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TRENDS IN DISEASE PREVALENCE AND INCIDENCE AMONG THE POPULATION OF THE CITY BISHKEK AND THE KYRGYZ REPUBLIC

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Abstract. Trends in the disease prevalence and incidence in the population of the city Bishkek and the Kyrgyz Republic. Naizabekova S.D., Kurmanova A.R., Baitova G.M. *Changes in the political and economic situation in the Kyrgyz Republic in the 90s of the XX century, to a certain degree, had an impact on the health of the population as related to the availability and quality of medical care, especially at the primary level. Naturally, the indicator of the disease prevalence and incidence of the population is one of the most important parameters of the effectiveness of health resource provision, planning of medical care and preventive measures for specific age and social groups. The purpose of the study was to assess the level of the disease prevalence and incidence of the urban population of the Bishkek megacity in comparison with the national level. Data on the disease prevalence and incidence of the population of the Bishkek city population were from the Electronic Health Center of the Ministry of Health of the Kyrgyz Republic for the period 1989-2019 and were compared with the national level. Analytical, statistical and comparative analysis methods were used and data processed with the MS Excel 2021 and SPSS-16 software packages. There is definitely a multidirectional dynamics of the disease prevalence and incidence of the population of the entire country and the city Bishkek during the observation period 1989-2019. However, the disease prevalence in absolute figures shows an increasing growth rate tendency 6.2% (1999) to 5.7% (2009) and 7.0% (2019) and a decline in the relative indicator -5,4%, -5,0% and -10.8% respectively. Bishkek's absolute numbers fell sharply in 1999 (-30,6%), and 2009 saw an increase of up to 637 252 cases (+56%) and 2019 (926845 or +45,4%) and was similar by the relative number per 100,000 population: +42,5%,+41,8%, +17,3% respectively, which indicates the general increased load on the urban health care system. The disease incidence revealed fluctuations in absolute values and per 100,000 population both in the entire country and Bishkek, with decreasing tendencies by 1999 and an increase in subsequent decades, especially in the group of children and adolescents. In the gender aspect, there is a decrease in the disease morbidity in men and growth in women against the background of variations observed in disease incidence indicators by age groups. The results obtained indicate the uneven dynamics of morbidity in different age and social groups of the urban population compared with the national values. The observed increase in population morbidity in the Bishkek megacity largely correlates with the increasing population size and the state of the city's primary health care network, as well as staffing. At the same time, differences are seen in the gender aspect for the entire country: among men, the incidence was decreasing, while among women there were growing tendencies, and on the contrary, in Bishkek there was a general trend of increasing morbidity among all categories of the population. The presented results indicate the problems of organizing primary health care in the whole country and in Bishkek, especially for the male population, related to healthcare access and shortcomings in the organization of preventive work. Thus, the dynamics of the disease prevalence and incidence in the population of the entire country and the metropolitan area demonstrates multidirectional tendencies, showing shortcomings in the planning and implementation of national programs aimed at strengthening and improving the primary health care system. Overall, this indicates the need to review strategies and approaches to ensure more effective healthcare management.*

