UDC: 616.33-006.6-036.22-037 DOI: 10.52532/2663-4864-2023-4-70-4-11

GASTRIC CANCER: EPIDEMIOLOGY AND PROSPECTS FOR THE DEVELOPMENT AND IMPLEMENTATION OF INNOVATIVE TECHNOLOGIES FOR EARLY DETECTION AND TREATMENT

D.R. KAIDAROVA[1,2], O.V. SHATKOVSKAYA[1], A.A. KHOZHAYEV[2], I.K. LAVRENTIEVA[1], A.M. NURMUKHAMBET[2], A.A. SAMIKHOVA[2]

[1]«Kazakh Institute of Oncology and Radiology» JSC, Almaty, the Republic of Kazakhstan;
[2]«Asfendiyarov Kazakh National Medical University» NCJSC, Almaty, the Republic of Kazakhstan

ABSTRACT

Relevance: *Gastric cancer is a heterogeneous group of malignant epithelial tumors arising from the cells of the gastric mucosa, one of the most common forms of malignant neoplasms in many coun-tries of the world. But, despite repeated attempts, there are no convincing approaches to early large-scale (screening) detection technology for this form of cancer. This causes a high rate of late detec-tion of advanced forms of gastric cancer in most countries of the world, a high one-year mortality rate of patients, and a low five-year survival rate. Currently, full screening for gastric cancer is car-ried out only in Japan, Korea, and China - countries with high incidence rates.*

The study aimed to *assess the epidemiologically disadvantaged regions of Kazakhstan for cancer to select optimal early detection techniques to improve the treatment results.*

Methods: *For the analysis, we used available epidemiological indicators on GC from the specialized literature, data obtained from annual reporting forms No. 7, approved by the Ministry of Health of the Republic of Kazakhstan, in the country code (ICD 10 - C16), publications with statistical and analytical materials on Kazakhstan. Morbidity and mortality rates were calculated based on data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Re-public of Kazakhstan website on the aver-age annual population by region of Kazakhstan.*

Results: *A long-term decrease in the incidence and mortality from gastric cancer in Kazakhstan since 2021 has been replaced by a stable increase in the incidence of gastric cancer against the back-drop of a high frequency of advanced forms, relatively high mortality, and low five-year survival of patients. At the same time, there is experience in the world of certain approaches to screening the popula-tion for early detection of gastric cancer.*

Conclusion: *The high morbidity of gastric cancer in most regions of the country in recent years re-quires the search and devel-opment of optimal forms of screening for its early detection; this will re-duce mortality from gastric cancer and increase the five-year survival rate of patients.*

Keywords: *gastric cancer, morbidity, mortality, dynamics of indicators, regions of Kazakhstan, screening.*

Introduction: Gastric cancer (GC) is common in the world, with a morbidity of 31.9 (World standard per 100,000 population) according to WHO in 2005 in different countries worldwide. Men suffered from GC twice more often than women (21.5 vs. 10.4). The highest mortality was observed in Eastern Asia and Eastern Europe. Mean mortality from GC amounted to 15.6 per 100,000 males and 7.8 per 100,000 females. In far-abroad countries, the highest morbidity (per 100,000 World standard) was registered in Japan (47.6), Costa Rica (37.7), and China (26.8), with low rates in the U.S.A. (5.8), Egypt (3.4), and Indonesia (2.8) [1, 2].

The study aimed to assess the epidemiologically disadvantaged regions of Kazakhstan for cancer to select optimal early detection techniques to improve the treatment results.

Materials and Methods: For the analysis, we used available epidemiological indicators on GC from the specialized literature, data obtained from annual reporting forms No. 7, approved by the Ministry of Health of the Republic of Kazakhstan, in the country code (ICD 10 - C16), publications with statistical and analytical materials on Kazakhstan.

The authors conducted a retrospective analysis of literature data on GC epidemiology in separate countries and the world and the own materials summarized by experts of "Kazakh Institute of Oncology and Radiology" JSC (KazIOR, Almaty, Kazakhstan) on GC epidemics in the country and the types and results of GC early detection screenings in the world.

Morbidity and mortality rates were calculated based on data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan website on the average annual population by region of Kazakhstan [3].

Results:

GC incidence in the world

In recent years, GC has ranked second among all can-

cers globally. However, the incidence rates in different countries vary. The incidence is still high in Japan, China, Chile, and Iceland. In the U.S.A., about 27,600 new GC cases and 11,010 deaths from GC are registered each year [4, 5].

Adenocarcinomas account for 95% of gastric malignancies; localized gastric lymphomas and leiomyosarcomas are less common. In the past decades, GC incidence has reduced in the U.S.; GC ranks 7th in cancer mortality. There, GC is more common among African Americans, Hispanics, and American Indians. More than 75% of patients are above 60 years [5].

