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Incidence of and mortality due to cervical cancer in Kazakhstan

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ABSTRACT

Structured: Despite some stabilization, an examination of the current state of affairs during the last five years reveals that cervical cancer morbidity and mortality in Kazakhstan continue to be a serious issue. The long-term planning of oncological care for patients with cervical cancer will take into consideration the characteristics of cervical cancer morbidity and mortality that have been identified within the Republic of Kazakhstan.

In the Republic of Kazakhstan (RK), from 2018 to 2022, an epidemiological analysis of the incidence and mortality rates from Cervical Cancer (CC) was carried out. In 2022, for the first time in the Republic of Kazakhstan, 1934 women diagnosed with cervical cancer were registered for dispensary registration and it ranks ninth among all malignant neoplasms, 602 women died. Over the years, the indicators of primary morbidity per 100,000 female population of the RSM are almost at the same level of 19.3% of LLC and 19.4% of LLC and a slight decrease in mortality from 6.4% of LLC to 6.0% of LLC. Regions with a high incidence of morbidity have been identified (Pavlodar, Atyrau, West Kazakhstan and North Kazakhstan). An increase in the specific gravity of stages I-II was noted.

The ratio of mortality to morbidity according to standardized indicators decreased from 33.1% to 30.9% during this period, which indicates an improvement in the parameters of providing oncological care to the population of the Republic of Kazakhstan. The identified features of morbidity and mortality from cervical cancer in the territory of the Republic of Kazakhstan will be taken into account in the long-term planning of oncological care for patients with cervical cancer

Objectives: In the Republic of Kazakhstan (RK), from 2018 to 2022, an epidemiological analysis of the incidence and mortality rates from Cervical Cancer (CC) was carried out.

Study design: Data for this study came from "Reports on Patients with Malignant Neoplasms" from the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan. The data were analyzed for the country as a whole, for each of 14 administrative and territorial regions, and for the three major cities, Astana, Almaty, and Shymkent. Traditional methods of statistical analysis were applied standardized age-and-gender indicators of morbidity and mortality per 100,000 population were calculated. The methods recommended by the Resolution of the Government of the Republic of Kazakhstan. To calculate standardized indicators, the WHO world standard population for Kazakhstan was used.

Results: In 2022, 1934 women in the Republic of Kazakhstan were diagnosed with cervical cancer and 602 women died. Kazakhstan ranks ninth internationally for rates of malignant neoplasms. Over the years, the indicators of primary morbidity per 100,000 female population of the RSM are almost at the same level of 19.3% of LLC and 19.4% of LLC and a slight decrease in mortality from 6.4% of LLC to 6.0% of LLC. Regions with a high incidence of morbidity have been identified (Pavlodar, Atyrau, West Kazakhstan and North Kazakhstan). An increase in the specific gravity of stages I-II was noted.

Conclusion: The ratio of mortality to morbidity according to standardized indicators decreased from 33.1% to 30.9% during this period, which indicates an improvement in the parameters of providing oncological care to the population of the Republic of Kazakhstan. The identified features of morbidity and mortality from cervical cancer in the territory of the Republic of Kazakhstan will be taken into account in the long-term planning of oncological care for patients with cervical cancer.

Keywords: Kaizen method; Pediatric radiotherapy; Reception strategy; Anxiety reduction.

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INTRODUCTION

Cervical cancer is a common and serious problem worldwide. The Age-Standardized incidence Rate (ASR) per 100,000 women ranges from 4.1 in Western Asia to 40.4 in East Africa [1-5]. The crude (non-standardized) Mortality-to-Incidence Ratio (MIR), to some extent a reflection of the level of diagnostic and treatment services in a country, is high in both developed and developing countries, ranging from 0.36 in North America to 0.68 in Africa [6], indicative of the seriousness of the diagnosis. Kazakhstan has a relatively high world ASR for cervical cancer—15.5 per 100,000 women in 2022 - and a mortality rate of 7.7, placing it 9th internationally in terms of cancer morbidity and 8 in terms of cancer mortality **Tab. 1.** [7]. Approaches to cervical cancer treatment include surgical treatment as a curative approach in early stages and as a palliative approach in late-stage cancer. Radiation and chemotherapy are used in stages II and III. Hormonal therapy is used if the tumor is estrogen sensitive.

