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REGIONAL FEATURES OF THE INCIDENCE OF THE LOWER EXTREMITIES VARICOSE IN KAZAKHSTAN

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Diseases of the cardiovascular system remain an important medical and social problem throughout the world, since the prevalence, features of the clinical course and outcomes lead to a significant decrease in the quality of life. The study of the geographic variability of varicose veins of the lower extremities (hereinafter – VLE) can expand the understanding of this problem.

Objective. To assess the regional features of the incidence of VLE in Kazakhstan for 2009-2018.

Material and methods. The material for the study was the data of the Ministry of Health of the Republic of Kazakhstan – annual form No. 12, concerning VLE (ICD 10 – I83) for 2009-2018. A retrospective study using descriptive and analytical methods of biomedical statistics was used as the main method.

Results and discussion. For 2009-2018 in the republic 158 151 cases of VLE were registered for the first time, of which 37 670 (23.8%) in men and 120 481 (76.2%) in women. The average annual incidence rate of VLE (both sexes) in the republic was 91.6±9.6 per 100,000 of the total population (95% CI=72.8-110.3‰). The lowest incidence rates of VLE in the entire population were established in Aktobe region – 28.1±1.4‰ (95% CI=25.4-30.8‰). Very high incidence rates (both sexes) were detected in North Kazakhstan region (130.5±7.6‰, 95% CI=115.6-145.4‰) and in Astana city (163.0±11.0‰, 95% CI=130.6-195.4‰).

Conclusions. The study showed a preliminary assessment of VLE incidence in the republic, identifying regions of low and high frequency, trends of VLE morbidity.

In dynamics, morbidity rates tended to grow. With the equalization of the incidence rates of VLE, the average annual growth rate was T=+12.5%.

Keywords: varicose veins of the lower extremities, incidence, Kazakhstan.

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Т Ұ Ж Ы Р Ы М

ҚАЗАҚСТАНДА АЯҚ ВАРИКОЗЫНЫҢ СЫРҚАТТАНУШЫЛЫҒЫНЫҢ ӨҢІРЛІК ЕРЕКШЕЛІКТЕРІ

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Жүрек-қантамыр жүйесінің аурулары, атап айтқанда аяқ варикозы бүкіл әлемде маңызды медициналық-әлеуметтік проблема болып қала береді, өйткені таралуы, клиникалық ағымның ерекшеліктері мен нәтижелері өмір сапасының едәуір төмендеуіне әкеледі.

Зерттеу мақсаты. 2009-2018 жылдары Қазақстанда аяқ варикозы ауруының аймақтық ерекшеліктерін бағалау.

Материал және әдістері. Зерттеу материалы Қазақстан Республикасы Денсаулық сақтау министрлігінің деректері – 2009-2018 жылдардағы аяқ варикозына (МКБ 10 – I83) қатысты № 12 жылдық форма болды.

Нәтижелері және талқылауы. 2009-2018 жылдары республикада алғаш рет 158 151 аяқ варикозы тіркелді, оның ішінде 37 670 (23,8%) ерлерде және 120 481 (76,2%) әйелдерде. Республикада аяқ варикозы (екі жыныста да) ауруының орташа жылдық көрсеткіші барлық 100 000 тұрғынға шаққанда 91,6±9,6 құрады (95% ДИ=72,8-110,3‰). Бүкіл халықтың аяқ варикозымен сырқаттануының ең төмен көрсеткіштері Ақтөбе облысында анықталды – 28,1±1,4‰ (95% ДИ=25.4-30,8‰). Аурудың өте жоғары көрсеткіштері (екі жыныс) Солтүстік Қазақстан облысында анықталды (130,5±7,6‰, 95% ДИ=115,6-145,4‰) және Астана қаласында (163,0±11,0‰, 95% ДИ=130,6-195,4‰).

Қорытынды. Жүргізілген зерттеу республикада аяқ варикозымен сырқаттанушылықтың алдын ала нәтежесін көрсетті, жиілігі төмен және жоғары өңірлер анықталды, сондай-ақ аяқ варикозымен сырқаттанушылықтың трендттері анықталды. Динамикада ауру көрсеткіштері өседі. Аяқ варикозы сырқаттанушылық көрсеткіштерін теңестіру кезінде орташа жылдық өсу қарқыны $T_{пр}$=+12,5% құрады.