Among ex-Soviet countries, in 2000, GC led the cancer incidence structure among men in Turkmenistan and Kyrgyzstan (18.3-21.7%) and consistently ranked 2nd in Russia (among both sexes), Kazakhstan, Armenia, and Azerbaijan (among men). Compared to 1990, GC's share in cancer incidence structure reduced in Russia, Kazakhstan, Armenia, and Tajikistan and increased in Kyrgyzstan and Turkmenistan. The number of new cases in Russia reduced by 10,000 (16%) since 1990 to reach 48,200 [6]. In 2008, the highest GC incidence per 100,000 population (World standard) was registered in Ukraine (34.9), Belarus (34.6), and Russia (27.2); the lowest – in Armenia (18.3), Kyrgyzstan (11.9), Georgia, and Azerbaijan (9.1) [7].

In 2020, GC ranked 6th in the world among all malignant tumors and was detected in 1.09 mln people; 769,000 people died from GC, making it 4th reason of death from malignancies. Age-standardized GC incidence in the world decreases annually by 4-5%. However, in some developed countries, the incidence of cancer of the gastric cardia is increasing [8].

In 2020, the highest GC incidence per 100,000 population was registered in Eastern Asia (22.4), Central and Eastern Europe (11.3), South America, Polynesia, and Western Asia (about 8.6); the lowest rate (3.3) was recorded in the south of Africa. According to the American Cancer Society, GC primarily affects older adults. About 6 of 10 people diagnosed with GC are above 65 years old. Men are at twice the higher lifelong risk of developing GC (about 1 in 96 vs. 1 in 152 women) [9, 10].

In 2018, in Russia, GC accounted for 7.4% of all malignancies in men and 4.6% in women. The average age at diagnosis increased from 66.4 years in 2008 to 67.5 years in 2018. Over the same period, the GC crude incidence per 100,000 population of both sexes decreased from 28.6 to 25.16, with an annual decrease of 1.36%; the standardized incidence went down from 17.37 to 13.55, with an annual decrease of 2.58%. GC ranked 2nd (9.5%) in men and 3rd (8.4%) in women in Russia's cancer mortality structure. The average age of those who died from GC has increased from 67.4 to 68.7 years since 2008. The mortality from GC per 100,000 population decreased significantly over the same period from 25.39 to 18.97 in crude rates and 15.02 to 9.94 in standardized rates [11].

In 2021, GC became 6th most prevalent malignancy and 2nd cause of death from cancer in Russia. According to the Russian National Cancer Register, 32,031 new cases of GC were registered in the country, and 26,311 patients died from that disease [12].

In recent years, the average five-year survival with GC amounted to 18% in Western Europe and 21% in the US. The highest five-year survival (53%) was registered in Japan, possibly due to a mass screening for GC in this country. Generally, five-year survival with GC varies within 10-20% globally [13].

GC incidence in Kazakhstan

In RK, till 1985, GC ranked first in total cancer incidence and, in subsequent years, moved to second place. KazIOR experts reported a persistent downward trend in GC incidence over several years: from 20.9 per 100,000 population in 2000 to 16.3 in 2012 and 10.9 in 2015 [14-16].

An epidemiology analysis of GC incidence in Kazakhstan in 2004-2014 conducted by KazIOR experts confirmed the downward trend in GC morbidity and mortality over time. Men suffered from GC 2.5 times more often than women. The incidence was high in the Pavlodar, Kyzylorda, Aktobe, and Akmola regions. In 2009-2014, the incidence rates increased in Astana and the Zhambyl, Akmola, and Aktobe regions and decreased in the North Kazakhstan and Mangistau regions [16]. The proportion of stage I-II cases increased by 1.8 times. The morbidity-to-mortality ratio decreased from 83.9% to 66.6% over the same period, evidencing an improvement in oncological care for the RK population and the efficacy of GC screening conducted in that period.

In 2015, the incidence per 100,000 population was high in Kostanay (23.9), Pavlodar (23.4), North Kazakhstan (North Kazakhstan) (23.0), East Kazakhstan (EKR) (22.9), Karaganda (21.9), and Akmola (21.2) regions; average – in West Kazakhstan (WKO) (17.4), Aktobe (16.8), Zhambyl (15.7), and Kyzylorda (15.1) regions; and low in in Atyrau (13.9), Almaty (13.14), Mangistau (11.5) and South Kazakhstan (SKO) (11.2) regions [17] (Figure 1).

