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INDICATORS

OF MORBIDITY AND MORTALITY FROM CARDIOVASCULAR DISEASES OF RURAL POPULATION IN THE OSH REGION (KYRGYZ REPUBLIC)

INDICADORES DE MORBILIDAD Y MORTALIDAD POR ENFERMEDADES CARDIOVASCULARES DE LA POBLACIÓN RURAL EN LA REGIÓN OSH (REPÚBLICA KIRGUISA)

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ABSTRACT

The work analyzes the leading epidemiological indicators of cardiovascular morbidity and mortality in 2014-2021 in the Kyrgyz Republic, the city of Osh, and the Osh region. During the analyzed period, morbidity and mortality from cardiovascular diseases among the adult rural population of the Osh region was higher than in Osh and the Kyrgyz Republic. However, the prevalence of cardiovascular pathology was higher in urban residents, which may indicate a good level of diagnosis and timely detection of patients with a cardiological profile in urban areas. Hypertension and coronary heart disease (angina pectoris) are the main contributors to cardiovascular morbidity in adults and adolescents in rural areas and the city. Cardiovascular diseases are much less common among children under 14 years of age. They are mainly represented by acute rheumatic fever and chronic rheumatic heart disease with the formation of structural heart defects. The study of medical and statistical data of patients with cardiovascular diseases can be used to optimize prevention programs for this category of patients and improve cardiological care for the population.

Keywords: Rural population, Cardiovascular diseases, Morbidity, Mortality, Health statistics.

RESUMEN

El trabajo analiza los principales indicadores epidemiológicos de morbilidad y mortalidad cardiovascular en 2014-2021 en la República Kirguisa, la ciudad de Osh y la región de Osh. Durante el período analizado, la morbilidad y mortalidad por enfermedades cardiovasculares entre la población rural adulta de la región de Osh fue la mayor de la República Kirguisa. Sin embargo, la prevalencia de patología cardiovascular fue mayor en los residentes urbanos,

lo que puede indicar un buen nivel de diagnóstico y detección oportuna de pacientes con perfil cardiológico en áreas urbanas. La hipertensión y la enfermedad coronaria (angina de pecho) son los principales contribuyentes a la morbilidad cardiovascular en adultos y adolescentes de las zonas rurales y de la ciudad. Las enfermedades cardiovasculares son mucho menos comunes entre los niños menores de 14 años. Están representados principalmente por fiebre reumática aguda y cardiopatía reumática crónica con formación de defectos cardíacos estructurales. El estudio de datos médicos y estadísticos de pacientes con enfermedades cardiovasculares puede utilizarse para optimizar los programas de prevención para esta categoría de pacientes y mejorar la atención cardiológica de la población.

Palabras clave: Población rural, Enfermedades cardiovasculares, Morbilidad, Mortalidad, Estadísticas de salud.

INTRODUCTION

Cardiovascular diseases (CVD) remain the leading cause of morbidity and mortality in the adult population in almost all countries of the world (De Suárez, 2020), including the Kyrgyz Republic (KR). The high prevalence of CVD is caused mainly by modifiable risk factors, such as smoking, excessive alcohol consumption, low physical activity, unbalanced diet (Li et al., 2022), and environmental factors (Kovalev et al., 2020; Bazarbaeva et al., 2021; Mukataeva et al., 2023). One of the priority areas of preventive medicine at the present stage is the impact on modifiable risk factors for CVD (Obrová et al., 2022). Additionally, focusing on preventive medicine offers a proactive way to manage public health, emphasizing the significance of educating the populace about the health risks associated with lifestyle choices. By fostering awareness and facilitating access to preventive care, healthcare systems can empower individuals to take charge of their health, leading to a decrease in the incidence of chronic diseases.

