], indicating that the lack of such knowledge can pose a substantial obstacle to promoting healthy lifestyle. Despite that, knowledge about food impact on health is not of particular interest amongst the general population.

Even though essential nutritional knowledge is required, it is not likely to be sufficient for dietary changes. Literature indicates that knowledge is not the only important determinant; food purchases are also influenced by socioeconomic and demographic factors including age, gender, ethnicity, environment, household size and income [10,16].

Compared to the actual food intake, greater attention is given to certain other factors including taste, convenience, price and food security, as well as to different cultural, educational and economic factors [11]. What more, food availability also plays an important part on food behavior and food choices [20]. The positive correlation between knowledge and nutritional behavior is described in many studies [21–24].

It is a well known fact that specific knowledge about eating healthy and living a healthy lifestyle can prevent diseases, such as obesity, cardiovascular disease, diabetes and cancer [11]. Some nutritional components of food, like dietary fibre, also play an important role in the prevention of these diseases [1,2,25–27].

Data analysis

This cross-sectional study involved a single survey of a convenience sample of the population covering all of the Croatian counties. The survey explored the respondents' knowledge about the importance of consuming dietary fibre and about the health effects of fibre. Various sociodemographic factors (age, gender, education level, urban or rural environment) were tested for their possible association with the level of knowledge about dietary fibre and fibre intake. We recruited respondents from the general population with the sole inclusion criteria that they be older than 18 years of age. We recruited through newspaper advertisements, booths in shopping centres and downtown areas and by word-of-mouth. We recruited this way with the intent of gathering a range of ages and education levels in both genders and in urban or rural living environments. Before filling out the survey, subjects were told about the purpose of the study; they were assured that the study was voluntary and that their responses would remain anonymous. Upon providing consent, subjects filled out the survey in individual cubicles to ensure privacy. A total of 2536 individuals were surveyed from October 2014 to March 2015. Ethical approval was granted by the Human Research Ethics Committee of the Zadar General Hospital. The entire data collection and analysis are in accordance with the ethical standards of the Declaration of Helsinki.

Measures

The original questionnaire was written and validated in English by the CI&DETS Research Center of the Polytechnic Institute in Viseu, Portugal [28]. This English survey was translated into Croatian by two native speakers of Croatian with experience in public health and nutrition studies. No questions were modified, removed or added during the translation. The translated survey was examined by the creators of the English survey, who verified that the overall structure was unchanged. In this survey, respondents were asked about their consumption of dietary fibre and their awareness of concepts, definitions and health effects of dietary fibre. Items on the survey deal with demographic characteristics, fibre consumption (fruit, vegetables, whole grains), knowledge of fibre sources in foods, recommended daily fibre intake, and effects of fibre intake on the risk of certain diseases. The Croatian version of the questionnaire validation included a factor analysis (N = 2356). The level of dietary fibre knowledge was grouped into five factors explaining 55% of the variance; in the original questionnaire three factors included 76% of the variance, N = 182 [28]. Using Cronbach's alpha, the internal reliability of responses was acceptable, $\alpha = 0.75$; in the original questionnaire it was $\alpha = 0.90$ [28,29]. Responses to items were on a Likert scale from 1 to 5, with 1 indicating «completely disagree»; 2, «disagree»; 3, «neither disagree nor agree»; 4, «agree»; and 5, «completely agree». Responses to questions formulated in a negative way were scored using the same 5-point scale in reverse, so that higher scores always corresponded to greater knowledge. Responses were interpreted as reflecting familiarity about each statement (type of knowledge) according to the following 5-point scale: 1, «completely unfamiliar»; 2, «mostly unfamiliar»; 3, «uncertain»; 4, «somewhat familiar»; and 5, «completely familiar».

Statistical analysis

The data was processed using SPSS 22.0 (IBM, Armonk, NY, USA). Results were analysed using descriptive statistics, primarily frequency distribution, measures of central tendency, dispersion and normal or asymmetric distribution. Since the data did not satisfy the conditions of normality based on the Kolmogorov-Smirnov test, differences in knowledge between men and women, between urban and rural residents, and between respondents of different educational backgrounds were assessed for significance using the Mann-Whitney *U* test (for two-variable comparisons) or the Kruskal-Wallis test (for comparisons of three or more variables). Possible associations among variables were explored using the