According to operational data from KazIOR, in 2017-2019, the downward trend in GC incidence in Kazakhstan remained. GC then ranked 3rd in primary cancer incidence in both sexes (8.2% in 2019), 2nd in men (11.9%), and 5th in women (5.3%), and the incidence was gradually decreasing (per 100,000 both sexes) from 15.3 in 2017 to 14.9 in 2018, and 14.4 in 2019 in crude figures, and 14.4 to 13.6 and 12.9 in standardized figures, respectively. Sex-related incidence (per 100,000 of the relevant sex) in that period also steadily decreased from 22.8 to 20.5 in men and from 10.8 to 7.8 in women.

GC ranked 2nd in cancer incidence in both sexes in Kyzylorda and Turkestan regions and 5th in North Kazakhstan. In 2019, it was above the national average (14.4 per 100,000) in eight regions, including the Kostanay (21.0), Aktobe (20.8), Pavlodar (20.7), Karaganda (20.4), North Kazakhstan (20.4), Akmola (20.2), East Kazakhstan (20.0) and West Kazakhstan (17.9) regions. The incidence per 100,000 was low in the Turkestan (6.9), Almaty (10.5), Mangistau (11.0), and Kyzylorda (12.6) regions [18].

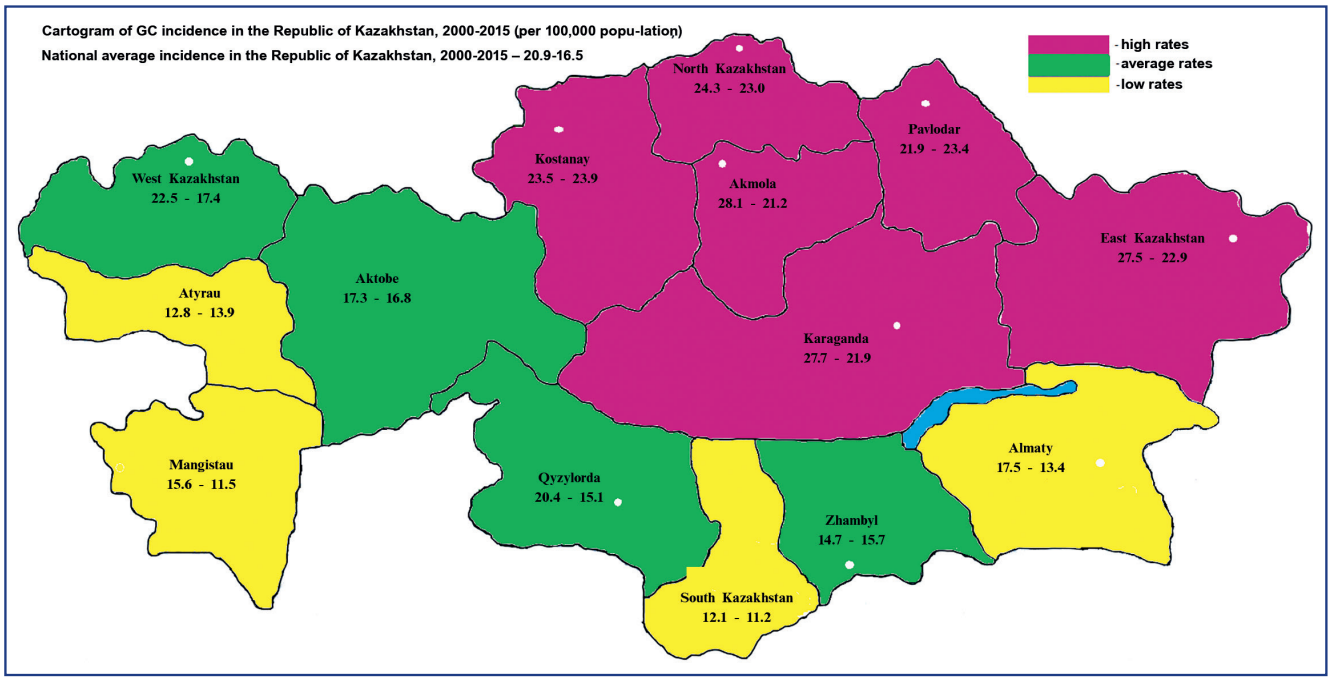

Figure 1 – GC incidence trends by region of Kazakhstan

Later, the GC incidence in Kazakhstan started growing; it increased from 13.2 to 13.5 in 2021 and 14.9 in 2022. The rates were above the national average per 100,000 in 2022 in the Kostanay (22.9), Karaganda (21.5), North Kazakhstan (21.1), East Kazakhstan (21.0), Pavlodar (20.4), Akmola (20.2), Abay (19.8), West Kazakhstan (19.3), and Aktobe (19.2) regions [19, 20].