The lifestyle and living conditions of urban and rural residents differ. In the large-scale cohort Prospective Urban and Rural Epidemiology study (PURE) with the inclusion of 153,996 rural and urban residents aged 35 to 70 years in countries with different levels of economic development, it was demonstrated that urban residents were significantly more likely to adhere to a healthy lifestyle compared to rural residents (Teo et al., 2013). The work of Mohd Nor et al. (2022), showed that the prevalence of the main cardiovascular risk factors in young people (15-24 years old) living in rural areas was higher than in urban residents. A study conducted in Brazil by Da Luz et al. (2020), demonstrated that the most common risk factors for CVD among rural residents were high blood pressure (35.8%) and dyslipidemia (34.4%), and people over the age of 50 were 5.6 times more likely to have two or more cardiovascular risk factors.

According to the results of the large epidemiological study "Epidemiology of cardiovascular diseases and their risk factors in the regions of the Russian Federation" (ESSE-RF) conducted in 11 regions of the Russian Federation (Balanova et al., 2014), it turned out that rural residents, compared with the urban population, were more prone to an unbalanced diet in the form of insufficient consumption of vegetables and fruits (45.3 vs. 41.1%), fish and seafood (39.9 vs. 36.3%), and excessive salt intake (54.9 and 48.9%). At the same time, residents of urban areas were more likely to have low physical activity than rural residents (39.7 and 34.2%, respectively).

Thus, the high prevalence of modifiable CVD risk factors among the rural population suggests that they have an increased incidence of cardiovascular pathology. Insufficient knowledge of the medical and social aspects of CVD makes it challenging to develop effective prevention programs and organize medical care for rural residents, which determines the relevance of this work.

The study aims to assess the morbidity and mortality rates from CVD in the rural population of the Osh region of the KR in 2014-2021.

MATERIALS AND METHODS

Taking into account the purpose of the study, the authors conducted comprehensive research aimed at assessing the morbidity and mortality rates from cardiovascular diseases (CVD) in the rural population of the Osh region of the Kyrgyz Republic between 2014 and 2021. A combination of statistical, analytical, and epidemiological research methods was employed to analyze the morbidity and mortality data from CVD.

This study was conducted in the rural areas of the Alai and Chon-Alai districts of the Osh region, including a comparative analysis with data from the urban population of the city of Osh and the national averages for the Kyrgyz Republic.

The primary sources of information for this research were:

- Official statistical reports from the Electronic Health Center of the Ministry of Health of the Kyrgyz Republic.
- Reports from district hospitals and centers of standardization and metrology in the Alai and Chon-Alai districts of the Osh region and the city of Osh.

The study population included adults, adolescents, and children under 14 years of age residing in the rural areas of the Alai and Chon-Alai districts, with comparisons made to urban populations in the city of Osh and broader national data.

The results were analyzed using the Microsoft Excel application software package.

RESULTS AND DISCUSSION

From 2014 to 2019, the share of CVD in the structure of the total morbidity of adults and adolescents in the KR increased from 4.7 to 6.5%. However, in 2020, there was a decrease in this indicator, which in 2021 was comparable to 2014 (Table 1).

Table 1: The structure of the general morbidity of the population of the KR in 2014-2021 (%).

Class of diseases	Years of observation							
	2014	2015	2016	2017	2018	2019	2020	2021
Respiratory diseases	21.7	20.9	24.5	22.5	24.3	22.3	28.1	28.4
Diseases of the genitourinary system	12.0	12.2	11.4	12.2	11.2	10.6	10.0	9.3
Diseases of the digestive system	10.2	11.5	10.4	9.4	8.9	13.3	10.8	12.7
Injuries and poisoning	8.7	7.7	7.7	7.7	7.9	7.6	6.9	6.4
Diseases of the blood and hematopoietic organs	4.9	4.7	3.6	2.7	2.4	2.0	1.6	1.5
Diseases of the eye and its appendages	5.9	5.9	5.9	6.4	7.1	7.2	5.7	6.0
Diseases of the nervous system	5.7	5.8	3.5	3.5	3.6	3.3	2.8	3.2
Diseases of the skin and subcutaneous tissue	5.3	5.4	3.8	4.5	4.4	4.4	3.8	3.8
Some infectious and parasitic diseases	4.2	4.2	3.1	3.4	3.3	3.2	7.2	7.2
Diseases of the circulatory system	4.7	5.1	6.4	6.5	6.0	6.5	5.9	4.3
Diseases of the endocrine system	2.5	2.5	2.6	2.2	2.2	2.2	2.3	1.7
Diseases of the ear and mastoid process	3.6	3.8	3.4	2.9	2.9	3.3	2.9	2.8
Other diseases	10.6	10.3	13.7	16.1	15.8	14.1	12.0	12.7

