



CELIAC DISEASE: THE SITUATION ON THE SLOVAK MARKET

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ABSTRACT

Celiac disease, also known as celiac sprue, non-tropical sprue, idiopathic sprue, idiopathic steatorrhoea and gluten-sensitive enteropathy, is a serious genetic autoimmune disease, which damages the villi of the small intestine and interferes with absorption of nutrients from food. The latest researches show that while in the 1970s the prevalence of celiac disease in the world was 0.03%, in the present years the estimated prevalence is 1%. In average, the prevalence of celiac disease in the Western countries is close to 1:100. The celiac disease occurs more often in the case of women than of men, at a ratio of 2.8:1. The aim of the present paper was to bring few information about the celiac disease, highlight the increasing number of celiacs, as well as to determine the Slovak celiacs opinion about the situation on Slovak market and their consumer behaviour on the market of gluten free products. As research methods, there have been used the methods of survey and structured questionnaire consisting of 22 questions. The total number of respondents was 130 randomly selected celiacs from all over the Slovak republic. For a deeper analysis of the obtained results, there have been set out four assumptions and ten hypotheses, which have been tested with the use of Pearson's chi-square test, Mann-Whitney U-Test and Cramer's contingency coefficient. The results of the present paper show, that despite the fact that few of our findings are pleasing – almost 52% of our respondents stay that the labelling of gluten free products is sufficient, over 74% of respondents think that they have enough information about the availability of gluten free products and more than 89% of respondents think that the present scope of range of gluten free products is better as before; there are still some shortcomings, which has to be reduced or eliminated – only less than 7% of respondents think that the price of gluten free products is adequate, over 45% of respondents use this possibility of granting a monetary contribution for compensation of increased expenses on a special diet, almost 65% of respondents think that the scope of range of gluten free products is in the Slovak market insufficient, 53% of respondents think that the availability of gluten free products in the Slovak market is inadequate and only 48% of respondents prefer the domestic producers of gluten free products.

Keywords: celiac disease; gluten free product; gluten free diet; consumer behaviour; Slovak republic

INTRODUCTION

Celiac disease is a life-long gluten sensitive autoimmune disease of the small intestine affecting genetically susceptible individuals (Gujral et al., 2012). In general we can say, that it can affect both – adults but also children and that it is not (URL 1, 2015):

- simply a food allergy (IgE) – wheat allergies are rare among adults; in children, wheat allergies affect 0.04 – 0.05% of population,
- an idiosyncratic reaction to food proteins (mediated by IgE);
- typified by a rapid histamine-type reaction (such as bronchospasm, urticaria, etc.);
- an intolerance which is a non-immune system response to food.

„When people with celiac disease eat foods or use products containing gluten, their immune system responds by damaging or destroying villi – the tiny, fingerlike projections on the inner lining of the small intestine. Villi normally absorb nutrients from food and pass the nutrients through the walls of the small intestine and into the

bloodstream. Without healthy villi, people can become malnourished, no matter how much food they eat.“(URL 2, 2015).

The first description of the disease derives from the 2nd century BC, when Aretaeus from Cappadocia described a patient with chronic diarrhea and failure to thrive and called it koiliakos, which was in 1856, translated by Francis Adams into English as “coeliac” (Villanaci et al., 2011). The more detailed description was given by Samuel Gee (a paediatrician at the London Hospital of Saint Bartolommeo) in 1880 (Ciclitira et al., 2005; Walker et al., 2010) and the link between the consumption of gluten and the symptoms of the illness was demonstrated during the World War II (Abdulkarim et al., 2003).

The classical symptoms of the disease are diarrhea, abdominal pain and weight loss (Olén et al., 2011). Besides the classic symptoms there are appearing also new once, which are the result of insufficient absorption of important nutritional components in the digestion process. They are represented by osteoporosis, joint pain, chronic fatigue, skin lesions, anemia etc. (Fasano, 2009).

