

## **Epidemiological Features of the Pathology of the Upper Departments of the Gastrointestinal Tract among the Population of St. Petersburg**

**Yuliya V Kokovina<sup>1</sup>, Tatiyana M Chirkina<sup>2\*</sup>, Batibek I Aslanov<sup>3</sup>, Igor G Bakulin<sup>4</sup> and Adelya R Galiullina<sup>5</sup>**

<sup>1</sup>Assistant of the Department of Propaedeutics of Internal Diseases, Gastroenterology and Dietetics, North-Western State Medical University Named After I. I. Mechnikov, Russian Federation

<sup>2</sup>Assistant of the Department of Epidemiology, North-Western State Medical University Named After I. I. Mechnikov, Russian Federation

<sup>3</sup>Associate Professor of the Department of Epidemiology, North-Western State Medical University Named After I. I. Mechnikov, Russian Federation

<sup>4</sup>Professor, Head of the Department of Propaedeutics of internal Diseases, Gastroenterology and Dietetics, North-Western State Medical University Named After I. I. Mechnikov, Russian Federation

<sup>5</sup>Third Year Medical Student of North-Western State Medical University Named After I. I. Mechnikov, Russian Federation

**\*Corresponding Author:** Tatiyana M Chirkina, Assistant of the Department of Epidemiology of North-Western State Medical University Named After I. I. Mechnikov, Russian Federation.

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### **Abstract**

Gastrointestinal diseases are still considered to be crucial problems in a clinical medicine, attracting attention of medical practitioners and healthcare policymakers. In St. Petersburg, among the examined chronic diseases of the upper gastrointestinal tract, gastritis and duodenitis are widespread. The prevalence analysis included patients registered in the reporting period. The most common disease occurs among adolescents 15 - 17 years old. Currently, there is a number of statistical reports, which describe information about the number of registered patients with hernias is not correct. After analyzing the registration of diseases, it should be noted that it is necessary to record diseases correctly, which will lead to competent prevention and follow-up of patients of all groups, and this will result in one of the main stages of the implementation of state programs to reduce morbidity, oncopathology and mortality.

**Keywords:** Patients; Prevalence; GERD; Diseases; Prevention; Cases

### **Abbreviations**

GORD: Gastroesophageal Reflux Disease; NAFLD: Non-Alcoholic Fatty Liver Disease; BE: Barrett's Esophagus; EAC: Esophageal Adenocarcinoma; MEGRE: Multicenter Study "Epidemiology of Gastroesophageal Reflux Disease in Russia; NERD: Non-Erosive Reflux Disease; Hp: *Helicobacter pylori*

### **Introduction**

Gastrointestinal diseases are still considered to be crucial problems in a clinical medicine, attracting attention of medical practitioners and healthcare policymakers. Incidence of digestive organ's diseases has increased among the population of Russian Federation. In particular, for the last 20 years initial incidence of digestive organs diseases has surged. The trend has not just moved towards the wide spreading of the disease but also to the changes in the structure, type and forms of this pathology: upper gastrointestinal tract

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pathologies are prevailing; the frequency of the cholelithiasis, gastric ulcers and duodenum linked to gender differences is now reducing; age boundaries of the gastrointestinal pathologies formation are being modified. The major trend is towards the growth of incidence related to upper gastrointestinal tract pathologies, namely, gastro-oesophageal reflux disease (GERD), gastritis and duodenitis and non-alcoholic fatty liver disease (NAFLD). Their medical and social value is determined by their relapsing nature and the deteriorating quality of life. Erosive gastritis (*H. pylori*- associated) and gastro-oesophageal reflux are the most common among the diseases of the upper divisions of the digestive tract. On average, in Western European countries up to 8.2% of population has peptic ulcer disease, in Germany one in 10 is exposed, in the UK - 15% of the population, in the USA from 7% to 10% of the inhabitants, in Japan - 11%, in India - 25%. According to the reports of the Ministry of Health of the Russian Federation, for the last years the share of patients with initial incidence of erosive disease in Russia has jumped up from 18 to 26%, while 3 billion people are registered on clinical rolls with the following diagnosis. Significant argument, determining social value of digestive organs' diseases, is that all age groups are exposed to this pathology. In the past decade the frequency of kids' and teenagers' digestive diseases has tripled.

