

## Gastroesophageal reflux disease in residents of the Trans-Baikal Territory

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### Abstract

**Aim.** To study the prevalence of gastroesophageal reflux disease (GERD) symptoms and lesions of the esophageal mucosa in residents of Zabaikalsky krai, taking into account ethnicity.

**Methods.** The first stage: 371 residents of Zabaikalsky krai over 18 years old, were door-to-door interviewed by using the GERD questionnaire (GerdQ). The respondents with 8 or more points were classified as having GERD symptoms. Additionally, we collected passport data, smoking status, alcohol and coffee consumption, anthropometric data and social status. The second stage: we analyzed 2130 upper gastrointestinal (GI) endoscopy reports from Regional Clinical Hospital in Chita.

**Results.** 48 (12.9%) of 371 respondents had GERD symptoms. 135 (36.4%) respondents were Buryats, and 236 (63.6%) were non-Buryats, with the latter more often had GerdQ total score of 8 or more [38 (16.1%) non-Buryats and 10 (7.4%) Buryats,  $p=0.009$ ]. The average age of non-Buryats respondents with GERD symptoms was  $53.4\pm 17.47$  years and exceeded that in the group without symptoms ( $46.2\pm 19.2$  years),  $p=0.035$ . The age of Buryats with and without GERD symptoms did not differ ( $42.67\pm 11.52$  and  $37.89\pm 15.54$  years, respectively,  $p=0.087$ ). The prevalence of obesity, smoking, alcohol and coffee consumption of respondents with and without GERD symptoms, both among Buryats and non-Buryats was the same. Of the 2130 patients who underwent endoscopy, 164 (7.8%) had morphological changes in the esophagus, 105 (4.9%) had erosive esophagitis (EE). Catarrhal and erosive changes in the esophagus were detected in 156 non-Buryats (91 men and 66 women) (7.7%), while EE was diagnosed in 97 (4.8%) patients. 6.5% (5 women and 3 men) Buryats had the esophagus pathology, which caused by erosion. It was found that in non-Buryats group EE develop more often in male respondents ( $p=0.0019$ ). Only non-Buryats had catarrhal changes in the esophagus (37.8%, 59 people),  $p=0.0312$ . At the same time, the incidence of complicated disease course in groups with EE was the same ( $p=0.8934$ ).

**Conclusion.** About 13% of residents of Zabaikalsky krai have weekly symptoms of GERD, male of a non-Buryat ethnic group are more likely to develop erosive esophagitis than women; the incidence of complications of esophagitis is the same in Buryats and non-Buryats respondents groups.

**Keywords:** gastroesophageal reflux disease, erosive esophagitis, epidemiology, ethnic origin, Zabaikalsky krai.

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**Background.** Nowadays, there is an increasing number of gastrointestinal tract diseases with predominance in the esophageal pathology structure and a decreasing frequency of gastric and duodenal ulcers [1]. An increase in the prevalence of gastroesophageal reflux disease (GERD) is accompanied by an increased risk of complications, including esophageal adenocarcinoma [2].

GERD has become one of the first chronic diseases in recent decades. In the general population, clinical and endoscopic signs of GERD are diagnosed in 8%–25% of the population, depending on the country, race, and gender. In the Russian Fed-

eration, the disease occurs in 11%–15% of cases [3]. Analysis of the prevalence of GERD symptoms in Russia indicates the social and medical significance of this disease in various regions of the country [2]. Special attention should be paid to the studies by Isakov et al. and Lazebnik et al. [4,5].

Assumed risk factors for GERD include the following: age, ethnic origin, geographical location, high body mass index, obesity, smoking, and alimentary factors. The prevalence of the disease is significantly lower for Asians [2]. Thus, in the eastern regions of Russia, it was shown that people belonging to the Mongoloid ethnic group (Kha-

kas, Evenks, and Tuvans) were less likely to have GERD symptoms than Caucasians [6,7]. The study of the prevalence of GERD in the Zabaikalye Territory has not been previously conducted. Considering the special ethnic structure of the region (representatives of the indigenous Buryats live in the territory of the Zabaikalye Territory), we can assume that there are differences in the epidemiological data of GERD from the all-Russian ones.

Nowadays, all epidemiological data are based on the results of patient surveys using specially designed test tasks. One of these questionnaires is the GerdQ questionnaire. The DIAMOND study showed that the sensitivity and specificity of GerdQ were 65% and 71%, respectively, which is comparable with the data obtained in the GERD diagnosis by a gastroenterologist at 67% and 70%, respectively [8]. This questionnaire was validated for the Russian-speaking population [9].