This report summarizes cervical cancer incidence, mortality, and treatment modality in Kazakhstan for the five years from 2018 to 2022. It updates epidemiologic data from 2009 to 2018 published by Igissinov et al. [8] and data from 2011 to 2021 published by Zhetpisbayeva et al [9].

MATERIALS AND METHODS

Data for this study came from "Reports on Patients with Malignant Neoplasms" from the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan. The data were analyzed for the country as a whole, for each of 14 administrative and territorial regions, and for the three major cities: Astana, Almaty, and Shymkent.

Traditional methods of statistical analysis were applied [1,2]. Standardized age-and-gender indicators of morbidity and mortality per 100,000 population were calculated. The methods were recommended by the Resolution of the Government of the Republic of Kazakhstan [3]. To calculate standardized indicators, the WHO world standard population for Kazakhstan was used [4].

RESULTS

Table 2 summarizes the incidence, prevalence, stage at diagnosis, treatment, and mortality for the years 2018-2022. In total, Table 2 shows that 9037 women were diagnosed with cervical cancer in Kazakhstan from 2018 to 2022; 2,946 women died from cervical cancer during that same period, for a 5-year mortality-to-incidence ratio of 0.33. Screening accounted for the diagnosis of approximately 18.5% of all new cases; cases identified during screening were overwhelmingly diagnosed (96.5%) in an early stage (Stage I or II). Over a 5-year period, the average annual incidence of cervical cancer was 5.58, and mortality was 3.12 per 100,000 population. Morphological confirmation of cervical cancer is important to eliminate diagnostic errors. During the analyzed period, the proportion of morphologically confirmed cases of cervical cancer in Kazakhstan is at a high level from 99.3% in 2018 and 99.2% in 2022.

Surgery is the most common approach to early-stage disease (Stages I-III); radiation is used more commonly in stages II and III. Combination treatment (surgery, radiation, chemotherapy plus hormonal therapy) are used in complicated later stagte disease. The percentages of patients receiving combination treatment increased during the study period, indicating a more comprehensive approach to treatment and improved access to these treatment modalities.

Fig. 1. and Fig. 2. shows the incidence and mortality of cervical cancer in the 11 administrative regions and major cities with the highest rates. Morbidity rates per 100,000 population were obtained for 2018-2022 based on 5-year averages in 9 regions and two cities of national significance (Almaty and Astana).

An integrated indicator of the quality of care for patients with cervical cancer, which takes into account the level and timeliness of pathology detection, the quality of observation and treatment of patients, is the five-year survival rate of patients. Cervical cancer survival reflects women's success in diagnosis and treatment, as well as public health efforts to detect the disease early through screening programs. The introduction of combined methods of gentle surgery, combined radiation therapy and auxiliary maintenance therapy ensure an increase not only in survival, but also in the quality of life of patients **Tab. 2.**

Principal findings: An analysis of the five years from 2018 to 2022 shows that the incidence and mortality from cervical cancer remains a serious problem in Kazakhstan, despite some stabilization.

Results in the context of what is known: The decrease in one-year mortality and the increase in the ratio of morbidity to mortality, when compared to the earlier data presented in Igissinov et al. [8] and Kaidarova et al. [10], show that the incidence of cervical cancer depends on the availability and quality of diagnostic care, the organization of cancer screening, the quality of follow-up and treatment. Also, an increase in the incidence in Pavlodar, Atyrau, West Kazakhstan and North Kazakhstan regions is associated with an increase in the detection of cervical cancer after the introduction of a screening program, an increase in the age group and an improvement in the quality of the program in these areas.