Gastritis and duodenitis are the most common diseases of upper parts of gastrointestinal tract pathologies [1]. Chronic gastritis is the most spread somatic disease. The following diagnosis is considered to be morphological, therefore, in case of the absence of the morphological research, the risk of over-diagnosis is high. Special importance is given to etiologic role of *Helicobacter pylori* (Hp). Various epidemiological studies have revealed the wide spread of *H. pylori*-infection - 60 - 70% of the world's population is exposed. There are two variants of *H. pylori* being spread. According to the first variant, mainly prevalent among the developing countries (Nigeria, Chili, Brazil, Peru, Thailand, Saudi Arabia), *H. pylori* is detected with a high frequency among the kids (90% of the kids are infected); while almost the whole population is infected at 30 years old. According to the second variant, infection is gradually increasing with the age - among 5 years old children 15% are infected, among 20 years old - 65%. This variant is common in developed countries like Finland, US, Belgium, Italy and France. *H. pylori* is persistent. However, only part of the ones infected is getting exposed to the *Helicobacter* diseases. The reasons for this trend, are incomplete diagnostic of the disease, particularities of microorganisms reactivity and/or virulence differences of a causative agent. There is a proof that various genotypes of *H. pylori* do exist, supposedly varied by the virulence factors. Keen interest of the researchers to problems related to accurate diagnostics of chronic gastritis is due to the high probability of its transition into a precancerous disease of a stomach. Data on the incidence of a disease differs in various countries. In Germany, frequency of atrophic gastritis is 2 - 11%, in Portugal - 20%, in Romania - 24,7%. In the majority of Russian Federation regions, for the last 20 years, a marginal increase of gastrointestinal diseases, with chronic gastritis dominating, is being dwelled. In this case, atrophic gastritis is detected among 5% of people under 30, among 30% of people from 31 to 50 years old and among 50 - 70% of people over 50 years old [2]. Structure of chronic gastritis is varied: 70% of them are related to *Helicobacter pylori*, 15 - 18% is autoimmune, around 10% are associated with nonsteroidal anti-inflammatory agents, less than 5% is reflux gastritis, 1% is represented by rare forms of chronic gastritis (lymphocytic, eosinophilic, Crohn's) [3].

According to the world statistics, around 7 - 14% of the population suffers from ulcers. Duodenal localization of ulcers is detected 4 times more often than the stomach ulcer; in Russian Federation the number of patients with this disease exceeds 3 million. Frequency among the women in comparison to men is fluctuating between 1:2 and 1:7 [3]. At young age, men suffer 2 - 5 times more often than women, after reaching the age of 40, the gender differences are disappearing; in the last years there's a diminishing tendency towards the hospitalization. Patients at the age of 15 can rarely have a duodenal ulcer, while stomach ulcer can be detected at the age of 5. There are different assumptions; duodenal ulcer can only be detected among the patients, which were infected with *Helicobacter pylori* in their late childhood or in the adult age, as since that time the number of parietal cells does not change. In the last few years, ulcerative disease's frequency and prevalence decrease has been noticed. This fact gives an evidence: the number of patients which are hospitalized in central Research Institute of gastroenterology with ulcerative diseases of duodenum and especially stomach has decreased significantly. The comparative data of public health department in Moscow indicates reduction in frequency and prevalence of ulcerative disease. Therefore, the incidence of peptic ulcer in Moscow in 2005 amounted only to 66 cases per 100,000 of the city's population (compared

with 1994 - 167 cases per 100,000 of the city's population). In this way, over 10 years, the incidence of peptic ulcer of Moscow inhabitants has gone down to 60.5% of cases. The prevalence of peptic ulcer in Moscow in 2005 amounted only to 1308 cases per 100,000 of the city's population (compared with the same coefficient in 1994 - 1992 cases per 100,000 of the city's population). Subsequently, the prevalence of peptic ulcer in Moscow decreased by 34%. Considering the etiopathogenetic aspects of peptic ulcer's development, it has to be noted that the genetic predisposition, the imbalance between the factors of aggression and defense, the presence of *Helicobacter pylori* (Hp) are the three factors that are currently most often taken into account as the factors likely contributing to the appearance of peptic ulcer and its relapses [4]. In 2001, the incidence of peptic ulcer of the stomach and duodenum was 1.57 per 1000 people [5]. This disease is more common among the males over 18 years old. Early diagnosis and timely treatment prevent the development of complications and preserve the working capacity of patients. The prognosis worsens in the absence of timely and effective treatment, frequent and prolonged relapses, with malignant degeneration of the ulcer.

