IS THE QUESTIONNAIRE A GOOD TOOL FOR RESEARCHING DIETARY HABITS AND UNHEALTHY DIETARY STYLE IN SLOVAKIA

Je dotazník dobrý nástroj pre výskum dietárnych zvykov a zdravého životného štýlu na Slovensku?

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Abstract

Nutritional intake represents the sum of substances originating from food intake. The aim of this preliminary questionnaire-based study was to evaluate the level of healthy eating style among older children, i.e. from 10 to 15 years old, in Slovakia. The questionnaire was completed by 346 girls (49.0%) and 354 boys (51.0%). Results showed that the illness level in the nPACVF (non-physically active and consuming vegetable and fruit) group was significantly higher compared to the PACVF (physically active and consuming vegetable and fruit) group. Nevertheless, we conducted only a preliminary study based on a questionnaire. Therefore, further findings and evaluations coupled with biochemical analyses will be needed in the future.

Key words: *breakfast, consumption of fruits and vegetables, questionnaire*

Introduction

Human nutrition represents the sum of substances originating from food intake. Essential nutrients for humans are especially those that are important for energy supply, growth, development and for the cell function and regeneration. In addition to macronutrients (proteins, carbohydrates and fats) and micronutrients (vitamins, minerals, etc.), nutritional supplements are also important food components (Babička, 2012, Bellows & Moore, 2012, Babinská, 2015).

According to current dietary recommendations, carbohydrates should account for about 60.0% of total energy intake. Several authors (Fajfrová, 2011, Bellows & Moore, 2012) have shown that the simple carbohydrates we consume consist mostly of sucrose. Its consumption has reached a level of almost 40.0 kg per person per year (120.0 g/day) for several years now, which is twice the recommended amount (60.0 g/day). Most of this consumption is made up of so-called hidden sugar (sweet drinks, confectionery, preserved fruits, etc.). If carbohydrate intake is extremely low, there is a decrease in muscle mass and a negative influence on the brain. On the other hand, if the energy obtained from carbohydrates is not depleted, it is stored in the form of fat. A high intake of monosaccharides and disaccharides is a risk factor for various diseases, including dental caries and metabolic diseases. Moreover, a diet rich in carbohydrates leads to deteriorated glucose tolerance over time and, ultimately, to *diabetes mellitus* (Fajfrová, 2011, Bellows & Moore, 2012).

The source of minerals can be almost any natural food (e.g. vegetables, fruits, milk, eggs, cheese and meat). Only a varied diet composition actually contains the optimal number of elements needed for physiological processes (Pánek, 2002, Pánek et al., 2007, Piťha & Poledne, 2009). The lack of a certain element in the diet, but also its excess, has negative consequences on the physiological processes occurring in the body. Many human illnesses (such as rheumatism, grey/green cataract, various forms of asthma, sclerosis, migraine, gastrointestinal disorders, etc.) are probably related to a lack of minerals in food (Pánek, 2002, Marounek et al., 2003). Fruits and vegetables make up a significant part of our diet and act as a preventive factor against many civilization diseases. They contain health-improving substances, and an increased intake of fruit and vegetables helps reduce the consumption of foods with a high content of saturated fat and carbohydrates. We should consume vegetables and fruits evenly throughout the year, combining a variety of individual types. The recommended daily intake of fruit and vegetables is 500.0 g (2/5 units of fruit and 3/5 units of vegetables) (Babinská, 2015, Kunová, 2011).

Aim

The aim of our preliminary questionnaire-based study was to evaluate the level of healthy eating style among older children in Slovakia. In addition, the goal was to find out how much is required to prevent disease and improve health in the future.

Methodology

We evaluated a questionnaire that was completed by 700 students: 346 girls and 354 boys, from 10 to 15 years old. We only evaluated questionnaires that were completed by students whose parents (legal guardians) signed a consent form for participation/non-participation of their child in the survey. The process of selecting the research sample was done randomly and solely on the voluntary decision of students to participate in the study. We worked with six questions and questionnaire was focused on the issue of healthy lifestyle and drug use. Students were asked to complete a questionnaire containing questions related to their demographics (age, sex) and their dietary behaviors, such as Regular breakfast, Daily regularity of eating, Consumption of fruits and vegetables, Type of bread consumed, Consumption of simple sugars and Drinking regime (Table 1). The questionnaire was adopted and modified as recommended and used by several authors (Al-Rethaiaa et al., 2010; Yahia et al., 2016). All responses were categorized and coded in ranked scales, as shown in Table 1. The results of the Fisher's test based on the examination of physical activity and the frequency of consumption and non-consumption of fruit and vegetables are shown in Table 2.