Негізгі сөздер: аяқтың варикозы, ауру, Қазақстан.

Р Е З Ю М Е

РЕГИОНАЛЬНЫЕ ОСОБЕННОСТИ ЗАБОЛЕВАЕМОСТИ ВАРИКОЗОМ ВЕН НИЖНИХ КОНЕЧНОСТЕЙ В КАЗАХСТАНЕ

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Заболевания сердечно-сосудистой системы, в частности варикоз нижних конечностей (далее – ВНК), остается важной медико-социальной проблемой во всем мире, поскольку распространенность, особенности клинического течения и исходы ведут к значительному снижению качества жизни.

Цель исследования. Оценить региональные особенности заболеваемости ВНК в Казахстане за 2009-2018 гг.

Материал и методы. Материалом исследования послужили данные Министерство здравоохранения Республики Казахстан – годовая форма №12, касающиеся ВНК (МКБ 10-I83) за 2009-2018 гг. В качестве основного метода использовалось ретроспективное исследование с применением дескриптивных и аналитических методов медико-биологической статистики.

Результаты и обсуждение. За 2009-2018 гг. в республике был впервые зарегистрирован 158 151 случай ВНК, из них 37 670 (23,8%) у мужчин и 120 481 (76,2%) у женщин. Среднегодовой показатель заболеваемости ВНК (оба пола) в республике составил 91,6±9,6 на 100 000 всего населения (95% ДИ=72,8-110,3‰). Самые низкие показатели заболеваемости ВНК у всего населения были установлены в Актюбинской области – 28,1±1,4‰ (95% ДИ=25,4-30,8‰). Очень высокие показатели заболеваемости (оба пола) были выявлены в Северо-Казахстанской области (130,5±7,6‰,95% ДИ=115,6-145,4‰) и городе Астана (163,0±11,0‰, 95% ДИ=130,6-195,4‰).

Выводы. Проведенное исследование показало предварительную оценку заболеваемости ВНК в республике, установлены регионы низкой и высокой частоты, а также выявлены тренды заболеваемости ВНК. В динамике показатели заболеваемости имели тенденцию к росту. При выравнивании показателей заболеваемости ВНК среднегодовой темп прироста составил $T_{пр}$=+12,5%.

Ключевые слова: варикоз нижних конечностей, заболеваемость, Казахстан.

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Diseases of the cardiovascular system, in particular varicose of the lower extremities (hereinafter referred to as VLE), remains an important medical and social problem throughout the world, since the prevalence, features of the clinical manifestations and outcomes lead to significant decrease in the quality of life. In Russia, about 30 million people suffer from VLE and percentage of woman suffering is much higher [1]. In USA and Western countries, varicose veins have an estimated prevalence between 5% and 30% in the adult population, with a female: male predominance of 3:1 [2]. In the US, 40 million people were diagnosed with varicose veins, which is about 23 percent of the country's population suffering from the disease between the ages of 40 and 80 [3-5].

The prevalence of varicose veins is ubiquitous, but higher in developed countries. Risk factors found to be associated with VLE include age, sex, a family history of varicose veins, obesity, pregnancy, phlebitis, and previous leg injury, environmental or behavioral factors, like sedentary lifestyle [2, 3, 6-9].

In Kazakhstan, most of the population is also exposed to VLE. The study of the geographical variability of VLE in Kazakhstan will increase the understanding of this problem.

MATERIAL AND RESEARCH METHODS

The research material included data obtained from the reporting form No. 12 of the Ministry of Health of the Republic of Kazakhstan on patients with a diagnosis of CLE (ICD 10 - I83), established for the first time in their life.

A retrospective study (2009-2018) with descriptive and analytical methods of modern epidemiology was used as the main method for studying the incidence of VLE. Extensive and rough indicators of morbidity are determined by the generally accepted methodology used in modern statistics [10-12]. The annual averages (M), mean error (m), 95% confidence interval (95% CI), and average annual upward/downward rates (T%) were calculated.

The dynamics of morbidity indicators have been studied over 10 years, while trends are determined by the least squares method. The geometric mean was used to calculate the average annual growth rates and decrease in the time series.

RESULTS AND DISCUSSION

During the study period (2009-2018), in the republic 158,151 cases of VLE were registered for the first time, in which 37,670 (23.8%) and 120,481 (76.2%) cases are among men and women, respectively.

