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Factors of Regional Extensive Development (FRED 2019)

On Human Welfare and Health

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***Abstract* — The report presented by V.V. Putin to the Federal Assembly on February 20, 2019 focuses on the welfare of the population because the well-being is determined by the quality of human life. The Decree of the President of the Russian Federation of 07.05.2018 No. 204 "On the national goals and strategic objectives of development of the Russian Federation for the period up to 2024" was strengthened by new measures aimed at developing respectful, careful attitude to human health. A healthy lifestyle is an important link for preventing chronic diseases, including chronic gastritis, and improving the quality of life. The article presents results of the statistical analysis of the role of Helycobacter pylori in the etiology of gastritis and online Ufa Petroleum Technical University students survey results. The survey results showed that 45% of respondents had chronic gastritis in history. Their average age was 21 years. These results indicate the prevalence of chronic gastritis manifested as constant heaviness after eating (22% of respondents) and heartburn (10%). Promotion of a healthy lifestyle, health concerns should be a mandatory component of the education process.**

Key words – well-being problems, trends of the modern world, gastritis, etiology

I. INTRODUCTION

The well-being of the modern world is determined by the quality of human life. This thesis was voiced by V.V. Putin in his message to the Federal Council on February 20, 2019. The President touched on the issues of ecology, support for large families, and an increase in social benefits. Particular attention was paid to the national health project which aims to prevent and treat diseases, reduce mortality caused by chronic diseases and improve availability of medical care. Prevention is a modern approach to medicine aimed at preventing chronic diseases and improving living standards [1].

The well-being of the population depends on the health state. Most chronic diseases are accompanied by asthenic syndromes whose symptoms affect performance [2, 3]. Chronic gastritis is one of the widespread diseases.

Physical labor is a contraindication for severe and exacerbated forms of gastritis which limit professional activities of petroleum specialists [4]. A healthy lifestyle is a method which can prevent chronic diseases and improve the quality of life of the population [5].

Currently, the course of gastroenterological diseases changes. The disease can develop in young people and is characterized by persistent chronic relapsing course, loss of seasonality of exacerbations, severe complications. High frequency of concomitant and multiorgan pathologies, allergic diseases, a chronic intoxication syndrome resulting in resistance to traditional methods of treatment and a hard choice of medicines [6].

The most common chronic diseases are stomach and duodenum pathologies (gastritis, gastroduodenitis, peptic ulcer). The factors causing chronic inflammatory diseases of the gastroduodenal zone are alimentary, neurogenic, hereditary, immunological, and allergic. For the last 25 years, the majority of domestic and foreign gastroenterologists believe that gastritis and peptic ulcer can be caused by pyloric helikobakteriozu.

II. RESULTS AND DISCUSSION

Helicobacter pylori (H. pylori, HP) deteriorates local immunity, the microecological structure of the stomach and intestines, causes inflammation of the mucous membrane of the digestive organs. H. pylori produces catalase, oxidase and catalase-negative mutants. They produce urease but do not decompose carbohydrates. H_2S formation tests and tests for reduction of nitrates to nitrites are variable. Alkaline phosphatase, γ-glutamyl transpeptidase, and leucine aminopeptidase are isolated. To differentiate them from Campylobacteriaceae, researchers use the tests for determining the ability of H. pylori to grow in the presence of 2,3,5-triphenyltetrazoline chloride (0.4 and 1 mg / l), sodium selenite (0.1%), glycine (1%) are used; no growth in a 8% glucose solution and a 3.5% sodium chloride solution; sensitivity to cephalotin and resistance to nalidixic acid [7].

H. pylori produces a wide range of enzymes: urease, cytochrome oxidase, catalase, alkaline phosphatase, alcohol dehydrogenase, lipase, γ-glutamyl transpeptidase, leucine aminopeptidase, protease and lipase, but it does not produce saccharolytic enzymes. Metabolism of H. pylori is due to the energy produced by decomposition of tricarboxylic acids and amino acids rather than carbohydrates. This bacterium acquired properties that allow it to survive in adverse environmental conditions. H. pylori is able to change the conditions of its microenvironment. Under acidic conditions, a powerful alkalization system produces a huge amount of urease, but bacteria are killed at pH = 8. Therefore, in neutral conditions, H. pylori "switches on" the system of oxidase enzymes, which cause the release of hydrogen ions shifting pH to the acidic side. Oxidizing enzymes acidify the microenvironment of H. pylori and produce reactive oxygen species that damage tissues of the mucous membranes. Thus, at pH <6, urease has a toxic effect, and when the pH environment turns into the alkaline one (which often occurs during the use of antisecretory medicines), oxidase has a damaging effect [8].