Erosive esophagitis is a frequent esophageal appearance of GERD and is observed in 20%–40% of patients with GERD [10–12]. Data on the prevalence of erosive esophagitis in Russia are few and contradictory. In some studies, the detection of esophagitis during endoscopic examination varies from 2.6% to 13%. Only a small number of papers have been published to the study of changes in the esophageal mucosa in Russia, considering ethnicity. The research of Vasilevsky et al. revealed that the prevalence of erosive esophagitis in residents of the Leningrad region was 4.9% [13]. (The study was conducted in Caucasians.)

**Aim.** This research aimed to study the prevalence of GERD symptoms and esophageal mucosal lesions of Zabaikalye Territory residents, taking into account ethnicity.

**Materials and methods.** The first stage of the research was conducted on the Zabaikalye Territory using the survey method. Participants were selected by random selection (from September 2017 to June 2018) using household round. The study included people over 18 years of age who have Russian citizenship, have been living and registered in the Zabaikalye Territory for at least a year, and have given their consent to the study. The study excluded people who did not meet the specified inclusion criteria, did not understand the study goals, and were pregnant. The interviewers, who were resident doctors, did not inform the respondents about the purpose of the study before questionnaire completion.

The responsible researcher confirmed the fact of participation in the study by a sample survey over the phone. The GerdQ questionnaire was used [9,14]. Additionally, passport data and information about smoking, alcohol, and coffee consumption were collected. People who smoked at least one

cigarette a day during 30 days preceding the survey were considered regular smokers. When conducting a survey on the frequency of alcohol consumption, 200 mL of wine, 500 mL of beer, and 50 g of vodka were defined as a unit of alcohol at least once every 2 weeks [15]. Regular coffee consumption was recognized among respondents who consumed the beverage daily. The questionnaire was also supplemented with information about anthropometric data, social status, and belonging to a certain ethnic group (Buryats and non-Buryats). The signature of the subject served as an informed consent to participate in the study.

Respondents who scored 8 points or more on the GerdQ scale (according to the instructions of the questionnaire [9,14]) were considered people with epidemiological quantitative criteria for GERD.

Thus, the following four observation groups were formed in the first stage of the study:

- the first group—Buryat representatives who scored 8 points or more on the GerdQ questionnaire;
- the second group—non-Buryat people who scored 8 points or more on the GerdQ questionnaire;
- the third group—Buryat representatives who did not score 8 points on the GerdQ questionnaire;
- the fourth group—non-Buryat who did not score 8 points on the GerdQ questionnaire.

The second part of the work was an analysis of 2130 protocols of endoscopic examinations of the upper gastrointestinal tract, conducted from January to December 2018, based on the Regional Clinical Hospital of Chita for hospital and outpatient. (Repeated procedures were not taken into account.) Examinations were made for patients with symptoms of gastric dyspepsia and as part of preventive measures. The examination was made by one team of doctors according to the standard protocol. The study was conducted for both the residents of Chita (47%) and the population of the Zabaikalye Territory (53%).

All respondents who underwent endoscopic examination were divided into two groups according to ethnicity: Buryats and non-Buryats. Additional telephone interviews were done to clarify the ethnicity of patients who underwent endoscopic examination. Changes in the esophageal mucosa were distributed as follows: catarrhal and erosive esophagitis, esophageal stenosis and strictures, gastric and intestinal metaplasia (specified by the results of histological examination), and esophageal ulcer.

Data accumulation and processing were made using MS Excel program. Statistica 10.0 with descriptive statistics (mean and standard deviation) was used for statistical processing and Student's

**Table 1.** Distribution of respondents by age (years) and ethnic structure

Respondents	GerdQ $\geq$ 8 points	GerdQ < 8 points	P
Buryats (n = 135)	42.67 $\pm$ 11.52	37.89 $\pm$ 15.54	0.907
Non-Buryats (n = 236)	53.4 $\pm$ 17.47	46.2 $\pm$ 19.2	0.035

*t*-test for quantitative indicators. Nonparametric statistics (median, 25th and 75th percentile,  $\chi^2$ , and Mann–Whitney test) were also applied. The differences were considered significant at the probability level of 0.05.

The study was approved by the local ethics committee of the Chita State Medical Academy, Protocol No.83 dated 22.10.2016.