High extensive indicators of VLE were established in Karaganda region (11.1%), Almaty city (13.1%) and South Kazakhstan region (18.1%). The lowest extensive indicators of VLE were in Mangistau (1.4%), Aktobe (1.4%) and West Kazakhstan (1.9%) regions (table 1).

As can be seen from Table 1 the distribution of VLE by region, taking into account the gender of the population, had the above feature.

The average annual incidence rate of VLE (both sexes) in the republic was 91.6±9.6 per 100,000 of the total population (95% CI=72.8-110.3‰).

Table 1 – **Distribution of VLE by regions in Kazakhstan for the period 2009-2018**

Region/city	Both sexes		Male		Female	
	Abs.	%	Abs.	%	Abs.	%
Mangystau	2246	1.4	658	1.7	1588	1.3
Aktobe	2265	1.4	643	1.7	1622	1.3
West Kazakhstan	2942	1.9	773	2.1	2169	1.8
Kostanay	4436	2.8	1236	3.3	3200	2.7
Atyrau	4788	3.0	2206	5.9	2582	2.1
Akmola	4869	3.1	2358	6.3	2511	2.1
Kyzylorda	5215	3.3	802	2.1	4413	3.7
Pavlodar	7333	4.6	2521	6.7	4812	4.0
North Kazakhstan	7523	4.8	1778	4.7	5745	4.8
Zhambyl	9431	6.0	1488	4.0	7943	6.6
East Kazakhstan	9746	6.2	2499	6.6	7247	6.0
Nur-Sultan city	13581	8.6	2667	7.1	10914	9.1
Almaty region	16866	10.7	3967	10.5	12899	10.7
Karagandy	17541	11.1	5112	13.6	12429	10.3
Almaty city	20695	13.1	3888	10.3	16807	13.9
South Kazakhstan	28674	18.1	5074	13.5	23600	19.6
Republic	**158151**	**100.0**	**37670**	**100.0**	**120481**	**100.0**

In the dynamics, the incidence rates tended to grow from 69.2‰ in 2009 to 138.7‰ in 2018. While levelling the incidence rates of VLE, the above-mentioned upward trend was also established, the average annual growth rate was T=+12.5% (figure 1).

In dynamics, a similar picture was observed in both men and women. The incidence rates of VLE increased for men from 40.7‰ in 2009 to 58.8‰ in 2018, and for women from 95.7‰ in 2009 to 213.7‰ in 2018. At the same time, the average annual growth rate of equalized indicators were T=+5.3% and T=+15.4%, respectively.

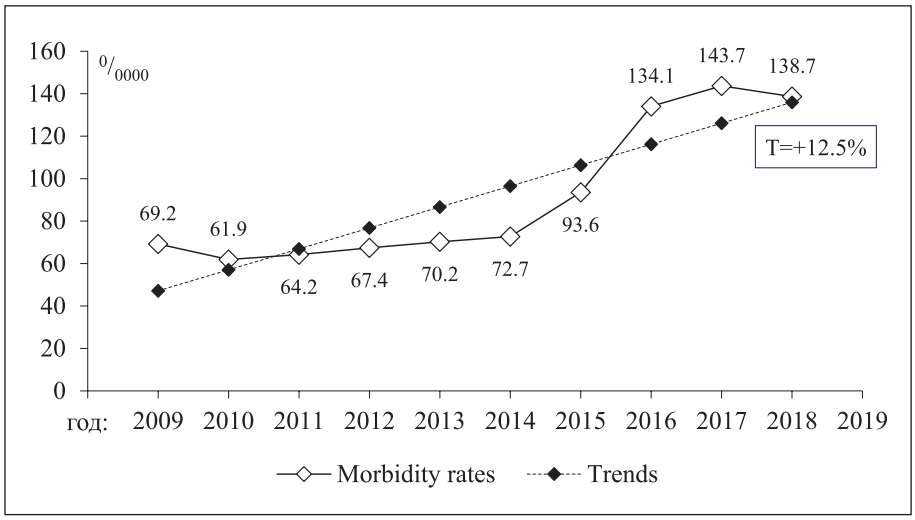

Figure 1 – Dynamics of VLE morbidity rates in the entire population of Kazakhstan for 2009-2018

The average annual incidence rate of VLE in men (45.5±2.4‰, 95% CI=40.8-50.1‰) had a statistically significant difference (p=0.000) compared with the data in women (134.7±16.5‰, 95% CI=102.3-167.0‰).