Epidemiological studies conducted in various countries indicate that 75-100% of cases of chronic gastritis, 70-80% of cases of gastric ulcer, 80-100% of cases of duodenal ulcer, 30-90% of cases of non-ulcer dyspepsia are caused by H. pylori.

The epidemiological situation in Russia is not clear; epidemiological studies were conducted only in some regions. This is due to the complexity and high costs of the research as well as the low prevalence of non-invasive H.pylori diagnostic methods. Epidemiology data are as follows: in the adult population, H.pylori was found in Perm - 65%, Yakutia - 70%, St. Petersburg - 72%, Chukotka and Khanty-Mansiysk - 77%, Tuva - 83%, Novosibirsk - 86%. Interesting results were obtained [9] when studying the infection in Novosibirsk and some regions of Siberia and the Far East: 474 young people (of 25-34 years old) were examined in Novosibirsk; antibodies to H.pylori were found in 86% of the examined, and in men, the antibodies were found more often than in women (89% and 80%, respectively).

The infection rate in children was quite high (48% in Perm and 55% in Minsk; in Omsk it was close to that of the adult population and amounted to 63-86%) [10].

The infection rate increases with aging. According to the study conducted in Moscow and Moscow Region, H. pylori was found in 40–45% of 5–6-year-old children, and in 65–70% of 14–15-year-olds. In Novosibirsk, the infection rate in children increased from 10% at the age of 3-4 years to 62% by the age of 14-15 years [11].

Even babies can be contaminated with H. pylori. The microorganisms were found in the stomach of a two-month baby [12].

Interesting data for seasonal H.pylori contamination: were obtained: the infection rate was higher in May and October-November which corresponds to the seasonality of peptic ulcer exacerbations due to the prevalence of H.pylori in these patients [13].

The works on epidemiology emphasize the dependence of the infection on living conditions. It is believed that the spread of H.pylori is influenced by socio-economic factors (crowded population, low living standards, violation of hygienic norms, lacking centralized water supply, etc.). In 1994, American researchers found that H.pylori is not found in families whose annual income exceeds 70 thousand dollars [11]. In Brazil, a high rate of H.pylori contamination (up to 96.7%) is typical of families using unboiled running water whose annual per family income does not exceed $ 5,000 [12]. In the US, there was a significant spread of H. pylori in the African American community. In families with more than one child, the contamination rate is higher. Persistent eradication can be achieved by treating all family members [13].

In Russia, it is not possible to draw a clear correlation between H.pylori contamination and living conditions. However, higher according to data [13], in large families living in densely populated apartments or houses with partial amenities, the rate of H.pylori infection is 30–40%; among children from ecologically unfavorable areas, the H.pylori contamination rate was 97.3%, from favorable areas - 44%; for Omsk, these values were 86% and 63%, respectively [14], for Minsk - 55% and 35-40%, respectively [15].

Researchers note that the H. pylori infection rate in children living in rural areas and not experiencing constant anthropogenic pressure is lower than in those living in large industrial centers [16].

The long-term H. pylori persistence on the gastric mucosa contributes to atrophic changes, intestinal metaplasia and carcinogenesis which is confirmed by similar data on the prevalence of H. pylori-associated cases of gastric cancer (17-95%) and MALT lymphoma (35-100%) [8]. In 1994, WHO experts attributed H. pylori to carcinogens [17].

The history of H. pylori discovery is connected with the history of the study of etiology and pathogenesis of gastritis. The idea of an infectious origin of gastritis was suggested at the end of the nineteenth century. A century later, its significant role for the etiology of gastritis and peptic ulcer was proved. Marshall and D.R. Warren. Due to this fact, eradication therapy is widely used for treating gastritis. The therapy efficiency was confirmed by dynamic observation of a global decrease in the infection prevalence rate [12].

The authors used the following methods: the statistical and online survey methods. The copying method involved analysis of protocols of microscopic examination of biopsies of the pathoanatomical department of city clinical hospital 21 in Ufa. The data were processed using Microsoft Office Word 2013 and Microsoft Office Excel 2013.