Source: own elaboration.

In the Osh region in 2014-2017, the incidence of CVD was higher than in the city of Osh and the KR. From 2018 to 2021, this indicator among the rural population was significantly lower than among city residents and lower than the data for the KR (541.1 cases vs. 670.7 and 784.4 cases, respectively) (Table 2).

Table 2: The incidence of CVD in the KR, the city of Osh and Osh region in 2014-2021.

Year of observation	Number of cases per 100 thousand people		
	KR	Osh	Osh region
2014	1,118.1	1,079.3	1,127.9
2015	1,220.0	1,138.1	1,579.9
2016	1,198.4	1,181.7	1,999.6
2017	1,344.3	1,017.7	1,611.8
2018	1,199.9	1,277.8	985.6
2019	1,242.8	1,156.1	1,009.2
2020	894.6	793.3	687.3
2021	784.4	670.7	541.1

Source: own elaboration.

The prevalence of CVD in the KR increased over the period between 2014 and 2019 (2014: 293,400 cases, 2019: 332,202 cases), but in 2020-2021 a decrease in this indicator was recorded (252,110 and 253,406 cases, respectively).

Most likely, this circumstance is associated with the spread of the new coronavirus infection, COVID-19, which is confirmed by the fact that in 2021 respiratory diseases were the most frequent in the structure of morbidity (282,302 cases).

In 2021, 254,355 cases of CVD were registered in the KR (3,800.8 cases per 100 thousand people), of which 35,611 patients were diagnosed for the first time in their lives (532.1 cases per 100 thousand people) (Table 3). The main proportion of cases were adults and adolescents (253,406 cases, 5,653.1 per 100 thousand people), while CVD was much less common in children under 14 years of age (949 cases, 43.0 cases per 100 thousand people).

Table 3: The incidence of CVD among the KR population in 2021.

Nosology	Registered patients						Patients registered for the first time in their lives					
	Total		Adults and teenagers		Children under 14 years		Total		Adults and teenagers		Children under 14 years	
	Abs.	Per 100 thousand.	Abs.	Per 100 thousand.	Abs.	Per 100 thousand.	Abs.	Per 100 thousand.	Abs.	Per 100 thousand.	Abs.	Per 100 thousand.
Diseases of the circulatory system	254,355	3,800.8	253,406	5,653.1	949	43.0	35,611	532.1	35,162	784.4	449	20.3
Rheumatic fever in the active phase	436	6.5	342	7.6	94	4.3	129	1.9	88	2.0	41	1.9
Chronic rheumatic heart disease	4186	62.6	3952	88.2	234	10.6	617	9.2	529	11.8	88	4.0
including rheumatic structural heart defects	3622	54.1	3411	76.1	211	9.5	448	6.7	368	8.2	80	3.6
hypertension (HT)	133,864	2,000.3	133,851	2,986.0	13	0.6	15,653	233.9	15,653	349.2	0	0.0
including target organ lesions	110,094	1,645.1	110,094	2,456.0	0	0.0	10,536	157.4	10,536	235.0	0	0.0
Coronary heart disease (CHD)	69,699	1,041.5	69,699	1,554.9	0	0.0	5,677	84.8	5,677	126.6	0	0.0
including angina pectoris	18,043	269.6	18,043	402.5	0	0.0	2,112	31.6	2,112	47.1	0	0.0
acute myocardial infarction	1,047	15.6	1,047	23.4	0	0.0	760	11.4	760	17.0	0	0.0
recurrent myocardial infarction	229	3.4	229	5.1	0	0.0	39	0.6	39	0.9	0	0.0
pulmonary embolism	46	0.7	46	1.0	0	0.0	19	0.3	19	0.4	0	0.0
mitral valve prolapse	1,367	20.4	1,280	28.6	87	3.9	556	8.3	528	11.8	28	1.3
CVD	24,735	369.6	24,633	549.5	102	4.6	5,883	87.9	5,837	130.2	46	2.1
including hemorrhagic stroke	835	12.5	830	18.5	5	0.2	425	6.4	420	9.4	5	0.2
ischemic stroke	2,312	34.5	2307	51.5	5	0.2	1,000	14.9	997	22.2	3	0.1
unspecified stroke	1,713	25.6	1,710	38.1	3	0.1	521	7.8	521	11.6	0	0.0