Реферат. Динаміка загальної та первинної захворюваності населення м. Бішкек і Киргизької Республіки. Найзабекова С.Д., Курманова А.Р., Баїтова Г.М. *Зміни політичної та економічної ситуації в Киргизькій Республіці в 90-х роках XX століття певною мірою вплинули на стан здоров'я населення, що пов'язано з доступністю та якістю медичної допомоги, особливо на первинному рівні. Відповідно, показники первинної та загальної захворюваності населення розглядаються як одні з найважливіших індикаторів ефективності ресурсного забезпечення системи охорони здоров'я, планування медичної допомоги та профілактичних заходів для конкретних вікових і соціальних груп. Мета дослідження – оцінити рівень загальної та первинної захворюваності міського населення м. Бішкек порівняно з національними показниками країни. Використано дані Центру електронної охорони здоров'я Міністерства охорони здоров'я Киргизької Республіки за період 1989-2019 рр. щодо загальної та первинної захворюваності населення м. Бішкек порівняно з національними показниками. Застосовано аналітичний, статистичний та порівняльний методи аналізу з використанням пакету програм MS Excel 2021. За період спостереження 1989-2019 рр. простежується різноспрямована динаміка показників загальної та первинної захворюваності населення країни та м. Бішкек. При цьому в абсолютних значеннях спостерігається тенденція до зростання поширеності: на 6,2% (1999 р.), 5,7% (2009 р.) і 7,0% (2019 р.), тоді як у відносних величинах – навпаки, зниження: -5,4%, -5,0% та -10,8% відповідно. У м. Бішкек показники різко знизилися до 1999 року (-30,6%), а далі зросли до 637 252 випадків у 2009 році (+56%) та 926 845 у 2019 році (+45,4%). Інтенсивні показники відповідно становили: +42,5%, +41,8%, +17,3%, що свідчить про зростання навантаження на міську систему охорони здоров'я. Первинна захворюваність демонструє коливання в абсолютних значеннях і на 100 тис. населення як по країні, так і по м. Бішкек, із тенденцією до зниження до 1999 року та подальшим зростанням у наступні десятиліття, особливо в групах дітей і підлітків. У гендерному аспекті спостерігається зниження захворюваності серед чоловіків і зростання серед жінок на тлі виявлення вікових особливостей динаміки первинної захворюваності. Отримані результати свідчать про нерівномірність динаміки захворюваності серед різних вікових і соціальних груп міського населення порівняно з національними показниками. Зростання захворюваності в м. Бішкек значною мірою корелює зі збільшенням чисельності населення та станом міської мережі первинної медико-санітарної допомоги, а також кадрового забезпечення. Водночас у гендерному аспекті по країні виявлено зниження захворюваності серед чоловіків і тенденції до зростання серед жінок, тоді як у м. Бішкек загальна захворюваність зростає серед усіх категорій населення. Наведені результати вказують на наявні проблеми в організації первинної медико-санітарної допомоги як у країні загалом, так і в м. Бішкек зокрема, особливо щодо чоловічого населення, що пов'язано з недостатнім урахуванням звернень та недоліками в організації профілактичної роботи. Динаміка загальної та первинної захворюваності населення країни та столичного мегаполіса демонструє різноспрямовані тенденції, що вказує на недоліки в плануванні та реалізації національних програм, спрямованих на посилення та вдосконалення системи первинної медико-санітарної допомоги. Загалом це свідчить про необхідність перегляду стратегій і підходів до забезпечення більш ефективного управління системою охорони здоров'я.*

Changes in the political system of the Kyrgyz state in the 90s of the 20th century and the living conditions of citizens led to negative trends in the health of the population. Today, despite a number of measures taken, the implementation of the national projects Manas (1996-2006), Manas-Taalimi (2006-2011), Den Sooluk (2012-2018) and many other programs have not led to a noticeable improvement in public health indicators [1, 2]. Morbidity rates of the entire population of the country and residents of Bishkek including by individual age groups, demonstrate instability with trends of growth or stagnation, which indicates the lack of effective preventive work at the level of primary health care (PHC) provision to the population [3, 4].

It is known that the level and quality of life of the population is judged by a variety of indicators, because it is clearly reflected by a number of medico-demographic indicators, including one of the most important parameters characterizing the health status of the population – the level of disease prevalence [5, 6]. Therefore, a retrospective analysis of the dynamics of disease prevalence reflects the state of medical care in the entire country or its regions. As a result, it allows us to identify the main trends and plan a set of necessary measures to eliminate risk factors affecting human health and reducing the availability of medical services. It is clear that in the long term, the dynamics of overall morbidity is a criterion for the effectiveness of the ongoing national healthcare reforms in the country for the last three decades [7, 8, 9,]. At the same time, the determination of differences in the indicators of disease prevalence and disease incidence in the population of the Kyrgyz Republic and the urban metropolis of Bishkek makes it possible to reasonably plan therapeutic, preventive and health-improving measures, first of all, at the level of primary health care, taking into account the existing network of outpatient medical organizations. [10, 11, 12, 13, 14, 15].

The purpose of the study was to assess the level of disease prevalence and disease incidence in the urban population of the Bishkek megacity in a comparative aspect with the country's national levels.

MATERIALS AND METHODS OF RESEARCH

The study uses the following methods: analytical, statistical, and comparative analysis of the disease

prevalence and disease incidence in the population of the Bishkek city, in comparative terms with respective national indicators, for the Soviet (1989) and sovereign (1999-2019) periods. Official statistical data from the Electronic Health Center of the Ministry of Health of the Kyrgyz Republic were used. The obtained official statistical data were processed on their software tools – MS Excel 2021 (version 2108), an online statistical program VassarStats and SPSS-16. We processed all data by programs used at the Centre of Electronic Health under the Ministry of Health of the Kyrgyz Republic.