The lowest incidence rates of VLE were found in Aktobe region. So among the entire population (both sexes) – 28.1±1.4‰ (95% CI=25.4-30.8‰), in men – 16.4±1.0‰ (95% CI=14.4-18.5‰) and women – 38.9±2.0‰ (95% CI=35.1-42.7‰) (table 2, 3). In dynamics, the equalized indicators of the incidence of VLE of the entire population (both sexes) in this region tended to grow (T=+2.2%). At the same time, the average annual rates of decrease in equalized VLE indicators in women (T=+0.8%) were less pronounced compared to the data in men (T=+1%) (table 2, 3).

Very high rates of primary incidence of VLE (both sexes) were detected in the North Kazakhstan region (130.5 ± 7.6‰, 95% CI=115.6-145.4‰) and Astana city (163.0±11.0‰, 95% CI=130.6-195.4‰) (table 2).

Table 2 – **Average annual incidence of VLE of Kazakhstan entire population (both sexes) by regions in for the period 2009-2018**

Region/city	Incidence. 0/0000		T, %
	M±m	95% CI	
Aktobe	28.1± 1.4	25.4-30.8	+2.2
Mangystau	37.5± 8.6	20.5-54.4	+22.4
West Kazakhstan	47.0± 4.4	38.3-55.7	+8.4
Kostanay	50.3± 3.4	43.7-57.0	+4.5
Akmola	66.1± 3.0	60.2-72.0	+3.8
Kyzylorda	69.5± 14.6	40.9-98.2	+28.3
East Kazakhstan	70.0± 9.3	51.7-88.3	+16.5
Zhambyl	86.6± 11.0	65.0-108.2	+18.0
Almaty	87.2± 8.3	70.9-103.5	+9.2
Atyrau	88.0± 19.8	49.2-126.7	−22.8
Republic	**91.6± 9.6**	**72.8-110.3**	**+12.5**
Pavlodar	97.6± 5.2	87.4-107.8	+4.6
South Kazakhstan	102.8± 20.7	62.2-143.4	+40.6
Almatycity	127.7± 19.6	89.4-166.1	+20.2
Karaganda	128.3± 6.8	114.9-141.6	+5.7
NorthKazakhstan	130.5± 7.6	115.6-145.4	+5.6
Astanacity	163.0± 16.5	130.6-195.4	+9.7

At the same time, in dynamics, the equalized indicators of the VLE incidence in North Kazakhstan region had a less pronounced tendency to increase (T=+5.6%) compared to Astana city (T=+9.7%) (table 2).

As can be seen from Table 3, the incidence rates of VLE in men were very high in Karaganda (79.1±5.9‰) and Atyrau regions (82.4±19.3‰). In women, the indicators were very high in North Kazakhstan region (190.6±13.2‰), as well as in Almaty (190.8±29.9‰) and Astana (251.6±28.8‰) cities.

In dynamics, the equalized incidence rates of VLE (both sexes) in the regions had a different trend. So, a high rate of decline was noted in Atyrau region (T=−22.8%) (table 2).

A similar picture was observed when analyzing the equalized indicators for men and women, where, in addition to this region, there was also a high average annual rate of decline in men in Pavlodar region (T=−6.3%) (table 3).

During the study period the highest average annual growth rates of the equalized indicators of VLE incidence were established in the South Kazakhstan region, which amounted to T=+40.6% for the entire population (both genders) and T=+100.1% for women. Among men, the highest growth rate was noted in Kyzylorda region T=+59.8% (table 3).

DISCUSSION AND CONCLUSION

VLE are a common multifactorial complex vascular disease. Data regarding its prevalence are still underestimated, nevertheless the CVD is negatively impacting on the patient's quality of life and has a high socio-economic factor. Prevalence estimates of this condition vary across ethnic groups ranging from 2-4% in the Northern group of the Cook Islands to 50-60% in some countries of the Western world [13].

Study conducted in Russia showed the prevalence of disease in 69.3% population [9], in Romani population 68.4%, newly diagnosed rate was 36.9% [14]. In Kazakhstan for 2009-2018 158,151 cases of VLE were first diagnosed, of which 23.8% men and 76.2% women.