obliterating endarteritis and thrombangiitis	267	4.0	267	6.0	0	0.0	102	1.5	102	2.3	0	0.0
phlebitis and thrombophlebitis of the superficial vessels of the lower extremities	111	1.7	111	2.5	0	0.0	41	0.6	41	0.9	0	0.0
phlebitis and thrombophlebitis of other deep vessels of the lower extremities	121	1.8	121	2.7	0	0.0	61	0.9	61	1.4	0	0.0
varicose veins of the lower extremities	3,659	54.7	3,632	81.0	27	1.2	2,194	32.8	2,177	48.6	17	0.8
other circulatory diseases	15,864	237.1	15,472	345.2	392	17.7	4,679	69.9	4,450	99.3	229	10.4

Source: own elaboration.

In the structure of CVD in the KR, the first place is occupied by HT: in 2021, its prevalence was 133,864 cases (2,000.3 cases per 100 thousand people), and the second place belongs to CHD (69,699 cases or 1,041.5 per 100 thousand), the leading share of which is angina pectoris. The prevalence of cerebrovascular diseases (CeVD) is relatively high, with 24,735 cases (369.6 cases per 100 thousand people).

Comparative analysis has shown that the prevalence of cardiovascular pathology among the urban population is higher than in rural residents. In 2021, the prevalence of CVD in the Osh region was 2,391.5 cases, and in the city of Osh, 3,410.5 cases per 100 thousand people. The number of CVD cases in adults (3,664.0 cases) and children (20.0 cases) among rural residents was lower than in Osh (5,186.1 and 29.2 cases per 100 thousand people, respectively). The number of patients with CVD diagnosed for the first time in 2021 was also higher among residents of Osh. It amounted to 670.1 cases per 100 thousand of the adult population and adolescents and 11.5 cases per 100,000 among children under 14. Among the rural population of the Osh region, similar indicators amounted to 541.1 and 5.9 cases per 100 thousand people.

The structure of the CVD incidence in the adult population of the Osh region and the city of Osh corresponded to the data for the KR, and the indicators of the rural and urban populations were comparable. In first place in prevalence was HT, with 2,229.3 cases in Osh region and 2,115.9 cases in Osh; the incidence of CHD was 862.2 and 853.6 cases per 100 thousand people, respectively; and CeVD amounted to 295.5 and 282.1 cases, respectively.

Attention can be drawn to the different structures of the incidence of cardiovascular pathology among children and adults. In 2021, in the Osh region, rheumatic fever in the acute phase (3.7 cases per 100 thousand people) and chronic rheumatic heart disease with the formation of structural heart defects (2.7 cases per 100 thousand people), as well as CeVD (3.1 cases per 100 thousand people) prevailed among children under 14. In Osh, CeVD was most common among children (8.9 cases per 100 thousand people), and the prevalence of HT was higher than among the rural population (3.5 cases and 0.2 cases per 100 thousand people, respectively). There were no cases of rheumatic fever among urban children, although the frequency of chronic rheumatic heart disease with structural heart defects was similar, with 2.7 cases per 100 thousand people.