Morbidity data and the results of their processing by medical statistical methods are presented in numerical format of the censuses: 1989, 1999, 2009, and 2019 [16]. The rates of growth of disease prevalence and incidence were calculated both in absolute values and per 100,000 population within age groups, relative to the previous year. To determine whether the differences in morbidity rates between trend years were statistically significant, a z-test for two independent proportions was conducted using the online platform VassarStats: Website for Statistical Computation (https://vassarstats.net/). Differences were considered statistically significant at $p<0.05$ (two-tailed test) [17].

Besides, the direction and statistical significance of changes in morbidity over time were identified using a linear regression model by applying IBM SPSS Statistics (version 16). Annual morbidity rates were entered as the dependent variable (Y), and the calendar year served as the independent variable (X). The slope coefficient (b) indicated the average annual rate of change, while the coefficient of determination (R^2) reflected the proportion of variation explained by time. The p-value (<0.05) for the regression coefficient was used to determine the statistical significance of the trend in the population morbidity over the observation period [18, 19].

The conducted research complies with the bioethical and moral-legal requirements of the Declaration of Helsinki and the Convention on Human Rights and Biomedicine, as confirmed by the decision of the Ethics Committee of the National Institute of Public Health of the Ministry of Health of the Kyrgyz Republic (Protocol No. 6, November 2, 2023).

RESULTS AND DISCUSSION

The indicator of the level of the disease prevalence in the entire population of the country during the analyzed follow-up period tended to increase in absolute terms with the growth rate (GR) relative to the previous period being: 6.2% (1999), 5.7% (2009), 7.0% (2019). A similar pattern was noted for the categories of the working-age population: 11.4%, 3.5%, 9.3%, respectively. In the group of children and adolescents there is a decline in the growth rate (-2.2%) for 1999, followed by a rise +9.8% in 2009 and +2.9% in 2019 (Table 1).

The rates of the disease prevalence per 100,000 population during these trend periods showed a significant tendency to decrease ($p<0.001$) for the entire population compared to the Soviet levels: 51683.3 (1989) – 48891.8 (1999) with a negative growth rate (-5.4%), maintaining this pattern during the period of sovereignization by 2009 – 46443.7 with the GR (-5.0%) and by 2019 – 41426.9 with the GR (-10.8). As can be seen from Table 1, a similar pattern is observed among the working-age population of 18 years and older ($p<0.001$): 49811.9 with GR (-12.3%), 46863.2 with GR (-5.9%), 43149.6 (GR -8.0%). In children and adolescents initially increasing levels were recorded for 1999 – 47640 (+5.8%), with subsequent decline ($p<0.001$): in 2009 to 45722.9 (GR -4.0%), in 2019 – 38356.1 (GR -15.7%).

In turn, the indicators of the disease prevalence in the entire urban population of Bishkek city (table 1) showed a significant decline in 1999 (408465) with the growth rate of -30.6%, an increase to 637252 with the growth rate of +56.0% (2009) to 926800 with the growth rate of +45.4% (2019). Identical algorithm is observed for able-bodied persons 18 years of age and older: 282423 (-28.2%); 441989 (+56.5%) and 623127 (+41.0%), and the population of children and adolescents: 126042 (-35.4%); 195263 (+54.9%); 303673 (+55.6%), respectively.

At the same time the data under discussion among urban dwellers per 100,000 population had a pronounced pattern of decline by 1999 ($p<0.001$) – more than 1.7 times (53520.0) with the growth rate of (-42.5%) compared to the Soviet period in 1989 (93079.9). Further, the prevalence of the disease increased 1.4 times (75908.6) with a growth rate of +41.8%, and by 2019 1.2 times (89070.0) with the rate of increase of 17.3% ($p<0.001$). A similar pattern was observed in the working age group of 18 years and older: 47875.2 (-45.7%); 73257.0 (+53%) and 88497.4 (+20.8%), as well as in children and adolescents: 73112.2 (-30.4%; p NAN); 75908.5 (+3.8%; $p<0.001$) and 90255.0 (+18.9%; $p<0.001$) respectively (Table 1).