Mortality from GC in the world

In the late 1980s, GC lost its leading place as the main cause of cancer mortality in the world to lung cancer, moving to second place. In Russia, it occurred in 1985. Despite an evident downward trend in GC mortality, GC still led the cancer mortality structure in the 1980s in Japan while occupying 14th place in the US [21].

Table 1 offers standardized GC mortality rates for men and women in 1994-1997, and GC ranks in cancer mortality structure by country according to WHO. The mortality rates differed 8.4 times in men and 7.7 times in women.

Table 1 – GC ranks and standardized mortality rates (per 100,000 population) by sex and country, 1994-1997 [21]

Men			Women		
Rank	Country	Index	Rank	Country	Index
1	Russia	36.9	1	Russia	15.3
2	Kazakhstan	33.1	2	Kazakhstan	13.9
3	Chile	33.2	3	Columbia	13.1
4	Japan	30.2	4	China	12.7
5	Kyrgyzstan	29.7	5	Japan	12.3
6	China	26.9	6	Estonia	12.0
7	Latvia	26.8	7	Latvia	11.8
8	Estonia	26.0	8	Канада	11.7
9	Lithuania	25.9	9	Туркмения	11.0
10	Azerbaijan	24.9	10	Kyrgyzstan	10.7
44	U.S.	4.4	44	U.S.	2.0

According to the ONCOLOGY.ru information portal, currently, the highest GC mortality (standardized per 100,000 population) is registered in Kyrgyzstan (men – 47.0, women – 19.0), Russia (men – 36.0, women – 15.0), and Japan (men – 31.0, women – 14.0). The mortality is also high in most East European countries but low in the US, Canada, New Zealand, and Western and Northern Europe [13].

Mortality from GC in Kazakhstan

According to KazIOR reports, the mortality from GC is steadily decreasing in Kazakhstan. Thus, it declined from 17.6 in 2000 to 10.9 in 2015 (per 100,000 population) (Figure 2).

In 2015, by region, the mortality per 100,000 population was high in the Pavlodar (17.6), East Kazakhstan (14.8), Zhambyl (14.6), North Kazakhstan (14.2), and Akmola (13.0) regions, average – in the Kostanay and Karaganda (11.9 each), West Kazakhstan region (11.4) and Atyrau (10.9) regions, and low – in the Kyzylorda, South Kazakhstan (9.1 each), Almaty (8.6), Aktobe (8.4), and Mangistau (6.5) regions [17].