Mortality from CVD in the KR increased from 279.7 in 2016 to 317.8 in 2020, while in 2021, there was a slight decrease in this indicator, with 297.0 per 100 thousand people (Table 4).

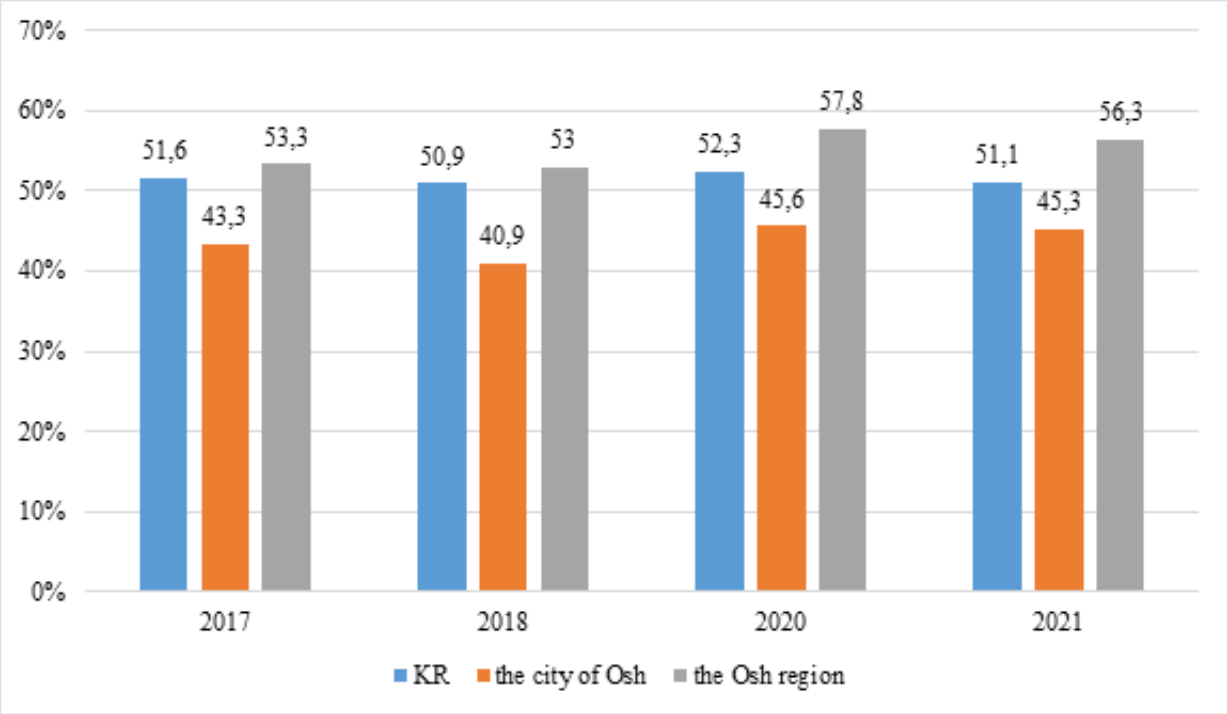
Table 4: Mortality from CVD in the KR in 2016-2021.

Class of diseases	absolute number						per 100 thousand people					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
Diseases of the circulatory system	17,006	17,105	16,803	17,188	20,909	19,879	279.7	275.9	265.7	266.2	317.8	297.0

Source: own elaboration.

In the structure of the mortality causes in the population of the KR, the share of diseases of the circulatory system was 51.1%. It did not tend to decrease over the 5-year follow-up period (Figure 1).

Fig 1: The share of diseases of the circulatory system in the structure of mortality causes in the population of the KR, the city of Osh, and the Osh region in 2017-2021 (%).



Source: own elaboration.

As shown in Figure 1, over the entire analyzed period, population mortality from circulatory system diseases in the Osh region was higher than in Osh and the KR. In 2013-2021, mortality from circulatory system diseases in Osh and the Osh region was lower than in the whole of the KR (Table 5).