Hernia remains one of the most common surgical pathologies. Ventral hernias are discovered among 3 - 7% of the population, which is 50 per 10,000 people [6]. Diaphragmatic hernia and diaphragm relaxation are the most common surgical pathologies of the diaphragm. They can occur due to an abnormality of the embryonic development of the diaphragm, its traumatic injuries, as well as some other reasons, including age-related involution changes. Traumatic diaphragmatic hernia is the movement of the organs of abdominal cavity into the chest cavity through a pathological hole in the diaphragm which occurs as a result of trauma. The frequency of development of traumatic diaphragmatic hernias, according to data, is 2 - 3%. They account for 13% of all diaphragmatic hernias [6].

GERD is considered to be a disease of the 21<sup>st</sup> century. This pathology in general occurs in 29% of cases, while equally often men and women are diagnosed with the symptoms of this disease. The injury peculiarity of patients with GERD is that from 18 years the frequency of the disease increases, with a favorable course it decreases after reaching 75 - 85 years old, with the exception of patients with peptic ulcer of the esophagus. It is necessary to pay attention to the fact that practical doctors and patients themselves underestimate the significance of this disease and less than 1/3 of patients with GERD go to the doctor. In most cases, patients ask for medical help late and, even with severe symptoms, are treated on their own. Doctors, in their turn, are poorly informed about this disease and underestimate its consequences; they do not rationally treat reflux esophagitis.

Such a serious complication as Barrett's esophagus diagnoses, which is a precancerous condition is extremely rare. Gastroesophageal reflux disease (GERD) is a dramatic problem in modern gastroenterology. The problem of gastroesophageal reflux disease (GERD) has recently attracted the attention of scientists and practitioners in many countries. First of all, this is due to an increase of the prevalence of GERD, a huge range of complaints made by patients, including those of an "extraesophageal" nature, the development of serious complications such as Barrett's esophagus (BE) and esophageal adenocarcinoma (EAC), as well as a long-term conservative therapy, and in some cases inevitability of surgical intervention. Esophagus disease is considered to be a disease of the 21<sup>st</sup> century. In general population, this pathology occurs in 29% of cases, equally often in both men and women. The peculiarity is that from 18 years the frequency of the disease increases, with a favorable course decreases after reaching 80 - 85 years, with the exception of patients with peptic ulcer of the esophagus. It is necessary to pay attention to the fact that some practical doctors and patients themselves underestimate the significance of this disease and less than 1/3 of such patients go to the doctor. Very often, patients ask for medical help late and, even with severe symptoms, are treated on their own. And some doctors, in turn, are poorly informed about this disease and underestimate its consequences; they do not rationally treat reflux esophagitis. Extensive epidemiological studies suggest that 40% of people constantly (with varying frequency) experience heartburn - the main symptom of GERD. In general, the prevalence of GERD in Russia among the adult population is 40 - 60%. In the general population, the prevalence of esophagitis is estimated at 5 - 6%; while 65 - 90% of patients have mild and moderate esophagitis, and 10 - 35% have severe esophagitis. The incidence of severe esophagitis in the general population is 5 cases in 100,000 per year. The prevalence of Barrett's esophagus among people with esophagitis reaches 8% with fluctuations ranging from 5 to 30%. In the recent decades, an increase in the incidence of EAC has been observed, the incidence develops against the background