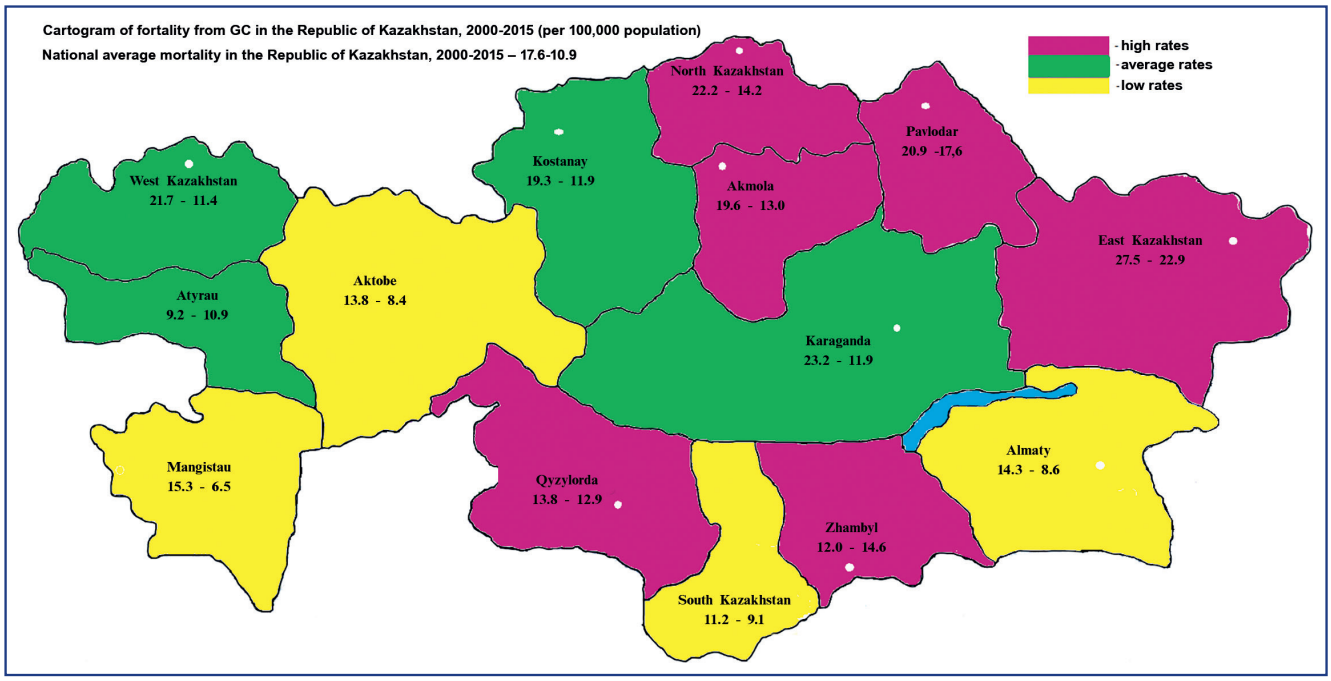

Figure 2 – GC mortality trends by region of Kazakhstan

In 2017-2019, this pathology ranked second in cancer mortality in RK, with a share of 11.5 to 12.1%. The crude mortality from GC decreased from 9.5 to 9.1 per 100,000 over those years, and the standardized mortality went from 8.9 to 8.2 [18, 22].

In 2019, the GC mortality per 100,000 population was above the national average in nine regions, including the Pavlodar (13.6) – the national maximum, East Kazakhstan (13.1), West Kazakhstan (12.0), Akmola (11.7), North Kazakhstan (10.8), and Karaganda (11.3) regions and Astana (10.9). The rates were low in the Almaty (6.2), Turkestan (6.5), Aktobe (7.6), Mangistau (7.7), and Kyzylorda (7.8) regions and the city of Shymkent (6.2). Morphological verification of the diagnoses achieved 95.8% in 2019. Early detection rate (GC stages I + II) amounted to 42.9%, with a late detection rate (stage IV) of 19.9% – one of the highest cancer neglect rates. Five-year survival improved over those three years from 42.1 to 44.5% [18].

The study by a group of Norwegian, Russian, and Kazakhstani experts covering 2004-2015 revealed statistically significant trends in decreasing morbidity and mortality from GC in the RK. Early detection rate (stages I-II) improved from 16,8 to 34.2%; however, five-year survival began to increase only in 2012 [23].

Discussion: Implementation of the State Health Care Development Program of the Republic of Kazakhstan "Salamatty Kazakhstan" for 2011-2015 and subsequent health care programs that provide for the priority development of oncology services and the expansion of screening programs for early detection of cancer became a key factor contributing to the reduction of morbidity, mortality, and improvement of early diagnosis of GC in the country over time.

As a result, the mortality from GC per 100,000 population has steadily decreased in Kazakhstan since 2000, including 8.6 in 2020 to 8.0 in 2022 [19, 20]. However, the mortality from GC in Kazakhstan still exceeds the rates in developed countries. To address this problem, KazIOR experts study the experience to select the optimal screening program for GC in the Republic of Kazakhstan, possibly starting with pilot regions with the highest incidence rates.

The A.A. Avanesyan et al. report utilizes various foreign sources to compare diagnostic criteria for GC adopted in Japan (East) and Western countries [24]. Thus, in Japan, non-invasive intraepithelial neoplastic lesions with a high degree of cellular and architectural atypia are called "non-invasive intra-mucosal cancer," while in Western countries, they are interpreted as "high-grade dysplasia" [25, 26]. These differences may lead to different approaches when counting this pathology, affecting the magnitude of epidemiological characteristics.

Countries in Western Europe and the U.S. have no national screening for GC. Screening of patients with dyspepsia, a GC development symptom, showed that this has no practical meaning [27, 28]. Studies in the U.S. showed the inappropriateness of routine screening of people at moderate risk of developing GC. According to the US National Cancer Institute, no evidence exists that screening for GC reduces mortality in the regions with a relatively low incidence of this disease [29, 30]. People with obvious risk factors for developing GC can benefit from screening [31]. Therefore, more studies are required to determine the screening population and methods [32, 33].

Several countries of Asia and Eastern Europe with a traditionally high GC incidence follow the screening procedure that includes double contrast fluorography, endoscopic examination with random or targeted biopsy, screening and treatment of Helicobakter pylori, se-

rological testing for antibodies to pepsinogens, gastrin and Helicobakter pylori, and breath tests for volatile organic compounds [34].

Other screening alternatives include measuring blood levels of gastrin-17 and pepsinogen I and assessing the ratio of pepsinogen I to pepsinogen II. A decrease in the level of these markers is a sign of atrophy of the gastric mucosa, which leads to the risk of developing GC.

Japan is studying the possibility of using a 13C breath test for H. Pylori (the «Screen & Treat H. Pylori» method) for GC screening. However, only 1% of H. pylori-infected develop GC, so more research into the effectiveness of this screening is needed.