100 people were surveyed online (74% of respondents were women). The average age of respondents was 21 years. The survey included questions on the etiology and symptoms of gastritis, their manifestations in the respondents. It was

revealed that 76% of the respondents consider malnutrition as the main cause of gastritis. According to 11% of the respondents, gastritis is caused by the Helycobacter pylori infection; 7% believe that it is caused by heredity, and 6% - by bad habits. 45% have a history of chronic gastritis, 50% have a history of a superficial form of gastritis. When asked how often you feel heaviness after eating, 22% of respondents answered “always”, 42% - “sometimes”. 10% of the respondents have constant heartburn.

The structure of the online survey results is presented in Figure 1.

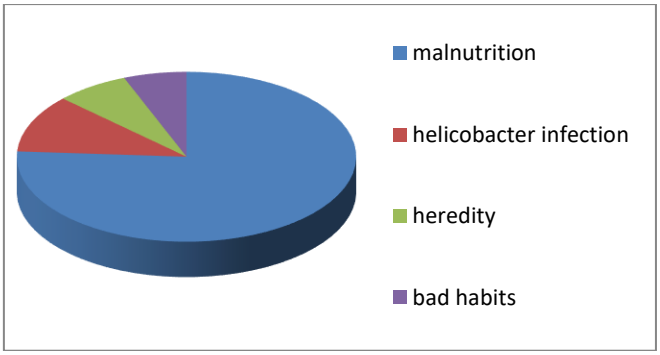

Fig. 1. The etiology of gastritis among the population identified by the survey.

Analysis of the protocols showed that from January 2014 to December 2015, there were 2384 cases of gastritis of different etiology, among which 1227 (51,5%) were caused by Helicobacter. The latter indicates the significant role of Helycobacter pylori in development of inflammatory diseases of the stomach. Helicobacter-associated forms of gastritis were found in 44.2% of men, and in 55.8% of women. The mean age was 58.7 years. The superficial form of gastritis was the most common..

The results of research protocols aimed at identifying the etiology of gastritis by biopsy are presented in Figure 2.

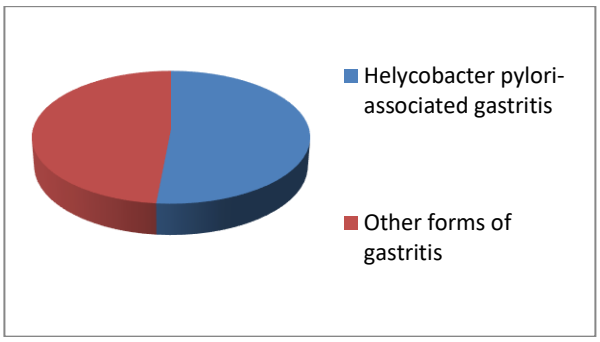

Fig. 2. The etiology of gastritis identified by biopsy.

51.5% of cases of chronic gastritis, being a frequent inflammatory disease of the gastric mucosa are caused by Helycobacter pylori. This is a spiral gram-negative bacterium with dimensions of 3 x 0.5 microns. It is mobile, microaerophilic. The bacterium produces oxidase, catalase and urease. Helycobacter pylori is capable of forming a biofilm that ensures bacterial immunity to antibiotics and protection against the host's immune response. In adverse conditions, it is turn into the cocci form which contributes to its survival and may be an important factor in the epidemiology and spread of the bacterium. The contamination mechanism is fecal-oral, oral-oral, and iatrogenic. Other etiological factors are malnutrition, chemical and thermal agents, chronic auto-intoxication, neuroendocrine disorders. There are superficial and atrophic forms of chronic gastritis.

III. CONCLUSION

According to biopsy data, chronic gastritis often develops in old age. At the same time, Helicobacter develops in 51.5% of cases, including in people of working age. Under these conditions, microscopic confirmation of the disease is important as it makes the therapeutic and diagnostic process more effective in patients with chronic stomach diseases, especially chronic gastritis. The survey results showed a high rate of chronic gastritis in students whose average age was 21 years. Constant heartburn (10% of respondents), heaviness after eating (22% of respondents) affect the quality of life. Chronic gastritis is common among all ages of the population and is a problem of the well-being of the population. Development of severe forms of chronic gastritis can be prevented if people seek treatment in case of heaviness after eating, heartburn, nausea, anorexia.

Thus, a healthy lifestyle and proper eating behavior improve the quality of life. Promotion of a healthy lifestyle (frequent, divided meals, a varied diet, exercises and no stress) plays an important role for preventing gastrointestinal diseases.

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