of the progression of dysplastic changes in the metaplasized epithelium of the mucous membrane of the distal esophagus. EAC develops in 0.5% of patients with a low degree of epithelial dysplasia, in 6% per year - with high degree dysplasia and less than 0.1% - without dysplasia. According to some other data, the disease occurs in 20 - 40% of the population [7,8]. The prevalence of GERD among the adults is up to 40%. In Western European countries and the USA, extensive epidemiological studies suggest that 40% of people constantly (with different frequencies) experience heartburn - the main symptom of GERD. 4 - 10% of the population experience GERD symptoms daily in industrialized countries, 30% weekly, 50% monthly. In the USA and Belgium, only endoscopically positive GERD is detected in 21 - 27% of the population, in Japan - in 16.5% and in some Asian countries - about 3 - 6%. In some regions of Russia according to sample studies, up to 48.5% of men and 51.4% of women periodically experience heartburn. However, it should be recognized that the first population-based epidemiological study in Russia was initiated by the president [9]. Scientific Society of Gastroenterologists in Russia, Director of the Central Research Institute of Gastroenterology L. B. Lazebnik within the framework of the MEGRE program (Multicenter study "Epidemiology of Gastroesophageal Reflux Disease in Russia). As a result, truly astounding results were obtained: it turned out that "the prevalence of GERD (the presence of heartburn and/or acid belching once a week and more often during the last 12 months) amounted to 13.3%" [10]. In the world, there is a tendency towards an increase in prevalence of this disease. One of the most significant risk factors for the development of GERD is the presence of visceral obesity, a typical disease of today. In this way, in many cases, GERD can be considered as one of the "gastroenterological manifestations" of systemic pathology - the metabolic syndrome [11]. The widespread prevalence of the diseases of the upper digestive system determines the relevance of the topic. An epidemiological analysis will reveal the peculiarities of the diseases being spread among the population of St. Petersburg in various age groups.

### Materials and Methods

The incidence, prevalence, dynamics and structure of various age groups of the population of St. Petersburg with diseases of the upper gastrointestinal tract were calculated and analyzed. The source of information was the reporting forms of Federal Statistical Observation No. 1 from 2015 to 2018. Statistical processing of the results was carried out using the software package EpiInfo (version 3.5.1) and PEPI.

### Results and Discussion

In St. Petersburg, among the examined chronic diseases of the upper gastrointestinal tract, gastritis and duodenitis are widespread. According to official registration in 2015, the incidence was 5.1 (95% CI 5.0 - 5.4) per 1000 people (here and after, in brackets after the indicator value, the lower and upper boundaries of the 95% confidence interval are shown), in 2016 - 6.0 (95% CI 5.9 - 6.3), in 2017 - 5.4 (95% CI 5.2 - 5.5), in 2018 - 6.1 (95% CI 6.0 - 6.4) per 1000 people. When calculating incidence, patients with diagnoses discovered for the first time in their lives were taken into account. The total prevalence of gastritis and duodenitis was 31.6 per 1000 (31.5 - 31.7). The prevalence analysis included patients registered in the reporting period. The most common disease occurs among adolescents 15 - 17 years old. The incidence and prevalence with a distribution by age and years are presented in table 1 and 2.

Age	2015 year	2016 year	2017 year	2018 year	Total
Total	5,1	6,0	5,4	6,1	5,7
0 - 14 years	8,1	8,4	6,8	6,8	7,5
15 - 17 years	19,5	22,5	20,2	19,1	20,3
18 - 55 years	5,0	6,0	5,7	6,9	5,9
Over 55 years	2,7	3,8	3,3	3,6	3,4

**Table 1:** The incidence of gastritis and duodenitis in 2015-2018 in Saint Petersburg.

Age	2015 year	2016 year	2017 year	2018 year	Total
Total	11,4	13,1	18,7	18,7	31,6
0 - 14 years	9,6	9,3	7,9	7,5	8,5
15 - 17 years	60,0	54,6	56,7	49,0	54,9
18 - 55 years	11,6	14,1	14,4	23,3	15,8
Over 55 years	7,8	10,0	10,7	14,6	10,8

**Table 2:** The prevalence of gastritis and duodenitis in 2015 - 2018 in Saint Petersburg

From 2015 to 2018 there is a drop in the incidence of peptic ulcer of the stomach and bulb of the duodenum. The maximum incidence over the past 4 years is observed in 2016 - 1.3 (95% CI 1.2 - 1.4) per 1000 people. Most often, peptic ulcer disease affects people over 18 years old - 1.2 (95% CI 1.1 - 1.3) per 1000 people. Comparison of intensive indicators calculated for different time periods are presented in table 3 and 4.