The last decade (2009-2019) has shown some interest in the disease prevalence rates among the female and male populations of the country and of the city of Bishkek (Table 2). The prevalence rates in the time periods under review in the republic as a whole, by absolute values, among men decreased from 1077906 to 1007669, with the growth rate of (-6.5%) and vice versa among women increased from 1422287 to 1666694 (+17.2%). The same trend is typical for the age group of 18 years and older: 640367 to 535,501 (-16.4%) and 954311 to 1206700 (+26.4%), respectively (Table 2). On the contrary, the

opposite processes are observed in children and adolescents, with increasing values for boys from 437539 to 472168 (GR +7.9%), and decreasing values for girls from 467976 to 459994 (GR -1.7%).

In turn, there is a significant decrease ($p<0.001$) in the disease prevalence per 100,000 population for both men from 40573.7 to 31454.1, GR (-22.5%), and for women from 52163.1 to 51237.3, GR (-1.8%). However, the working age group of 18 years and older is characterized by multidirectional processes: men show a significant decrease from 38842.3 to 27243.3 with a negative growth rate (-29.9%), while women, on the contrary, show an increase from 54401.5 to 55558.1 with GR +2.1% ($p<0.001$). In the children and adolescents' group, there is a unidirectional decrease ($p<0.001$) in boys from 43405.6 to 38139.6 with GR (-12.1%) and girls from 48125.1 to 38951.6 with GR (-19.1%).

Table 1

Disease prevalence in the Kyrgyz Republic and the city Bishkek – absolute numbers (1), per 100 000 population (2)

Parameters				Kyrgyz Republic				city Bishkek			
				1989	1999	2009	2019	1989	1999	2009	2019
Age	0-17 years	total	1	843240	824695	905515	932162	195205	126042	195263	303673
			GR		-2.2	9.8	2.9		-35.4	54.9	55.6
			2	45040.8	47640	45722.9	38536.1	105009.3	73113.2	75908.5	90255.0
			GR		5.8*	-4.0*	-15.7*		-30.4[N/A]	+3.8*	+18.9*
	≥18 years	total	1	1382995	1540105	1594678	1742201	393220	282423	441989	623127
			GR		11.4	3.5	9.3		-28.2	56.5	41.0
			2	56789.8	49811.9	46863.2	43149.6	88110.8	47875.2	73257.0	88497.4
			GR		-12.3*	-5.9*	-7.9*		-45.7*	53*	20.8*
	All ages	total	1	2226235	2364800	2500193	2674363	588425	408465	637252	926800
			GR		6.2	5.7	7.0		-30.6	56.0	45.4
			2	51683.3	48891.8	46443.7	41426.9	93079.9	53520.0	75908.6	89070.0
			GR		-5.4*	-5.0*	-10.8*		-42.5*	41.8*	17.3*

Notes: GR – growth rate; % relative to the previous year for per 100,0000 population data (2) $p<0.001$*; N/A – not applicable.

In Bishkek, for the general group of citizens, regardless of gender, there is a tendency for absolute indicators to increase: for men from 240952 to 321351 with GR +33.4%, for women from 396300 to 605494 with GR +52.8%. The same unidirectional increase was noted in the age group of 18 years and older (men – from 147750 to 172613 with GR +16.8%, women – from 294239 to 450514 with GR +53.1%), as well as children and adolescents (boys from 93202 to 131893 with GR +41.5%, girls from 102061 to 154980 with GR +51.9%), respectively (Table 2).

At the same time, considering per 100,000 population rates for the entire city's population (Table 2), there is an increase in men from 61902.9 to 65865.1 with GR +6.4% ($p<0.001$) and women from 88016.4 to 109554.6 with GR +24.5% (p=NAN). For

able-bodied age groups of 18 years and older as well as children and adolescents, the indicators among the male population are slightly decreasing: from 54711.5 to 54649.1 with GR (-0.1%, p=0.38) and from 78196.8 to 7665.9 with GR (-2.0%, p<0.001) and a high growth in the female population: from 88284.0 to 116033.5 with GR +31.4% (p=NAN) and from 87254.0 to 94255.7 with GR +8.0%, respectively (p<0.001).