Clinical implications: Some of the improved outcomes can be attributed to the introduction of a nationwide

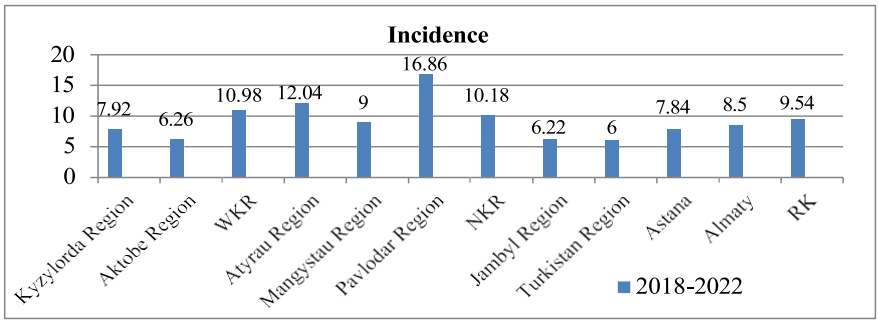

Fig. 1. Incidence rates: Rates of cervical cancer for the period 2018-2022 per 100,000 population for administrative regions and large cities.

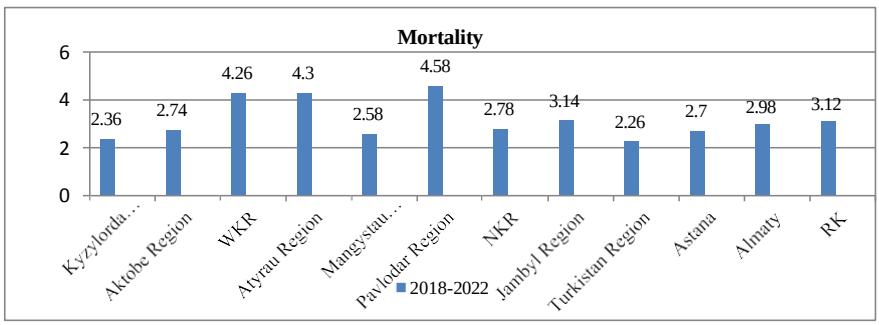

Fig. 2. Kaizen cycle applied to the reception of children in radiotherapy. WKR=West Kazakhstan Region; NKR=North Kazakhstan Region; RK=Republic of Kazakhstan (national data).

Tab. 1. Standardized rates of morbidity and mortality due to cervical cancer in 2022 (using world age-standardized rate) [8].

	Incidence (morbidity)/100,000 women	Mortality/100,000 women	Mortality to incidence ratio
Kazakhstan	15.5	7.7	0.30
World	15.5	15.5	0.50

Tab. 2. Data on cervical cancer diagnoses in Kazakhstan, 2018-2022.

Indicator	2018	2019	2020	2021	2022
The number of newly diagnosed cases (incidence)	1,830	1,797	1,672	1,804	1,934
The number of registered patients at the end of the year (prevalence)	13,541	14,242	14,814	15,355	16,142
Incidence rate per 100,000 women	16.6	16.0	14.7	15.6	16.5
Stage I-II (% of newly identified cases)	89.7	87.0	86.0	81.9	88.1
Screening					
Cervical cancer detected during screening as a percent of those screened	0.04	0.04	0.03	0.04	0.05
New cases identified during screening	334	360	264	319	392
Of new cases identified during screening, stage I-II (%)	325 (97.3)	342 (95.0)	249 (94.3)	308 (96.6)	389 (99.2)
Of all newly identified cases					
Stage IV at diagnosis (%)	2.7	3.2	3.3	3.2	2.7
Treatment					
Surgical treatment (%)	32.4	28.5	25.3	29.3	25.6
Radiation treatment (%)	16.0	16.2	11.6	11.4	11.1
Combined treatment (radiation+surgery, %)	12,6	13.4	12.8	14.1	11.9
Comprehensive treatment (radiation+surgery+chemotherapy, %))	12.0	12.7	12.0	16.7	18.9
Chemotherapy+radiation treatment (%)	22.2	23.5	28.6	21.3	18.9
Drug treatment (%)	4.6	5.0	6.8	4.8	10.4
Treatment coverage (%)	99.8	99.3	97.1	97.6	96.8
Mortality					
Lived less than one year from diagnosis (one-year mortality rate in % of people diagnosed in the previous year)	12.7	10.6	11.1	12.7	11.4
Number of deaths due to cervical cancer	604	562	588	590	602
Mortality per 100,000 women	5.5	5.0	5.1	5.0	5.0
The Mortality-to-Incidence Ratio (MIR)	0.33	0.31	0.35	0.32	0.30
The percent of registered patients who lived 5 years or more	55.5	56.8	58.9	60.1	61.3