Facts about celiac disease (National Foundation for Celiac Awareness, 2015; URL 3, 2015; URL 4, 2011)

- celiac disease is not a food allergy, it is an autoimmune disease, which damages the villi of the small intestine and interferes with absorption of nutrients from food, and which can never be "outgrown",
- celiac disease is a hereditary condition, which means it is passed through families – if one family member has celiac disease, other family members, especially 1st degree relatives (parents, brothers and sisters, or the children of people who have been diagnosed), should always be tested,
- it occurs in 3.9 – 12.3% of people with Diabetes Type 1, in 5 – 12% of people with Down syndrome, Turner syndrome and other auto-immune conditions, in 20% of people with collagenous colitis, in 4.5% of first degree relatives of people with the same disease,
- gluten is essentially toxic to people with celiac disease and gluten sensitivity,
- an estimated 1 in 133 Americans, or about 1% of the population, has celiac disease,
- celiac disease can affect men and women across all ages and races,
- it is estimated that 83% of Americans who have this disease are undiagnosed or misdiagnosed with other conditions,
- 6 – 10 years is the average time a person waits to be correctly diagnosed,
- 5 – 22% of celiacs have an immediate family member (1st degree relative) who also has celiac disease,
- celiac disease can lead to a number of other disorders including infertility, reduced bone density, neurological disorders, some cancers, and other autoimmune diseases
- the cause of disease is not known,
- over 90% of celiacs are undiagnosed or misdiagnosed,
- celiac disease declined during the bread shortages of the Second World War but climbed again after the war,
- half of all people with celiac do not show any symptoms,
- September 13th is a Celiac Awareness Day,
- some products, like lipstick, toothpaste and vitamins, use gluten for processing but because it is not food, does not need to be labelled,
- alcohol made with gluten-containing grains is gluten-free because the distillation process removes the gluten protein.

MATERIAL AND METHODOLOGY

The aim of the present paper was to bring few information about the celiac disease, highlight the increasing number of celiacs, as well as to determine the Slovak celiacs opinion about the situation on Slovak market and their consumer behaviour on the market of gluten free products.

In order to achieve the aim, as research methods, there have been used the methods of survey and structured

Table 1 Characteristics of respondents.

Category of respondents	Number
Male	10
Female	120
Place of residence	Number
City	86
Village	44
Age structure	Number
15 – 19 years	11
20 – 25 years	22
26 – 35 years	47
36 – 49 years	38
50 and more years	12
Education structure	Number
Primary education	4
Secondary education without A level	9
Secondary education with A level	59
Higher professional education	7
Higher education	51
Net family income	Number
Up to 500 €	23
501 – 1.000 €	56
1.001 – 1.500 €	31
1.501 € and more	20
Region	Number
BanskáBystrica	20
Bratislava	34
Košice	4
Nitra	22
Prešov	4
Trenčín	18
Trnava	9
Žilina	19

Note: Source: Results of the research.

questionnaire consisting of 22 questions formulated as closed, so that respondents (total number of respondents was 130 randomly selected celiacs, Table 1) had to choose one, alternatively several options.

In consideration of lack of information about the exact number of celiacs living in Slovak republic (the estimated number of celiacs living in Slovak republic in the year 2014 was between 0.5 and 1% of the total population of Slovak republic (URL 5, 2014), we tried to ensure the representativeness of the results by the random selection and geographic diversification of our respondents (celiacs).

The questionnaire was evaluated with the use of contingency tables, which were prepared by Excel, under which they were subsequently developed graphic representations.

For a deeper analysis of the obtained results, there have been set out the following assumptions:

1. Assumption no. 1 – we assume that most of our respondents are women.

2. Assumption no. 2 – we assume that most of our respondents have celiac disease diagnosed from 0 to 5 years.
3. Assumption no. 3 – we assume that most of our respondents use a so called possibility of granting a monetary contribution for compensation of increased expenses on a special diet.
4. Assumption no. 4 – we assume that most of our respondents think that the scope of range of gluten free products in the Slovak market is insufficient.

And the following and hypothesis:

1. H_{01} – there does not exist the dependence between the frequency of purchase of gluten free products and the respondent's place of living.
 H_{11} – there exists the dependence between the frequency of purchase of gluten free products and the respondent's place of living.
2. H_{02} – there does not exist the dependence between the place of purchase of gluten free products and the respondent's age.
 H_{12} – there exists the dependence between the place of purchase of gluten free products and the respondent's age.
3. H_{03} – there does not exist the dependence between the decisive criteria in the purchase of gluten free products and the respondent's age.
 H_{13} – there exists the dependence between the decisive criteria in the purchase of gluten free products and the respondent's age.
4. H_{04} – there does not exist the dependence between the decisive criteria in the purchase of gluten free products and the respondent's level of education.
 H_{14} – there exists the dependence between the decisive criteria in the purchase of gluten free products and the respondent's level of education.
5. H_{05} – there does not exist the dependence between the respondent's opinion on the adequacy of available information and the region from which the respondent comes from.
 H_{15} – there exists the dependence between the respondent's opinion on the adequacy of available information and the region from which the respondent comes from.
6. H_{06} – there does not exist the dependence between the respondent's opinion on the scope of gluten free products on the Slovak market and the region from which the respondent comes from.
 H_{16} – there exists the dependence between the respondent's opinion on the scope of gluten free products on the Slovak market and the region from which the respondent comes from.
7. H_{07} – there does not exist the dependence between the respondent's opinion on the scope of gluten free products in his region and the region from which the respondent comes from.
 H_{17} – there exists the dependence between the respondent's opinion on the scope of gluten free products in his region and the region from which the respondent comes from.
8. H_{08} – there does not exist the dependence between the respondent's opinion on the availability of gluten free products on the Slovak market and the region from which the respondent comes from.

H_{18} – there exists the dependence between the respondent's opinion on the availability of gluten free products on the Slovak market and the region from which the respondent comes from.

9. H_{09} – there does not exist the dependence between the respondent's opinion on the availability of gluten free products in his region and the region from which the respondent comes from.

H_{19} – there exists the dependence between the respondent's opinion on the availability of gluten free products in his region and the region from which the respondent comes from.

10. H_{010} – there does not exist the dependence between buying gluten free products abroad and the region from which the respondent comes from.

H_{110} – there exists the dependence between buying gluten free products abroad and the region from which the respondent comes from.

To test the dependence respectively the independence between the tested variables there were used the tests of Pearson's chi-square test, Mann-Whitney U-Test and Cramer's contingency coefficient.

RESULTS AND DISCUSSION

As it was mentioned before, celiac disease is an autoimmune disease affecting mainly the small intestine, induced by an intolerance of proteins of wheat, barley, rye and oats. The intolerance refers to the mixture of proteins of cereal grain, which are commonly named and known as *gluten* – gluten is a protein found in wheat, rye, and barley, but it can be found also in other products like medicines, vitamins and supplements, lip balm, and even the glue on stamps and envelopes (URL 6, 2015).

“Some of the gluten quantities could be hazardous for sensitive people as celiatics and allergic to gluten” (Mati, et al., 2012). The causes of the intolerance can be several (Bergendiová, 2012):

- the abnormal activation of own immune system to the presence of gluten in the food (so called hypersensitivity),
- the disorder of metabolism and of the activity of enzymes degrading the gluten,
- genetic factors.

The *symptoms* of celiac disease are a broad nature theme and therefore we have to remember that even in the case of celiac disease, each human is an individual case and example. There are patients in whom the celiac disease was manifested by other gastroenterology or other health problems and complications, which other patients may not have. It is also important to note that celiac disease may also occur in other than gastroenterology problems (Hes et al., 2014).

Nevertheless the fact, that the *prognosis* of the disease is very good (Frič, 2008), there still does not exist a test that could be universally accepted as a standard for the diagnosis. The early diagnosis and lifelong adherence to a so called *gluten free diet* causes that the complications caused by the illness are scarce and the life expectancy of celiacs does not significantly differ to the other populations (Košičiarová et al., 2015).

Celiac disease diagnosis, prevalence and treatment

Pekárková et al., (2009) indicate four basic forms of celiac disease diagnosis:

1. *laboratory diagnosis* – the American College of Gastroenterology recommends, that antibody testing, especially immunoglobulin A anti-tissue transglutaminase antibody (IgA TTG), is the best first test for the diagnosis of celiac disease (Goebel et al, 2015). The first step in the diagnosis is the investigation of patient's blood count and prothrombin time when it comes to the quest for anemia, thrombocytosis, and coagulation disorders. Then, the serological tests are done, where the serological markers of celiac disease are investigated,
2. *endoscopy* – the procedure takes a little less than 30 minutes and is used for adults, sedatives and local anesthetic. Children are usually putted under general anaesthesia. During the biopsy, the gastroenterologist inserts a small tube with a camera through the digestive tract to the small intestine (URL 7, 2015),
3. *histological examination* – samples sent for histological examination shall be assessed by histological scoring, in which is used so called Marsh classification,
4. *radio diagnostic methods* – in celiac disease are mainly used in the differential diagnosis, and therefore the exclusion of other diseases, such as maldigestive syndrome (characteristic for example with inflammation, cancer or cirrhosis) and malabsorption syndrome (important is to distinguish between the primary and secondary malabsorption syndrome).