Table 2

Disease prevalence in the Kyrgyz Republic and the city Bishkek, including male and female population – absolute numbers (1), per 100 000 population (2)

Parameters			Kyrgyz Republic				city Bishkek			
			2009		2019		2009		2019	
			1	2	1	2	1	2	1	2
Age	0-17 years	total	905515	45722.9	932162	38536.1	195263	75908.5	303673	90255.0
		GR	9.8	-4.0*	2.9	-15.7*	54.9	3.8*	55.5	18.9*
		males	437539	43405.6	472168	38139.6	93202	78196.8	131893	76665.9
		total			7.9	-12.1*			41.5	-2.0*
		GR	467976	48125.1	459994	38951.6	102061	87254	154980	94256
		females			-1.7	-19.1*			51.9	8.0*
	≥18 years	total	1594678	46863.2	1742201	43149.6	441989	73257	623127	88497
		GR	3.5	-5.9*	9.3	-7.9*	56.5	53.0*	41.0	20.8*
		males	640367	38842.3	535501	27243.3	147750	54711.5	172613	54649
		total			-16.4	-29.9*			16.8	-0.1 p=.38
		GR	954311	54401.5	1206700	55558.1	294239	88284	450514	116034 N/A
		females			26.4	2.1*			53.1	31.4
	All ages	total	2500193	46443.7	2674363	41426.9	637252	75908.6	926800	89070.0
		GR	5.7	-5.0*	7.0	-10.8*	56.0	41.8*	45.4	17.3*
		males	1077906	40573.7	1007669	31454.1	240952	61902.9	321351	65865.1
		total			-6.5	-22.5*			33.4	6.4*
		GR	1422287	52163.1	1666694	51237.3	396300	88016.4	605494	109554.6
		females			17.2	-1.8*			52.8	24.5 N/A

Notes: GR – growth rate, % relative to the previous year for per 1000000 population data (2) p<0.001*; N/A – not applicable.

The indicator of the disease incidence to a certain extent reflects the health status of the population and the possible level of primary health care (PHC) availability, as well as the sufficiency of the network of medical organizations providing such care in outpatient settings. It should be noted that the high level of the disease incidence and the tendency towards its growth may indicate the effectiveness of preventive work at the level of primary care to the population. In this regard, it is important to analyze

the dynamics of the disease incidence of the population in a comparative aspect both in the entire country and in Bishkek (Table 3).

The entire country's disease incidence over the period under review varied slightly in absolute numbers decreasing in 1999 (1314503) with GR (-0.2%) compared with 1989 (1316950) and increasing in 2009 (1425568), GR +8.4% and in 2019 (1499938), GR +5.2%. A similar scenario is observed in the population group of children and adolescents: an initial decrease to 551402 with GR (-10.5%) and then an increase to 680834 with GR +23.5% and 741688 with GR +8.9%, respectively. At the same time, undulating changes were noted among people of working age 18 years and older: an increase by 1999 (763101) with GR +8.9%, a decrease for 2009 to 744734 with GR (-2.4%) and re-increase in 2019 to 758250 with GR +1.8% (Table 3).

At the same time, regarding the disease incidence rates per 100,000 population (Table 3), changes for the entire population revealed a dynamic decrease ($p<0.001$) compared to the previous years: 27177.1 (1999) with GR (-11.1%), 26481.4 (2009) with GR (-2.6%) and 23231.4 (2019) with GR (-12.3%). Similar changes are typical for the working age of 18 years and older: 26481.1, GR (-8.0%); 21885.7, GR (-17.4%); 18779.8, GR (-14.2%), respectively ($p<0.001$). However, for the group of children and adolescents this indicator is wave-like falling to 31852.8 (1999) with GR (-3,2%), rising to 34377.9 (2009) GR +7,9% and then falling again to 30661.8 (2019) with GR (-10.8%) – $p<0.001$ (Table 3).

Table 3

Disease incidence in the Kyrgyz Republic and the city Bishkek – absolute numbers (1), per 100 000 population (2)

Parameters			Kyrgyz Republic				city Bishkek			
			1989	1999	2009	2019	1989	1999	2009	2019
Age	0-17 years total	1	616217	551402	680834	741688	149833	99153	154145	259778
		GR		-10.5	+23.5	+8.9		-33.8	+55.5	+68.5
		2	32914.6	31852.8	34377.9	30661.8	80601.7	57515.7	65271.7	77208.95
		GR		-3.2*	+7.9*	-10.8*		-28.6*	+13.5*	+18.3*
	≥18 years total	1	700733	763101	744734	758250	183477	132382	211482	298281
		GR		+8.9	-2.4	+1.8		-27.8	+59.8	+41.0
		2	28774.1	26481.1	21885.7	18779.8	41113	22440.9	35051.9	42723
		GR		-8.0*	-17.4*	-14.2*		-45.4*	+56.2*	+21.9*
	All ages total	1	1316950	1314503	1425568	1499938	333310	231535	365627	558059
		GR		-0.2	+8.4	+5.2		-30.5	+57.9	+52.6
		2	30573.7	27177.1	26481.4	23231.4	52724.6	30337.4	43553	52596
		GR		-11.1*	-2.6$^{p<.0002}$	-12.3*		-42.5*	+43.6*	+20.8*