Studies show that X-ray and endoscopic screenings can reliably reduce mortality from GC due to its early detection [35]. Still, there is no global consensus on the GC screening method that is most efficient for the general population [36].

Japan started screening for GC back in 1963. First, it covered people aged 40+ and included questioning and double-contrast radiography. Since 2016, it covers people aged 50+. The radiographic screening sensitivity was 80-90% [37, 38]. Therefore, early GC stages were detected in nearly 60% of cases, and five-year survival exceeded 65% [39]. However, according to recent research, endoscopic screening can reduce mortality from GC by 67% compared to radiographic screening [40]. The early detection rate was usually about 70% in the radiographic screening group and exceeded 80% in the endoscopic screening group. Endoscopy could diagnose earlier GC stages treated by endoscopic surgery dissection [40, 41]. Endoscopic screening also reduced mortality by 28-57% [42-44].

In 2016, the Japanese Government introduced endoscopic screening for GC as a National Program based on epidemiological case-control studies conducted in Japan and Korea. However, due to significant costs, radiographic examinations have been adopted for mass examinations using mobile buses [38], while endoscopic screening was carried out only in large cities [45].

Korea introduced GC screening in 2002 as part of the National Cancer Screening Program. The screening by esophagogastroduodenoscopy (main method) or double fluoroscopy is conducted every two years for people aged 40+ [46].

China started the National GC Screening Program in 2005 in rural areas and regions with a high prevalence of GC. Endoscopic examination with chromoscopy and target biopsy covers citizens aged 40 to 69 [44, 47]. The studies Результаты исследований provide good evidence that endoscopic screening detects not only potential invasive carcinoma but also early-stage cancer and precancerous lesions, which improves the effectiveness of subsequent treatment [48].

Several other countries implement regional screening for GC: Costa Rica has utilized the X-ray method since 1996; endoscopic examination offered in Kazakhstan every 2nd year since 2013 has covered 306,000 people. Some countries (like GB, the US, and Australia) are trying to develop AI- or neuron-network-based systems to relieve doctors from the enormous workload. Japan has been most successful in using AI in endoscopy. The accuracy of the new diagnostic system reaches 82.7%. The main technology breakthrough is the ability to perform optical biopsy in real time [24].

Conclusion: Therefore, today, further development and introduction of a single methodology for GC screening is vital for Kazakhstan and the rest of the world to significantly increase the GC early detection rate and reduce the related mortality [24].

Taking into account the still high incidence and mortality from GC in Kazakhstan, the steadily growing incidence in recent years, and a stable 3rd place in cancer incidence structure, while the neglect rate remains high (21.3%) and five-year survival does not improve (47.8%) [20], there is an evident need to implement a population screening program aimed at GC early detection and find new approaches to treating gastric cancer and pre-cancer considering modern approaches of genomics and proteomics.

With this in mind, a research team based at KazIOR, Atyrau Oncological Dispensary, Center of Nuclear Medicine in Semey, and East-Kazakhstan Regional Multi-Disciplinary "Oncology and Surgery Center" in Ust-Kamenogorsk started a project focused on improving the results of endoscopic diagnostics with the use of chromoscopy for GC and precancerous pathology. Since endoscopic methods of diagnosing diseases of the esophagus, stomach, and duodenum are considered most informative, in the framework of this project, they will be supported by chromoscopy (using methylene blue as a dye) with adapting the morphological classification of Japan Gastric Cancer Association (Japanese Classification of Gastric Carcinoma, 2nd English edition) for the use in Kazakhstani population. The study will involve men and women aged 40-75 years who have not been on dynamic record for GC after questioning and signing an informed consent.

In the future, after the project implementation, expanding the screening scope could be considered based on GC epidemiological peculiarities in problem regions of Kazakhstan.

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АНДАТПА

АСҚАЗАН ОБЫРЫ: ЭПИДЕМИОЛОГИЯ ЖӘНЕ ЕРТЕ АНЫҚТАУ МЕН ЕМДЕУДІҢ ИННОВАЦИЯЛЫҚ ТЕХНОЛОГИЯЛАРЫН ӘЗІРЛЕУ ЖӘНЕ ЕНГІЗУ ПЕРСПЕКТИВАЛАРЫ

Д.Р. Қайдарова[1,2], О.В. Шатковская[1], А.А. Хожаев[2], И.К. Лаврентьева[1], А.М. Нурмухамбет[2], А.А. Самихова[2]

[1]«Қазақ онкология және радиология ғылыми-зерттеу институты» АҚ, Алматы, Қазақстан Республикасы;
[2]«С.Ж. Асфендияров атындағы қазақ ұлттық медицина университеті» АҚ, Алматы, Қазақстан Республикасы