Despite the fact, that the technology is still developing, scientists and doctors know more about the illness and that there are few possibilities how to diagnose the disease, the number of people sensitive on gluten is still increasing. While in the 1970s the prevalence of celiac disease in the world was 0.03% (Lohi et al, 2007), in the present years the estimated prevalence is about 1% (Košičiarová et al., 2015). In average, the prevalence of celiac disease in the Western countries is close to 1 :100 (Gujral et al., 2012). The celiac disease occurs more often in the case of women than of men, at a ratio of 2.8 :1 (Thomas et al., 2009). Heritability of celiac disease is autosomally dominant with incomplete penetration. In the case of first degree relatives the celiac disease occurs in 8 – 18%, in the case of identical twins at 70% (Prokopová, 2008).

The exact and estimated prevalence of celiac disease in USA, Europe and Slovak republic in the year 2014 is alarming. While in the year 2012 the prevalence of celiac disease in USA was 0.71% (1 in 141) (Rubio-Tapia et al, 2012), in the year 2014 the prevalence was 0.75% (1 in 133) (URL 8, 2014), what represents an increase in 0.04%. Unfortunately, the situation in the case of Europe and Slovak republic, is wronger – while in the year 2010 and 2012 the prevalence of celiac disease in the Europe and in Slovak republic was for about 0.5% (Mustalahti et al., 2010) and 0.2% (1 in 404) (Kabátová, 2014) in the year 2014 it is estimated that the prevalence in Europe was exactly 1% (URL 9, 2015) and in Slovak republic between 0.5 and 1% (URL 5, 2014), what represents an increase for about 0.5 – 0.8% in only two or four years. However, it must be also mentioned that lots of celiacs are still not

diagnosed, what means, that the situation in the field of celiac disease can be much more wrong.

The most commonly used illustration of celiac disease forms is so called *celiac iceberg*, which is also shown on the Figure 1 and which can be very briefly described as follows – the tip of the iceberg is represented by the relatively small number of the world's population whose gross presentation of clinical symptoms often leads to the diagnosis of celiac disease. This is the classical case of celiac disease characterized by – gastrointestinal symptoms, malabsorption and malnourishment (it is confirmed with the "gold standard" of an intestinal biopsy). The middle part of the iceberg is largely invisible to classical clinical diagnosis, but not to modern serological screening methods in the form of antibody testing. This middle part is composed of asymptomatic and latent celiac disease as well as "out of the intestine" varieties of wheat intolerance. The base of the iceberg represents approximately 20 – 30% of the world's population (those who have been found to carry the HLA-DQ locus of genetic susceptibility to celiac disease on chromosome 6) (Sayer, 2005).

The only possibility how to treat the disease is a so called *gluten free diet*, which means to exclude all the food, which contains wheat, rye and barley (Suchá at al., 2015).

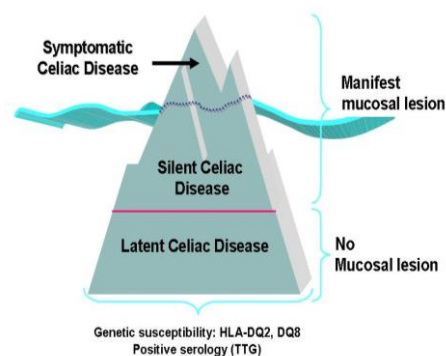


Figure 1 Iceberg image.

Source: Guandalini. Exploring the Iceberg.2009, p. 1.

The principles of gluten free diet can be described as follows (URL 10, 2015):

1. avoid all the foods made from wheat, rye and barley,
2. avoid oats – some celiacs can tolerate them, but the long term safety of oats in celiacs is unknown and some oat preparations can be contaminated with wheat, thus it is better to avoid oats,
3. pay attention to processed food, which may contain gluten (e.g. canned soups, salad dressing, ice cream, candy bars, instant coffee, luncheon meats and processed or canned meats, ketchup and mustard, yogurt, pasta),
4. beware of tablets, capsules and vitamin preparations, which contain gluten,
5. avoid beer, but wine, brandy, whiskey and other alcohols without barley are good in moderation,
6. avoid milk and other dairy products, which contain lactose – with successful treatment, dairy products can be often reintroduced slowly into the diet later,

7. consult dietitians and national celiac disease societies for lists of gluten free food; read the food and product labels before buying or consuming any product,
8. because of the fact, that celiacs who have severe malabsorption can develop vitamin and mineral deficiencies, vitamin and mineral supplements are important.