Notes: GR – growth rate, % relative to the previous year for per 1000000 population data (2) $p<0.001$*; N/A – not applicable.

Unidirectional changes are observed in the dynamics of the disease incidence in the urban population of Bishkek over the trend periods (1989-2019) (Table 3). Overall, in absolute terms, there is a decrease in the first decade with a rise in the second and third decades in the entire Bishkek's population: 231535 (1999) with GR (-30.5%), 365627 (2009) with GR +57.9%, 558059 (2019) with GR +52.6%, and for the age groups:

18 years and older (132382, GR (-27.8%), 211482, GR +59.7%, 298281, GR +41.0%, respectively; children and adolescents (99153, GR (-33.8%), 154145, GR +55.5%, 259778, GR +68.5%, respectively.

It should be noted that the disease incidence rate per 100,000 population mirrors the pattern of absolute values (Table 3). Thus, the disease incidence of all city's urban residents in 1999 (30337.4) decreased by 42.5% as compared with 1989 (52724.6), and further, there was an increase in 2009 (43553.0) with GR+43.6% and in 2019 (52596.1) with GR +20.8% ($p<0.001$). Definitely similar processes are observed for those of working age 18 years and older: 22440.9 with GR (-45.4%), 35051.9 with GR +56.2%, 42723 with GR +21.9%, respectively, as well as children and adolescents: 57515.7 with GR (-28.6%), 65271.7 with GR +13.5%, 77208.9 with GR +18.3, respectively ($p<0.001$).

In gender aspect, the disease incidence in the entire country's population in absolute terms as compared to 2009 decreased among men with GR (-2.3%) in 2019, and increased among women with GR +11.3%, respectively (Table 4). The same changes are typical for the age group of 18 years and older: men with GR (-19.3%) and women with GR (+16%). However, in children and adolescents, on the contrary, there is an increase for both sexes GR (+12.8%) and GR (+5.1%), respectively.

Table 4

Disease incidence in the Kyrgyz Republic and the city Bishkek, including male and female population – absolute numbers (1), per 100 000 population (2)

Parameters			Kyrgyz Republic				city Bishkek			
			2009		2019		2009		2019	
			1	2	1	2	1	2	1	2
Age	0-17 years	total	680834	34377.9	741688	30661.8	154145	65271.7	259778	77208.95
		GR	+23.5	+7.9*	+8.9	-10.8*	+55.5	+13.5*	+68.5	+18.3*
		males	337692	33500.4	380898	30767.3	75326	63198.8	131893	76256.8
		GR			+12.8	-8.2*			+75.1	+20.7*
		females	343142	35287.6	360790	30551.2	78819	67383.9	127885	77777.1
		GR			+5.1	-13.4*			+62.3	+15.4*
	≥18 years	total	744734	21885.7	758250	18779.8	211482	35051.9	298281	42723
		GR	-2.4	-17.4*	+1.8	-14.2*	+59.8	+56.2*	+41.0	+21.9*
		males	299021	18137.5	241213	12271.6	72679	26912.9	84907	26881.5
		GR			-19.3	-32.3*			+16.8	$-0.1^{p=0.4}$
		females	445713	25408.3	517037	24954.0	138803	41646.7	207374	52993.9
		GR			+16.0	$-1.8^{p=.001}$			+49.4	+27.2*
	All ages	total	1425568	26481.4	1499938	23231.4	365627	43553.0	558059	52596.1
		GR	+8.4	-2.6*	+5.2	-12.3*	+57.9	+43.6*	+52.6	+20.8*
		males	636713	23966.7	622111	19419.0	148005	38023.9	222840	45673.9
		GR			-2.3	-19.0*			+50.6	+20.1*
		females	788855	28931.6	877827	26986.0	217622	48332.8	335219	56386.0
		GR			+11.3	-6.7*			+54.0	+16.7*

Notes: GR – growth rate, % relative to the previous year for per 1000000 population data (2) $p<0.001$*; N/A – not applicable.