**Results.** As a result of the first stage of the study, 382 respondents were surveyed during the household round. However, only 371 questionnaires were selected for analysis after pretreatment, which was performed to reject incorrectly filled out questionnaires (multiple responses to a question that assumes one answer and no response to fundamental questions [heartburn and belching]). Of the respondents, 48 (12.9%) scored 8 points or more in the GerdQ questionnaire, and 135 (36.4%) Buryats and 236 (63.6%) non-Buryats were identified. GERD symptoms in Buryats (10; 7.4%) were less common than in non-Buryats (38; 16.1%;  $p = 0.009$ ).

The average age of people who do not belong to the Buryat ethnic group scoring 8 points or more due to the GerdQ questionnaire exceeded that of respondents without GERD symptoms. Appearance of GERD in Buryats appeared at a younger age, although there were no statistically significant age differences between respondents with and without symptoms of the disease (Table 1).

Both representatives of the Buryat and non-Buryat ethnic groups with signs of GERD had a comparable prevalence of weekly symptoms of acid indigestion (39; 81.25%) and belching (38; 79.1%).

The prevalence of obesity, smoking, and alcohol and coffee consumption was observed with the same frequency in all groups (Table 2).

In the second stage, 2130 protocols for endoscopic examinations of the upper gastrointestinal tract conducted at the regional clinical hospital in Chita were analyzed. The Buryat ethnic group included 129 patients (78 women and 51 men), with a median age of 54 (31; 63) years. In 2001, the survey was conducted among non-Buryat respondents (1149 women and 852 men), with a median age of 56 (38; 65) years. Buryats and non-Buryats were comparable in gender ( $p = 0.427$ ) and age ( $p = 0.498$ ) composition.

In the analyzed documents, esophageal changes were detected in 7.7% of cases (164 procedures), whereas erosive esophagitis was noted in 4.9% (105 people). Of the non-Buryat ethnic group, 156 representatives (91 men and 66 women) were diagnosed with catarrhal and erosive changes in the esophagus (7.8%), whereas erosive esophagitis was detected in 97 (4.8%) patients. Among Buryats, eight people (five women and three men) had pathology in the esophagus, which was caused by an erosive damage and accounted for 6.2%. For patients in the Buryat ethnic group, esophageal changes appeared at a younger age, but the differences were not statistically significant (Fig. 1).

It was found that erosive esophagitis developed more often in men than in the non-Buryat ethnic group who do not belong to the Buryat ethnic group (Table 3).

Only respondents who do not belong to the Buryat ethnic group had catarrhal changes in the esophagus (37.8%, 59 people),  $p = 0.0312$ . There was a tendency to the most frequent complicated course of esophagitis for Buryats, and it was relative to respondents of other nationalities, but the data were not statistically significant ( $p = 0.5781$ ; Table 4).

**Discussion.** In Russia, a meta-analysis of 11 studies involving 47,247 respondents assessed the prevalence of GERD symptoms. Significant variations in weekly symptoms of acid indigestion and belching were shown (from 6.4% to 23.6%, with an average of 14.5%) [2]. Particularly, low prevalence rates were found in the regions of Eastern Siberia (12.3%), Khakassia (10.3%), and Kazan (7.2%).

**Table 2.** Prevalence of obesity, alcohol and coffee consumption, and smoking for patients with and without signs of gastroesophageal reflux disease, taking into account ethnicity

Respondents	BMI $\geq$ 30 kg/m <sup>2</sup>		P	Drinking alcohol		P	Drinking coffee		P	Smoking		P
	GerdQ $\geq$ 8 points	GerdQ < 8 points		GerdQ $\geq$ 8 points	GerdQ < 8 points		GerdQ $\geq$ 8 points	GerdQ < 8 points		GerdQ $\geq$ 8 points	GerdQ < 8 points	
Buryats	1	16	0.756	2	16	0.6	2	19	0.932	2	11	0.604
Non-Buryats	12	40	0.27	6	32	0.673	4	41	0.09	6	20	0.471

BMI, body mass index.

At the same time, GERD symptoms were less common for representatives of the Evenk ethnic group (6.4%) [4]. In the European regions of Russia, this indicator had higher values (from 16.7% to 22.7%) [2, 5–7, 15–17].

In our study, the prevalence of GERD symptoms in the Zabaikalye Territory was 12.9%. The frequency of GERD symptoms in Buryats was lower (7.4%) than in non-Buryats (16.1%), although the differences were statistically significant ( $p = 0.009$ ).