Өзектілігі: *Асқазан обыры – бұл асқазан шырышты қабығының жасушаларынан шығатын қатерлі эпителиалдық ісіктердің гетерогенді тобы, әлемнің көптеген елдерінде қатерлі ісіктердің ең кең таралған түрлерінің бірі. Бірақ, бірнеше рет жасалған әрекеттерге қарамастан, обырдың осы түрі бойынша ерте масштабты (скринингтік) анықтау технологиясына сенімді тәсілдер жоқ. Бұл әлемнің көптеген елдерінде асқазан обырының асқынған түрлерін кеш анықтаудың жоғары жиілігіне, науқастардың бір жылдық өлім-жітімінің жоғары болуына және олардың бес жылдық өмір сүруінің төмен болуына себепші болады. Қазіргі уақытта асқазан обыры бойынша толық скрининг аурудың жоғары деңгейі бар Жапонияда, Кореяда және Қытайда ғана жүргізіледі.*

Зерттеудің мақсаты *– науқастарды емдеу нәтижелерін жақсартуға мүмкіндік беретін ерте анықтаудың оңтайлы технологиясын таңдау үшін Қазақстанның асқазан обыры бойынша эпидемиологиялық қолайсыз өңірлерін бағалау.*

Әдістері: *Талдау үшін РЖ бойынша арнайы әдебиеттерден қол жетімді эпидемиологиялық көрсеткіштер, Қазақстан Республикасы Денсаулық сақтау министрлігі бекіткен ел бойынша жиынтықтағы (АХЖ 10 – С16) № 7 жыл сайынғы есептік нысандардан алынған деректер, Қазақстан бойынша статистикалық және талдамалық материалдармен жарияланымдар пайдаланылды. Сырқаттану мен өлім-жітім көрсеткіштерін есептеу үшін Қазақстан Республикасы Стратегиялық жоспарлау және реформалар жөніндегі агенттігінің Ұлттық статистика.*

Нәтижелері: *Қазақстанда 2021 жылдан бастап асқазан обырынан сырқаттанушылық пен өлім-жітімнің көпжылдық төмендеуі іске қосылған нысандардың жоғары жиілігі, науқастардың салыстырмалы жоғары өлімі мен бес жылдық өмір сүру деңгейінің төмендігі аясында РЖ сырқаттанушылықтың тұрақты өсуімен ауыстырылды. Бұл ретте әлемде халықтың асқазан обырын ерте анықтауға скрининг жүргізудің белгілі бір тәсілдерінің тәжірибесі бар.*

Қорытынды: *Елдің көптеген өңірлерінде асқазан обырымен сырқаттанудың жоғары деңгейі соңғы жылдары оны ерте анықтауға скрининг жүргізудің оңтайлы нысандарын іздестіруді және әзірлеуді талап етеді, бұл асқазан обырынан өлім-жітімді азайтуға және науқастардың бес жылдық өмір сүруін арттыруға мүмкіндік береді.*

Түйінді сөздер: *асқазан обыры, сырқаттану, өлім-жітім, көрсеткіштердің динамикасы, Қазақстанның өңірлері, скрининг.*

АННОТАЦИЯ

РАК ЖЕЛУДКА: ЭПИДЕМИОЛОГИЯ И ПЕРСПЕКТИВЫ РАЗРАБОТКИ И ВНЕДРЕНИЯ ИННОВАЦИОННЫХ ТЕХНОЛОГИЙ РАННЕГО ВЫЯВЛЕНИЯ И ЛЕЧЕНИЯ

Д.Р. Кайдарова[1,2], О.В. Шатковская[1], А.А. Хожаев[2], И.К. Лаврентьева[1], А.М. Нурмухамбет[2], А.А. Самихова[2]

[1]АО «Казахский научно-исследовательский институт онкологии и радиологии», Алматы, Республика Казахстан
[2]НАО «Казахский Национальный Медицинский Университет имени С.Д. Асфендиярова», Алматы, Республика Казахстан

Актуальность: *Рак желудка (РЖ) – это гетерогенная группа злокачественных эпителиальных опухолей, исходящих из клеток слизистой оболочки желудка, и одна из самых распространенных форм злокачественных новообразований во многих странах мира. При этом, несмотря на неоднократные попытки, по данной форме рака до сих пор отсутствуют убедительные технологии раннего масштабного (скринингового) выявления, что обусловливает высокую частоту позднего обнаружения запущенных форм РЖ в большинстве стран мира, высокую одногодичную летальность и низкую пятилетнюю выживаемость больных. В настоящее время полноценный скрининг РЖ проводится только в Японии, Корее и Китае – странах с высоким уровнем заболеваемости.*