Results

The results obtained from evaluation of the questionnaire showed that 65.0% of respondents regularly had breakfast (458 children), while up to 35.0% of children (242 children) do not eat breakfast regularly. In the case of bread consumption, the results are also not very favorable. The consummation of "white" bread was found in more than 50% of respondents (56.0%, n = 448). This may in some cases lead to a deficiency in selenium intake. From the point of view of eating habits, it is not possible to determine the intake of simple sugars. Half of the children (n = 347, 49.0%) consume sweets daily, which adversely affects their development, causes nervous activity (cognitive, memory) and influences brain development. Our analysis showed that more than 40.0% of children drank sweetened drinks, which in the context of the aforementioned facts does not seem to be a positive trend (Table 1).

Such irregular eating habits at an early age may adversely affect children's health and development. Surprisingly, about

one-sixth of the children surveyed (119 children – 17.0%) eat at most three times a day, which causes a burden on the digestive system and leads to fluctuations in blood glucose levels (Table 1). Similarly, a negative phenomenon in the dietary habits of pupils and students was the alarmingly low intake of fruit and vegetables in 26.0% of children (184 of them) and thus of vitamins and other important substances (such as minerals, Table 1). Nevertheless, 43.0% of respondents (303 children) consume fruits and vegetables once a day and 31.0% (213 children) even more times a day. The most preferred fruits were apples and citrus fruits. Among vegetables, the most frequently mentioned were tomatoes, pepper and cucumbers.

Table 1. Participant's responses to the dietary behavior questionnaire

Regular breakfast	**N**	**%**
Eat breakfast	458	65
Not eat breakfast	242	35
Daily regularity of eating		
Three times and less	119	17
Three to five times	478	68
More than five times	105	15
Consumption of fruits and vegetables		
Several times a day	213	31
Once a day	303	43
2-3 times a week	149	21
2-3 times a month	23	3
I do not consume	12	2
Type of consumed bread		
White bread	448	64
Dark bread	298	43
Other	48	7
Consumption of simple sugars		
Daily	347	50
Occasionally	342	49
I do not consume	13	2
Drinking regime		
Water	447	64
Mineral water	83	12
Lemonade	141	20
Juice	115	17
Chocolate	222	32
Tea	131	19

Table 2. Physically active a physically non-active students

	Results	
	Sick once a year and less	**Sick more once a year**
Physically active and consume vegetable, fruit	108	22
Physically active and don´t consume vegetable, fruit	422	148
Marginal Column Totals	530	170
Fisher t-test, p	0.0313	

We found that the illness level in the nPACVF (non-physically active and consuming vegetable and fruit) group was significantly higher in comparison to the PACVF (physically active and consuming vegetable and fruit) group. The Fisher's test value for physically active and physically non-active students was 0.0313, $p < 0.05$ (Table 2).

Discussion

A Swedish study conducted for 30 years (Wennberg et al., 2015) showed that students without a regular breakfast have an almost 70.0% increase in metabolic disorders (abdominal obesity, elevated blood glucose) in adulthood. Our study surprisingly showed the importance of breakfast, in that up to 65% of respondents said that they eat breakfast regularly. Cahill et al. (2013) showed important results in a study obtained during a long-time study (i.e. 16 years) in which almost 27,000 respondents were observed. Skipping breakfast was associated with an increase in blood pressure, cholesterol and fluctuations in insulin levels due to the long period of fasting between dinner and meals the next day. Irregular eating also affects students' learning outcomes, as suggested by the Milburn study, which showed that young people with poorer educational outcomes also had irregular meals twice as often. Moreover, endangered groups of children include vegetarians, mainly in cases with an inadequate consumption of meat products (fish, pork, and beef), which are good sources of selenium. Selenium deficiency adversely affects the immune system (Fox, 1992, Maďarič et al., 1993).

Calder & Kew (2002) confirmed that young people risk their health when they refuse to eat fruits and vegetables. Similarly, several authors (Bentley-Hewitt et al., 2012, Hunter et al., 2016) confirmed the importance of fruit consumption. These findings are in accordance with our study, where up to 26.0% of children (184 children out of the total number of respondents) almost never consume fruit or vegetables (i.e. summarization of data of three types of answers: 2-3 times a week, 2–3 times month and I do not consume). This may also be the reason for the reduced intake of vitamins and other beneficial substances for the body. Similarly, a comprehensive analysis of 16 global studies from the US, Asia and Europe involving more than 833,000 respondents showed that five servings of fruit/vegetables per day were optimal for health (Boeing et al., 2012). Studies on phytochemicals, especially carotenoids, suggest that higher carotenoid intake is associated with a reduced incidence of infection (Cser et al., 2004, Horst-Graat et al., 2004). Increasing the consumption of vegetables can lead to the introduction of lifelong habits and reduce the risk of chronic diseases. The unwillingness of children to manage healthy food could have serious consequences for their health at a later age (Hunsaker, 2017).