screening program. In Kazakhstan, the cervical cancer oncological screening program was included in the system of annual mass preventive examinations in 2008. The Order of the Ministry of Health No. 607 dated 15.10. 2007. "On improving preventive examinations of certain categories of the adult population" meant the target groups, which are women of age 35, 40, 45, 50, 55, and 60 years old. And by Order of the Ministry of Health of the Russian Federation No. 174 dated 10/30/2020 "On approval of target groups of persons subject to screening studies, as well as the rules, scope and frequency of these studies", the age groups of persons aged 30, 34, 38, 42, 44, 48, 52, 54, 58, 62, 66, and 70 years old. The increase in the percentage of women receiving combined treatment approaches, despite the decrease in people being diagnosed at an earlier stage, suggests improved access to a broader range of treatment modalities. The data show a drop in most diagnosis indicators in 2020 and 2021, consistent with some of the disruption in health care that occurred during the COVID pandemic.

Research implications: There are numerous important ramifications for clinical practice, public health policy, and future study from the findings about the incidence and death of cervical cancer in Kazakhstan. First and foremost, the study's findings that the incidence and mortality rates are high in some regions of Kazakhstan highlight the pressing need for more robust national cervical cancer prevention and control initiatives. This entails raising public knowledge of the risk factors for cervical cancer as well as increasing access to and coverage of routine screening. From the standpoint of healthcare systems, the statistics can indicate structural obstacles such unequal access to diagnostic and treatment services. The necessity for specialized screening methods or region-specific health policies may be indicated if regional differences in incidence and death are noted. These differences can be utilized to pinpoint high-risk groups that would most profit from targeted clinical and educational outreach initiatives. Lastly, the study emphasizes how crucial it is to create or improve national cancer registries in order to guarantee precise and prompt data collecting. Evaluating the efficacy of interventions, monitoring trends over time, and directing evidence-based policies all depend on high-quality epidemiological data [11-13].

Strengths and limitations

Pertinence to priorities in public health: In Kazakhstan, where cervical cancer continues to rank among the top causes of cancer-related mortality for women, this study tackles a serious public health issue. The study provides useful information that can guide national cancer prevention initiatives.

Concentrate on a particular geographic situation: By focusing on Kazakhstan, the study offers localized

insights on the cervical cancer, taking into account cultural characteristics, regional health disparities, and issues specific to healthcare access in the nation.

Possibility of impacting screening programs and policy: The results could influence HPV vaccination laws, screening procedures, and public awareness campaigns, especially if they are connected to data specific to a given area.

LIMITATIONS

Completeness and quality of data

Estimates of incidence and mortality may be inaccurate in Kazakhstan due to underreporting, poor diagnostic coding, or insufficient death certification in national cancer registries or health data.

Restricted longitudinal information

Strong conclusions regarding changes over time or the effects of public health measures may be challenging to make if long-term data patterns are scarce or missing.

Absence of specific information

The capacity to fully identify and assess risk factors may be limited by the absence of important variables in many datasets, such as HPV status, socioeconomic characteristics, diagnosis stage, treatment modalities, or adherence to follow-up care.

Regional differences in access to healthcare

The data may be skewed by regional differences in healthcare infrastructure; for example, areas with stronger diagnostic services may report higher incidence just because of improved detection.

Restricted applicability outside of Kazakhstan

Cultural, economic, and healthcare system variations may restrict the study's direct relevance to other Central Asian or international nations, notwithstanding its value in the domestic context.

CONCLUSION

The improvement of indicators for early diagnosis and five-year survival indicate the systematic and effective measures taken in the Republic of Kazakhstan to prevent cervical cancer and to enhance early diagnosis and treatment of cervical cancer. The identified features of morbidity and mortality from cervical cancer in the territory of the Republic of Kazakhstan will be taken into account in the long-term planning of oncological care for patients with cervical cancer.

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