Age	2015 year	2016 year	2017 year	2018 year	Total
Total	0,9	1,3	0,8	0,7	0,9
0 - 14 years	0,1	0,1	0,1	0,1	0,1
15 - 17 years	0,6	0,7	0,5	0,7	0,6
18 - 55 years	1,1	1,9	1,0	1,0	1,2
Over 55 years	0,7	1,0	0,7	0,6	0,8

**Table 3:** The incidence of peptic ulcer of the stomach and bulb of the duodenum.

Age	2015 year	2016 year	2017 year	2018 year	Total
Total	3,9	4,1	4,0	4,6	4,1
0 - 14 years	0,2	0,2	0,2	0,1	0,2
15 - 17 years	2,3	2,2	2,2	2,1	2,2
18 - 55 years	4,7	5,2	5,0	6,3	5,3
Over 55 years	3,8	4,0	4,2	4,2	4,0

**Table 4:** The prevalence of peptic ulcer of the stomach and bulb of the duodenum

Age	2015 year	2016 year	2017 year	2018 year	Total
Total	10,5	11,9	11,7	11,5	3,4
0 - 14 years	4943,4	5868,1	5834,4	5973,2	15,5
15 - 17 years	0,6	0,6	0,4	0,4	3,4
18 - 55 years	35,5	38,7	38,5	35,2	1,4
Over 55 years	0,6	0,7	0,7	0,8	1,3

**Table 5:** The incidence of hernia (ICD-10: K40-K46).

Currently, there is a number of statistical reports, which describe information about the number of registered patients with hernias is not correct. It should be taken into account that in accordance with International Statistical Classification of Diseases of the 10<sup>th</sup> revision, the "Hernia" class includes not only digestive hernias, but also hernias of a different localization subject to surgical treatment. With regards

to this, speaking about gastroenterological hernias, summarizing all hernias, according to ICD-10, is incorrect. This is a problem, the solution of which requires an introduction of information on the form of the disease in the dispensary observation cards. The incidence, prevalence and distribution of intensity indicators by age are presented in table 5 and 6.

Age	2015 year	2016 year	2017 year	2018 year	Total
Total	10,5	11,9	11,7	11,5	3,4
0 - 14 years	4943,4	5868,1	5834,4	5973,2	15,5
15 - 17 years	0,6	0,6	0,4	0,4	3,4
18 - 55 years	35,5	38,7	38,5	35,2	1,4
Over 55 years	0,6	0,7	0,7	0,8	1,3

**Table 5:** The incidence of hernia (ICD-10: K40-K46).

Age	2015 year	2016 year	2017 year	2018 year	Total
Total	5,6	6,4	7,6	7,5	2,0
0 - 14 years	2037,7	2218,8	2370,8	2358,3	6,2
15 - 17 years	0,4	0,4	0,4	0,4	2,6
18 - 55 years	26,6	33,3	42,5	42,2	1,4
Over 55 years	0,5	0,5	0,8	0,9	1,2

**Table 6:** The prevalence of hernias (ICD-10: K40-K46).

In St. Petersburg, as in the world, there is a progressive growth of the number of patients with GERD. There is an official registration of GERD. There are NERD (non-erosive reflux disease), GERD (gastroesophageal reflux disease). Complications such as an ulcer of the esophagus, Barrett’s esophagus, adenocarcinoma are warning in case of timely diagnosis and treatment of GERD [12-15].