Significant histological changes will, in keeping with the gluten-free diet, appear in three months and in two years of diet the celiacs will become practically asymptomatic (Anderson, 2008). The main problem in the treatment is the non-compliance with the diet, which occurs in 50 – 80% of patients. Patients still continue in eating the food containing gluten due to lack of motivation or information. The key is the motivation of the patient, the doctor's approach and the cooperation with gastroenterologist or a registered dietitian who have the expertise in the gluten-free diet (Hybenová et al., 2013).

Among the new treatments, which are nowadays tested and the research is concerned on them, are included the *genetic modification of the wheat* by which the gluten has to be removed, as well as *new medicine and vaccines*, which could prevent the damage to the intestine by the gluten (URL 11, 2012).

Results of own research

With the aim to determine the Slovak celiacs opinion about the situation on Slovak market and their consumer behaviour on the market of gluten free products a structurized questionnaire survey was conducted in November 2015. The total number of respondents was 130 randomly selected celiacs from all over the Slovak republic.

From the Table 1 is clear, that the main groups of respondents were represented by women (92% of respondents – the assumption no. 1 was true), people living in the city (66% of respondents), people with the age between 26 and 35 years (36% of respondents), people with secondary education with A level (46% of respondents), people with net family income between 501 and 1.000 € and people from the Bratislava region (36% of respondents).

Up to the results of our own research we can say that most of our respondents have the celiac disease diagnosed from 0 to 5 years (68.46% of respondents – the assumption no. 2 was true), the most often symptoms up to which they have realized, that they are celiacs are diarrhea, abdominal pain, anemia, and allergy (rash and redness of the meal), which are also the typical symptoms of celiac disease (URL 12, 2014), most of our respondents did not have problems with the transition to a gluten free food (79.23% of respondents) and those who had the problems mentioned, that these problems were exactly – sadness, financial side of the illness, aversion to gluten free meals, need to learn how to cook without gluten, need to read all the information on the product and lack of choice (between the available products).

Despite the fact, that a few of our respondents have mentioned, that the situation with gluten free products and information about the celiac disease, resp. gluten free products on the Slovak market was before 10 to 15 years not very good, nowadays the situation is much more better – most of our respondents stay that the labelling of gluten

free products is sufficient (51.54% of respondents), they have enough information about the availability of gluten free products (74.62% of respondents) and they think that the present scope of range of gluten free products is better as before (89.23% of respondents).

Unfortunately, there is still one drawback of gluten free products and that is their price – 93.08% of respondents mentioned that up to their opinion, the price of gluten free products is inadequate (Figure 2).

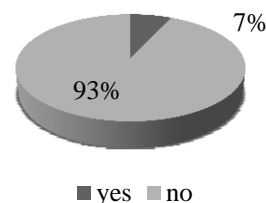


Figure 2 Adequacy of the price.
Source: Results of the research.

Because the Government of the Slovak Republic realizes, that this is a very huge problem, they offer (cross the Office of Labour, Social Affairs and Family) a so called possibility of granting a monetary contribution for compensation of increased expenses on a special diet. "Health insurance companies are covering gluten-free products approximately from 60% of the price (flour, pasta, raw material) to 5 – 30% (ready baked bread, additional gluten free cookies)" (Rimarova, 2013). In spite of that, that most of our respondents, exactly 82.31% of respondents, know about this possibility, only 45.38% of them also use it (the assumption no. 3 was not true) and 46.15% of them are not satisfied with its height.

Because of the need to realize how are Slovak celiacs satisfied with the scope of range of gluten free products, as well as with their availability, in the questionnaire, there were formulated also the questions connected to these issues. Up to their evaluation we can say, that in these questions the Slovak market has still some reserves – most of our respondents (64.62% of them and 57.69% of them – the assumption no. 4 was true) think that the scope of range of gluten free products in the Slovak market, as well as in their region is insufficient and most of them also think (53.08% and 57.69% of respondents) that their availability in the Slovak market, as well as in their region is inadequate.