Цель исследования *– оценка эпидемиологически неблагополучных по РЖ регионов Казахстана для выбора оптимальной технологии раннего выявления, что позволит улучшить результаты лечения больных.*

Методы: *Для анализа использовались доступные эпидемиологические показатели по РЖ из специальной литературы, данные, получаемые из ежегодных отчётных форм №7, утверждённых Министерством здравоохранения Республики Казахстан (РК), в своде по стране (МКБ 10 – С16), публикации со статистическими и аналитическими материалами по Казахстану. Для расчёта показателей заболеваемости и смертности использовались данные с сайта Бюро национальной статистики Агентства по стратегическому планированию и реформам Республики Казахстан о среднегодовой численности населения по регионам Казахстана*

Результаты: *Многолетнее снижение заболеваемости и смертности от РЖ в Казахстане с 2021 года сменилось стабильным ростом заболеваемости на фоне высокой частоты запущенных форм, относительно высокой смертности и низкой пятилетней выживаемости больных. При этом, в мире существует определённый опыт проведения скрининга населения на раннее выявление РЖ.*

Заключение: *Высокий уровень заболеваемости РЖ в большинстве регионов страны в последние годы требует поиска и выработки оптимальных форм проведения скрининга на его раннее выявление. Это позволит снизить смертность от рака желудка и увеличить пятилетнюю выживаемость больных.*

Ключевые слова: *рак желудка (РЖ), заболеваемость, смертность, динамика показателей, регионы Казахстана, оптимальный скрининг.*

Transparency of the study: *Authors are solely responsible for the content of this article.*
Conflict of interest: *Authors declare no conflict of interest.*
Financing: *This study was financed within the scientific and technical program "Design and development of innovative technologies for early diagnostics and treatment of malignant diseases, taking into account modern approaches of genomics" under Program Targeted Financing BR11065390 of the Ministry of Health of the Republic of Kazakhstan.*
Authors' inputs: *contribution to the study concept – Kaidarova D.R., Shatkovskaya O.V., Khozhayev A.A.; study design – Khozhayev A.A., Lavrentieva I.K.; execution of the declared study – Lavrentyeva I.K., Khozhaev A.A., Nurmukhambet A.M., Samikhova A.A.; interpretation of the declared study – Kaidarova D.R., Shatkovskaya O.V.; prepration of the manuscript – Kaidarova D.R., Shatkovskaya O.V., Khozhayev A.A., Lavrentyeva I.K., Nurmukhambet A.M., Samikhova A.A.*
Authors' details:
Kaidarova Dilyara Radikovna – Doc. Med. Sci., Professor, Academician of the National Academy of Sciences of the Republic of Kazakhstan, Chairperson of the Management Board of "KazIOR" JSC, Almaty, the Republic of Kazakhstan, tel. +77017116593, e-mail: dilara.kaidarova@gmail.com, ORCID ID: 0000-0002-0969-5983;
Shatkovskaya Oksana Vladimirovna – Deputy Chairperson of the Management Board for Scientific and Strategic Activities, "KazIOR" JSC, Almaty, the Republic of Kazakhstan, tel. +7-701 414 7124, e-mail: 1972arty@mail.ru, ORCID ID: 0000-0001-6085-2780;
Khozhayev Arman Aivarovich (corresponding author) – Doc. Med. Sci., Professor at the Department of Oncology named after. S.N. Nugmanov, "Asfendiyarov Kazakh National Medical University" NCJSC, Almaty, the Republic of Kazakhstan, tel. +77017601595, e-mail: akhozhayev@mail.ru, ORCID ID: 0000-0002-0499-5258;
Lavrentieva Inessa Kronidovna – physician-analyst for monitoring and assessment, "KazIOR» JSC, Almaty, the Republic of Kazakhstan, tel. +77013917661, e-mail: inessa.lavrentyeva@mail.ru, ORCID ID: 0009-0003-7961-6253;
Nurmukhambet Ayaulym Muratkyzy – resident oncologist at the Department of Oncology named after. S.N. Nugmanov, "Asfendiyarov Kazakh National Medical University" NCJSC, Almaty, the Republic of Kazakhstan, tel. +77083646159, e-mail: A_aya_n@mail.ru, ORCID ID: 0009-0006-1221-9036;
Samikhova Adela Adilzhanovna – resident oncologist at the Department of Oncology named after. S.N. Nugmanov, "Asfendiyarov Kazakh National Medical University" NCJSC, Almaty, the Republic of Kazakhstan, tel. +77078117498, e-mail: a.samikhova@mail.ru, ORCID ID: 0009-0003-0258-4345.

Address for correspondence: Khozhayev A.A., "KazIOR" JSC, Abay Ave. 91, Almaty 050022, the Republic of Kazakhstan.