**Conclusion**

1. The incidence of duodenitis, gastritis according to official registration is 5.7 per 1000 people, the prevalence is 31.6 per 1000 people. Teenagers of 15 - 17 years old get exposed more often. Secondary prevention of chronic gastritis includes conducting a successful course of *H. pylori* eradication. This applies to all *H. pylori* positive patients with CG. Successful anti-Helicobacter therapy provides the majority of patients with a recovery or a significant improvement in the clinical picture and morphological characteristics of the gastric mucosa. *H. pylori* eradication allows interrupting the tragic sequence of progression of changes in the gastric mucosa (inflammation → atrophy → metaplasia → dysplasia → cancer). Endoscopic monitoring of individuals taking NSAIDs for a long time is required. Given the increased risk of cancer for people with chronic gastritis (antral superficial gastritis, diffuse superficial gastritis under the age of 40 years) and mucous polyps, regular endoscopic observation is required. An important role in prevention is played by sanatorium treatment. All these preventive measures are possible only with introduction of such patients, which is also not reflected in the report. Maintaining a register of such patients will enable timely monitoring, and, therefore, more accurate diagnosis and timely competent treatment of these patients, which will lead to a decrease of the incidence, exacerbations, as well as complications of these diseases.
2. The incidence of peptic ulcer of the stomach and bulb is 0.9 per 1000 of people, the prevalence is 4.1 per 1000 of people. Patients of working age, 18-55 years, get exposed often. Primary prevention of peptic ulcer disease is aimed at preventing the development of the disease. Primary prevention activities are based on informing the population about the risk factors for ulcer, preventing infection and reinfection of HP, especially among children, since HP infection mainly occurs in childhood. Therefore, instilling

children with skills of elementary rules of personal hygiene (washing hands, drinking clean water, using individual dishes) should be a priority during the primary prevention of ulcer. Diagnosis of the presence of HP is important, especially among family members of a patient with ulcer. Prevention of ulcer involves the elimination of factors contributing to ulceration: the fight against bad habits (smoking and alcohol abuse), the normalization of work and rest, as well as the nature of nutrition, eradication of HP infection in patients with functional dyspepsia, the simultaneous appointment of PPI if necessary, taking NSAIDs and anticoagulants (especially elderly patients, patients with a history of UB, patients with concomitant diseases of the cardiovascular system and cirrhosis). There is a need in introducing schools for patients. Secondary prevention of peptic ulcer disease is aimed at reducing the risk of exacerbations and relapses of an existing disease. Secondary prophylaxis includes follow-up of patients with peptic ulcer disease, non-drug and drug prophylaxis methods: with secondary prophylaxis of peptic ulcer, all primary prevention measures will be relevant. The earliest possible detection of helicobacteriosis and eradication of *H. pylori* in patients with uncomplicated form of peptic ulcer. Eradication of *H. pylori* infection in patients with PU leads, first of all, to a decrease in the frequency of subsequent relapses of PU during the year from 70 to 4 - 5% and this frequency remains equally low in subsequent years. Eradication of *H. pylori* in patients with complicated form of peptic ulcer and further lifelong intake of PPI in half dose. After eradication of *H. pylori*, the recurrence rate of ulcers after surgical treatment decreases. An important place in the prevention of peptic ulcer disease and its relapses is occupied by spa treatment, carried out no earlier than 2-3 months after the exacerbation subsides in sanatoriums.

3. The incidence of hernias (ICD-10: K-40 - K-46) is 3.4 per 1000 people, the prevalence is 2.0 per 1000 people. Children aged 0 - 14 years often get exposed. Currently, there is a problem of registration according to the ICD: K40-K44 - all hernias, including surgical.
4. The incidence of GERD according to the data has not been studied due to the lack of registration in form 12. Namely, patients with GERD are subject to active dispensary observation with a follow-up examination at least 1 time per year. In case of complications, it is necessary to examine such patients 2 times a year, including endoscopic and morphological studies. In particular, the group should highlight patients who are diagnosed with Barrett's esophagus. The critical condition of successful secondary care should be taken into account: reducing the number of exacerbations, lack of progression, reducing the severity of reflux esophagitis and preventing the development of complications. All this must be proved in the need to comply with this huge group of pathologies, as well as for the relevant approach to the diagnosis and prevention of this dramatic problem in gastroenterology.

After analyzing the registration of diseases, it should be noted that it is necessary to record diseases correctly, which will lead to competent prevention and follow-up of patients of all groups, and this will result in one of the main stages of the implementation of state programs to reduce morbidity, oncopathology and mortality.

### **Conflict of Interest**

There is no conflict of interest.

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