As it can be seen from the figure above, the most important criterion in the purchase of gluten free products is their quality (51.54% of respondents). This is, why we have been interested not just in the detection of the frequency of the gluten free product's purchase, but also in

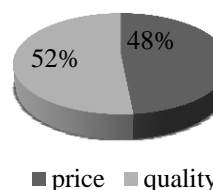


Figure 3 The decisive criterion in the purchase of gluten free products.
Source: Results of the research.

the place of their purchase (Figure 4), preference of domestic producers of gluten free products, mostly preferred labels of them, usage of the possibility to buy them abroad, as well as the reasons leading to their purchase abroad.

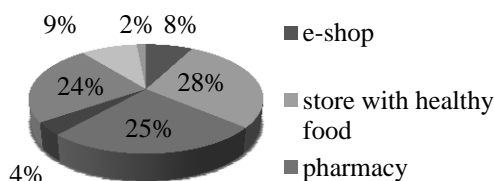


Figure 4 Place of purchase of gluten free products.

Source: Results of the research.

Up to the results of our questionnaire we can say, that most of our respondents buy gluten free products for few times in a week (39.23% of respondents), they buy them mostly in stores with healthy food, pharmacy and supermarket (28.46%, 25.38% and 23.85% of respondents), they do not exactly prefer the domestic producers of gluten free products (52.31% of respondents), they prefer mostly the labels of Schär, Novalim and Schnitzer (42.31%, 36.23% and 10.2% of respondents; Figure 5), they use the possibility to buy them abroad only randomly (63.85% of respondents do not use this possibility at all) and they use it only in the case of neighbouring countries because of the better quality and price of these products (81.11% and 79.3% of those respondents who use this possibility).

The above mentioned results correspond to some extant

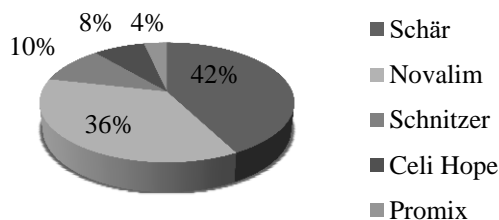


Figure 5 Mostly preferred labels of gluten free products.

Source: Results of the research.

to the results of research conducted by **Hes et al.,(2014)** on the sample of 289 randomly selected Slovak celiacs, where the authors have found out that the most important criterion in the purchase of gluten free products is their freshness and quality (57% of respondents), resp. the price (23% of respondents); that most of Slovak celiacs buy gluten free products for once or few times in a week (44% and 27% of respondents); most of them (45% of respondents) prefer to purchase gluten-free products in specialized stores, supermarkets (18% of respondents), hypermarkets (18% of respondents) and in pharmacies (10% of respondents) and that they prefer mostly the labels of Schär, Novalim and Pečivárne Liptovský Hrádok (96.19%, 28.35% and 23.18% of respondents); resp. with the results of research conducted by **Košičiarová et al., (2015)** on the sample of 506 randomly selected Slovak celiacs, where the authors have found out that the most important criterion in the purchase of gluten free products

is their freshness and quality (56.56% of respondents), price level (21.06% of respondents) and their range width (14.04% of respondents), that most of Slovak celiacs buy gluten free products in specialized shops (52.17% of respondents), hypermarkets (18.77% of respondents) and supermarkets (17.98% of respondents) and that most of them are not satisfied with the range width of the gluten free products (69.96% of respondents). Unfortunately, there are no more researches with which we could compare our results, because our research is very specific and in the area of Slovak republic there was not implemented a similar research. This disadvantage brings with it also additional advantage in the form of the possibility of implementing other similar studies, resp. other studies focused on the situation of Slovak celiacs.

Evaluation of the formulated hypotheses

Connected with few of above evaluated questions, there have appeared also the questions of the dependence resp. independence between few variables. This is, why in the part Material and Methodology were formulated ten different hypotheses, which have been tested with the use of Pearson’s chi-square test, Mann-Whitney U-Test and Cramer’s contingency coefficient; and which evaluation is following one:

1. H_{01} – there does not exist the dependence between the frequency of purchase of gluten free products and the respondent’s place of living – accepted.
2. H_{02} – there does not exist the dependence between the place of purchase of gluten free products and the respondent’s age – accepted.
3. H_{03} – there does not exist the dependence between the decisive criteria in the purchase of gluten free products and the respondent’s age – accepted.
4. H_{04} – there does not exist the dependence between the decisive criteria in the purchase of gluten free products and the respondent’s level of education – accepted.
5. H_{15} – there exists the dependence between the respondent’s opinion on the adequacy of available information and the region from which the respondent comes from – accepted.
6. H_{06} – there does not exist the dependence between the respondent’s opinion on the scope of gluten free products on the Slovak market and the region from which the respondent comes from – accepted.
7. H_{07} – there does not exist the dependence between the respondent’s opinion on the scope of gluten free products in his region and the region from which the respondent comes from – accepted.
8. H_{08} – there does not exist the dependence between the respondent’s opinion on the availability of gluten free products on the Slovak market and the region from which the respondent comes from – accepted.
9. H_{09} – there does not exist the dependence between the respondent’s opinion on the availability of gluten free products in his region and the region from which the respondent comes from – accepted.
- H_{110} – there exists the dependence between buying gluten free products abroad and the region from which the respondent comes from – accepted.

CONCLUSION

Up to the results of our own research, which was conducted on the sample of 130 randomly selected celiacs from different parts of Slovak republic, we can conclude, that while the situation with the information and availability of gluten free products on the Slovak market is nowadays on a better level as it was before, there are still some drawbacks, which must be reduced – still too high price of gluten free products (only 6.92% of respondents think that the price is adequate), lack of people who use so called possibility of granting a monetary contribution for compensation of increased expenses on a special diet (only 45.39% of respondents use this possibility), insufficient scope of range of gluten free products in the Slovak market (almost 65% of respondents), insufficient scope of range of gluten free products in the respondent's region (more than 58% of respondents), inadequate availability of gluten free products in the Slovak market (53% of respondents), inadequate availability of gluten free products in the respondent's region (almost 58% of respondents) and small preference of domestic producers of gluten free products (only 47.69% of respondents prefer them).

Because of the need to execute a deeper analysis of the obtained results, as well as to determine the dependence between variables, four assumptions and ten hypotheses have been formulated and finally tested. Up to their evaluation we can say, that only three assumptions were true – the assumption no. 1, which has said that most of our respondents are women (exactly 92% of our respondents were women, which confirms also the statement that the celiac disease occurs more often in the case of women than of men); the assumption no. 2, which has said that most of our respondents have celiac disease diagnosed from 0 to 5 years (exactly 68.46% of our respondents, which confirms our previous notes about the increasing number of celiacs in the last few years); and the assumption no. 4, which has said that most of our respondents think that the scope of range of gluten free products in the Slovak market is insufficient (exactly 64.62% of our respondents, which is a very interesting result because exactly 89.23% of our respondents stated in an another questions, that the present scope of range of gluten free products is better as it was before); and only two hypotheses have been confirmed. These hypotheses show, that between the respondent's opinion on the adequacy of available information and the region from which he/she comes from, there exists a small, but statistically significant dependence (the result of Cramer's contingency coefficient was equal to 0.10085, what can be interpreted as a weak dependence, and the result of Mann-Whitney's U-Test was – the U-value was 12.5, the critical value of U at $p \leq 0.05$ was 13, which means, that the result is at $p \leq 0.05$ significant) and between buying gluten free products abroad and the region from which the respondent comes from there exists also some dependence, but it is statistically not significant (up to the results of Pearson's chi-square test, the H_0 hypothesis must be on the level of significance 5% rejected and adopted must be its alternative H_1 hypothesis talking about the dependence between tested variables ($TC = 18.988 > CV = 14.067$), the result of Cramer's contingency coefficient was equal to 0.04242, what can be interpreted as almost none dependence, and the result of Mann-Whitney's U-Test was

– the U-value was 24, the critical value of U at $p \leq 0.05$ was 13, which means that, the result is at $p \leq 0.05$ not significant).

Based on the results of our research, we can propose the following recommendations for not just the Ministry of Health of Slovak Republic, but also for the Office of Labour, Social Affairs and Family, doctors as well as producers, suppliers and sellers of gluten free products:

- to increase the level, but also the promotion of so called possibility of granting a monetary contribution for compensation of increased expenses on a special diet – most of celiacs know about this possibility, but they do not use it, because they think that it is still very small and insufficient, as well as they say, that it is also difficult to obtain it,
- this is why it is needed also to reduce the bureaucracy and difficulty of its obtaining,
- to support the producers of gluten free products so that they could decrease their price,
- to organize free tasting of gluten free products,
- to increase their quality – exactly in the case of their taste,
- to organize free courses how to buy gluten free products, where to buy them, how to cook for celiacs, how to change to gluten free diet,
- to create separate corners with gluten free products, which will be visible for celiacs and where they could find also some added information about them, etc.

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