In dynamics, morbidity rates tended to grow. With the equalization of the incidence rates of VLE, the average annual growth rate was T=+12.5%.

At the same time, an interesting fact was established that the incidence in the northern regions (North Kazakhstan, Pavlodar and Akmola regions) was much lower than in the southern regions of Kazakhstan, such as Almaty and Zhambyl region, where climatic and geographic conditions are more favourable.

In this article, a preliminary assessment of VLE incidence in the republic was presented, identifying regions of low and high frequency, trends of VLE incidence.

Further in-depth study of the VLE incidence seems to be very important, since it provides new hypotheses about risk factors and effective preventive measures, and also allows obtaining reliable data on the morbidity. Changes in the incidence of VLE in dynamics dictate the conduct and continuation of epidemiological studies that will establish cause-and-effect relationships of the development of this disease. The above facts will be the priority scientific directions of our future research.

Assessment of regional features of the incidence of varicose veins indicates variability with territorial differentiation

Table 3 - **Average annual VLE incidence rates in both men and women by regions in Kazakhstan for the period 2009-2018**

Region/city	Male			Female		
	M±m	95% CI	T, %	M±m	95% CI	T, %
Aktobe	16.4±1.0	14.4-18.5	+6.1	38.9±2.0	35.1-42.7	+0.8
Mangystau	21.7±5.4	11.2-32.3	+31.6	53.0±12.5	28.6-77.5	+17.1
West Kazakhstan	25.6±2.6	20.5-30.8	+5.6	67.0±6.6	54.1-80.0	+9.5
Kostanay	29.7±2.1	25.5-33.9	+3.3	68.9±4.7	59.6-78.1	+5.0
Akmola	66.3±3.6	59.2-73.4	+4.1	65.9±4.3	57.6-74.3	+3.5
Kyzylorda	21.3±5.7	10.2-32.4	+59.8	117.7±23.6	71.5-164.0	+26.3
East Kazakhstan	37.7±3.5	30.9-44.5	+10.7	99.3±14.7	70.6-128.1	+19.0
Zhambyl	27.9±3.0	22.0-33.9	+14.2	143.0±18.9	105.9-180.1	+19.0
Almaty	41.8±2.9	36.1-47.5	+4.1	131.2±15.1	101.6-160.8	+11.1
Atyrau	82.4±19.3	44.6-120.3	−19.5	93.2±20.2	53.6-132.8	−26.4
Republic	**45.5±2.4**	**40.8-50.1**	**+5.3**	**134.7±16.5**	**102.3-167.0**	**+15.4**
Pavlodar	71.4±7.1	57.5-85.3	−6.3	121.1±12.2	97.2-145.0	+11.5
South Kazakhstan	37.1±4.6	28.2-46.1	+14.0	167.6±37.3	94.6-240.7	+100.1
Almatycity	52.9±7.2	38.7-67.0	+15.8	190.8±29.9	132.1-249.4	+21.3
Karaganda	79.1±5.9	67.5-90.7	+4.5	172.4±11.4	150.1-194.7	+6.2
North Kazakhstan	64.6±4.1	56.5-72.7	+1.5	190.6±13.2	164.7-216.6	+7.0
Nur-Sultan city	68.3±6.1	56.3-80.2	+1.8	251.6±28.8	195.1-308.1	+12.0

of "loci" with low and high indicators. The results obtained will allow health care organizers to have a clear spatial picture of the frequency of VLE and its incidence, which should be used for monitoring and evaluating ongoing treatment and prevention activities, as well as for optimizing costs in accordance with the prevalence of the disease in the region.

Research transparency

Research did not have a sponsorship. The authors are absolutely responsible for presenting the release script for publication.

Declaration about financial and other relations

The release script was approved by all authors. The authors did not get the honorary for the article.

Contribution of the authors

Nurbek S Igissinov – concept and design of the study, approval of the final version of the article.

Shyryn B Kenzhebekova, Zarina A Bilyalova – statistical processing of the material, writing the text of the article (material and methods, conclusion).

Mirsaid N Izimbergenov, Gaukhar S Nurtazinova, Saken K Kozhakhmetov – writing the text of the article (introduction, conclusions).

Dulat K Turebaev, Dariyana M Kulmirzaeva – writing the text of the article, editing.

Conflict of interest

The authors declare no conflict of interest.

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