Table 5: Mortality from CVD in the KR, the city of Osh, and Osh region in 2013-2021.

Territory	Number of cases per 100 thousand people								
	2013	2014	2015	2016	2017	2018	2019	2020	2021
KR	308.2	307.0	297.0	279.7	275.9	265.7	266.2	317.8	297.0
Osh region	264.4	273.0	265.7	239.0	240.8	229.3	230.9	304.8	248.1
Osh	266.8	270.1	253.5	248.9	240.3	223.4	208.8	287.4	258.9

Source: own elaboration.

In the dynamics of the Osh region, compared with the city of Osh, mortality from cardiovascular pathology was unstable. Thus, in 2013-2014, this indicator in the Osh region was generally comparable with the indicators of the urban population; in 2015, it was higher; in 2016, it was lower; in 2017-2018, it was almost the same; in 2019-2020 it was lower, and in 2021 it was again higher than in the city of Osh.

The conducted study has shown that the morbidity and mortality from CVD among the rural population of the Osh region is higher than in the city of Osh and the KR as a whole. At the same time, the prevalence of CVD was higher in urban residents, which may indicate a good level of diagnosis and timely detection of cardiological patients in urban areas.

Among the positive effects of living in highly urbanized territories, one should note the rapid and high-quality provision of medical care and the availability of education at its various levels (Tabakaev & Artamonova, 2015). In rural areas, there are often difficulties in organizing medical care for the population. While primary medical care is usually provided in total, specialized and high-tech care is often inaccessible (Samorodskaia et al., 2016). Besides, residents of rural areas have a lower level of awareness of CVD risk factors (Abshire et al., 2020), which leads to lower access of residents to medical care and detection of diseases at late stages. According to a multinational prospective cohort study involving more than 155 thousand participants without a history of CVD from 21 countries conducted by Yusuf et al. (2020), approximately 70% of cases of cardiovascular pathology and deaths from it among the studied contingent were associated with modifiable risk factors, among which metabolic factors prevailed (41.2%). At the same time, arterial HT made the most significant contribution (22.3%). In our study, the structure of the CVD of rural and urban populations of Osh and Osh region was dominated by HT and CHD.

According to Fahs et al. (2017), among the rural population, compared with urban residents, there was a higher incidence of late-diagnosed arterial HT (22.4 vs. 12.4%, p=0.001) and diabetes mellitus (8.6 vs. 6.6%, p=0.323), and awareness of CVD risk factors was the highest for smoking (89.7 and 91.5%, p=0.339) and the lowest for diabetes mellitus (55.7 and 54.4%, p=0.692).

One should note the decrease in the incidence of CVD in the KR in 2020-2021, most likely due to the spread of the new coronavirus infection and the need for medical organizations to provide medical care to this category of patients (Sabatello et al., 2020). In the dynamics from 2013 to 2021, one can note a decrease in morbidity and mortality in the Osh region, in Osh, and in the KR, which indicates the effectiveness of the ongoing therapeutic measures.

CONCLUSIONS

This study provides a comprehensive analysis of the morbidity and mortality rates from cardiovascular diseases (CVD) among the rural population in the Osh region of the Kyrgyz Republic from 2014 to 2021. The findings highlight a significant public health concern, revealing higher rates of CVD morbidity and mortality in rural areas compared to urban counterparts and the national average. Notably, hypertension and coronary heart disease emerged as predominant factors contributing to cardiovascular morbidity in both adults and adolescents, underlining the urgent need for targeted health interventions. This study underscores the critical need for targeted interventions to address the high prevalence of cardiovascular diseases in rural areas of the Kyrgyz Republic.

The study of medical and statistical data of patients with CVD can be used to optimize prevention programs for this population category and improve cardiological care. When developing a CVD prevention program for the rural population, it is necessary to consider the features of the regional prevalence of cardiovascular risk factors and the need to implement a strategy to overcome barriers to receiving medical care.

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