Other researchers have noted a clear correlation between the increase of GERD appearance frequency and age [2]. In our study, respondents with GERD symptoms were older than those without any signs of the disease, and differences were found only in the non-Buryat ethnic group ( $p = 0.035$ ). Several works about Asian populations revealed that age influence on the prevalence of this pathology was also not revealed [18, 19].

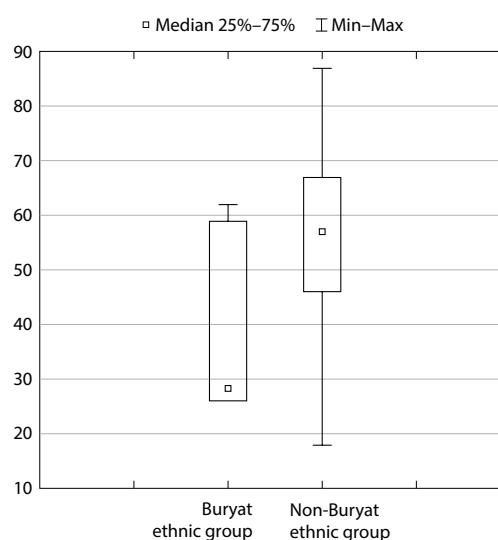
The leading risk factor for the development and progression of GERD, including its erosive form, is deemed increase in body mass index of more than 25 kg/m<sup>2</sup> [20, 21]. However, we found no differences in the prevalence of GERD symptoms in both Buryats and non-Buryats with normal and overweight body mass index ( $p = 0.756$  and  $0.27$ , respectively). The influence of alcohol, smoking, and coffee consumption on the development of GERD symptoms has been shown in some studies [2, 11, 15, 16, 21–23], but at present, the data are contradictory. We found no differences in the presence of bad habits and coffee consumption for Buryats and non-Buryats respondents with and without GERD symptoms.

The study found that the prevalences of erosive esophagitis for Buryats and non-Buryats were 6.2% and 4.8%, respectively. Furthermore, we obtained comparable results when comparing erosive esophagitis detection for Buryats with the data of authors studying Asian groups [24–26]. At the same time, the frequency of erosive esophagitis in our study was similar to the data obtained from domestic authors (4.8%) [13].

Currently, men may be a risk factor for developing erosive esophagitis [22, 23, 27–29]. We found that men who do not belong to the Buryat ethnic

group more often suffered from erosive lesions of the esophagus than women ( $p = 0.0019$ ). We did not find such differences among the Buryats, which is probably due to the small sample number ( $n = 8$ ;  $p = 0.9033$ ).

Few data are devoted to the study of the complicated course of erosive esophagitis in various ethnic groups. Alkaddour et al. (2015) found that Barrett’s esophagus in patients with reflux esophagitis is less likely to develop in African Americans than in Caucasians ( $p = 0.029$ ) [30]. We established the fact of more frequently complicated erosive esophagitis for Buryats than for respondents of other nationalities ( $p = 0.5781$ ).



**Fig. 1.** Diagram of the age range (years) of the Buryat and non-Buryat ethnic groups with endoscopic signs of esophageal lesions ( $p = 0.0147$ ).

**Table 3.** The prevalence of erosive esophagitis in men and women depending on ethnicity

Buryats			
Gender	Erosive esophagitis, <i>n</i>	Without erosive esophagitis, <i>n</i>	<i>p</i>
Men	3	48	0.9033
Women	5	73	
Non-Buryat respondents			
Men	46	806	0.0019

**Table 4.** Prevalence of esophagitis complications in the population of the Zabaikalye Territory, considering ethnic characteristics

Respondents	Strictures/stenoses, <i>n</i>	Gastric metaplasia, <i>n</i>	Intestinal metaplasia, <i>n</i>	Adenocarcinoma, <i>n</i>	Esophageal ulcer, <i>n</i>
Buryats ( <i>n</i> = 8)	2	0	0	0	0
Non-Buryats ( <i>n</i> = 156)	18	3	2	2	2
<i>p</i>	0.2565	0.6922	0.7473	0.7473	0.7473

## CONCLUSION

1. Of the Zabaikalye Territory residents, 12.9% have weekly symptoms of GERD.
2. Men who are not Buryats are more susceptible to development of erosive esophagitis than women.
3. The complicated course of esophagitis occurs with the same frequency for both Buryats and non-Buryats.

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**Conflict of interest.** The authors declare no conflict of interest.

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