A study published by Chan et al. (2002) confirmed that individuals who drink five or more glasses of pure water a day have a much lower risk of fatal coronary heart disease compared to those who drank fewer than two cups a day. Therefore, it is necessary to support the dietary process with a sufficient drinking regime (Shoalhaven Spring Water, 2016). However, our preliminary analysis showed that up to more than 40.0% of children drank sugary drinks. Due to the high sugar content of these drinks, this is not beneficial to health, so we recommend limiting their total intake. Physically active children were shown to have lower blood pressure levels, more favorable lipoprotein levels and reduced adiposity compared to their sedentary counterparts (Dietz, 1998, Fraser et al., 1983, Suter & Hawes, 1993). In addition, they had lower levels of anxiety and stress (Biddle, 1993, North et al., 1990, Wipfli et al., 2008). However, our understanding of the effect of normal physical activity (exercise) on the immune system in children is still unclear. In general, healthy children have minor overall disorders of the immune system (e.g. NK cells) in response to exercise compared to adults and show a faster regeneration of the immune system after exercise. There is limited evidence that moderate

to high levels of normal physical activity are associated with a reduction in the incidence of infection and disease in children (Timmons, 2007, Timmps, 2006).

In terms of eating habits, it is not possible to record the intake of simple sugars. Half of the children surveyed (n = 347, 49.0%) consumed sweets daily, which may adversely affect their further mental development, i.e. through nervous activity (cognitive abilities, memory) and adverse brain development. In addition, more than 40% of respondents also drank sugary drinks, which is related to an increase in sugar intake during the day. Consuming large amounts of sugars has a negative effect on mood and concentration, as blood glucose levels increase rapidly (Kanoski et al., 2014, Noble & Kanoski, 2016) (Table 1). Therefore, children should give preference to foods with a low glycemic index (foods containing starch together with plant fibers, i.e. complex carbohydrates). So-called "hidden" sugar, i.e. sugar added into foods and beverages, is another civilizational problem. The results of studies (citations) have shown a link between "added" sugar and an increased risk of cardiovascular disease in children due to increased energy intake and dyslipidemia. The American Heart Association recommends a daily limit for the consumption of added sugar by children up to ≤ 25.0 g (Vos et al., 2017).

In conclusion, our study showed that 70.0% of schoolchildren and youth spend more than 4 hours of their free-time per day on computers, watching TV and entertainment with mobile telephones. Only every third student was regularly engaged in physical activity, though we found that half of respondents performed some sporting activity. Such a sedentary way of life for children and youth brings with it an increase in obesity and overweight, incorrect body posture as well as other health disorders. The majority of experts recommend sufficient movement activity (an hour of moderate physical activity at least 5 times a week), healthy eating and adjusting the daily regime as the best prevention against health impairment. Physical education is the only school subject that develops motor activity in children and youth. Children acquire physical skills and develop their physical activities, which are the most effective prevention of diseases and ensure a good quality of life

Conclusion

In conclusion, we may state that physical activity and a healthy eating style greatly affect the health of older school-age children. Nevertheless, we have thus far performed only a preliminary study based on a questionnaire. Therefore, further findings and evaluations coupled with biochemical analyses will be needed in future. We also suggest cooperation not only in the field of education, but also in cooperation with pediatric doctors.

Acknowledgement

We would like to thank everyone who took part in this questionnaire survey in any way. Finally, we would like to thank to David McLean for revising the English language.

Súhrn

Príjem výživy predstavuje súhrn látok pochádzajúcich z príjmu potravy. Cieľom tejto predbežnej dotazníkovej štúdie bolo vyhodnotiť úroveň zdravého stravovacieho štýlu u starších detí, tj. od 10 do 15 rokov, na Slovensku. Dotazník vyplnilo 346 dievčat (49,0 %) a 354 chlapcov (51,0 %). Výsledky ukázali, že úroveň choroby v skupine s nPACVF (nefyzicky aktívna a konzumujúca zelenina a ovocie) bola významne vyššia v porovnaní so skupinou s PACVF (fyzicky aktívna a konzumujúca zelenina a ovocie). Na záver môžeme konštatovať, že fyzická aktivita a zdravý štýl stravovania ovplyvňujú zdravie starších školských detí. Napriek tomu sme doteraz vykonali len predbežnú štúdiu na základe dotazníka. Preto budú v budúcnosti potrebné ďalšie hodnotenia a štúdie, spojené s biochemickými analýzami. Navrhujeme tiež spoluprácu nielen v oblasti vzdelávania, ale aj v spolupráci s detskými lekármi.

Kľúčové slová: *raňajky, konzumácia ovocia a zeleniny, dotazník*

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