At the same time, per 100,000 population rates for the entire country's population, regardless of gender, are declining by 2019 in men with GR (-19.0%) and women with GR (-6.7%), as compared with 2009 ($p<0.001$). The same pattern is for the age groups of working age 18 years and older: men with GR (-32.3%, $p<0.001$) and women with GR (-1.8%, $p=0.001$), as well as children and adolescents: GR (-8.2%) and GR (-13.4%), respectively ($p<0.001$).

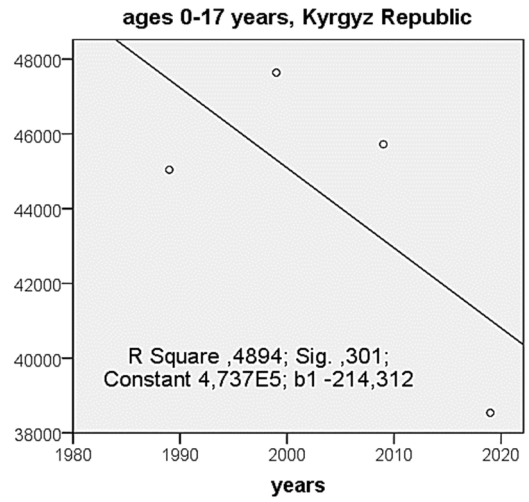
In Bishkek the number of incident cases in the city's total population showed growth, regardless of gender, with a significant increase in 2019: men with GR +50.6% and women with GR +54.0% as compared to 2009. The same pattern was observed in the age groups of citizens 18 years and older: men GR +16.8% and especially women GR +49.4%, as well as children and adolescents with a greater number in males GR +75.1% and less in females GR +20.7%.

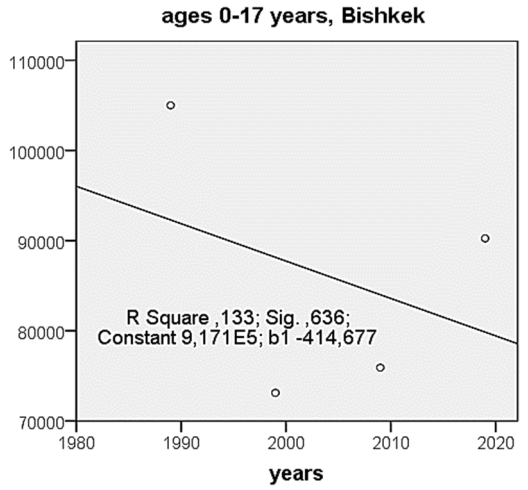
The disease incidence in Bishkek per 100,000 population during the specified observation period for the total city's population and that of children and adolescents increased in men and women: GR +20.1%, GR +16.7%; GR +20.7% and GR +15.4%, respectively ($p<0.001$). In the group of the working age population, there is a slight decrease in men GR (-0.1%, $p=0.4$) and an increase in women GR +27.2%, $p<0.001$ (Table 4).

The analysis of the dynamics of morbidity in the population of the Kyrgyz Republic and Bishkek over the past three decades revealed a number of significant trends that require planning in the implementation of the current national health strategy "Healthy Nation – Prosperous Country" (2019-2030). In the previous national programs, despite the organizational, financial and logistical support of the primary healthcare infrastructure, the levels of disease prevalence and incidence show instability and an increasing tendency. Possible causes include demographic changes, deterioration of the environmental situation, especially in an urban megalopolis environment, and an increase in the level of stress in society, which leads to an increase in the prevalence of chronic diseases [20, 21, 22, 23, 24].

In the conducted retrospective studies on disease prevalence per 100,000 population, statistically significant downward trends were observed at the national level. However, among the urban population of Bishkek, the presence of such trends was not statistically significant, indicating the need for further monitoring to obtain a greater number of data points (Fig. 1). A wave-like dynamics of morbidity is observed for children and adolescents, as well as among the working-age population. Moreover, the initial decline in 1999 among children and adolescents was followed by a significant increase in the following two decades. Naturally, all this indicates the need to strengthen preventive measures and improve access to primary health care, namely pediatric services.

To a certain extent, there are gender differences in morbidity rates between men and women. Thus, there is a downward trend in the disease prevalence among men, while there is steady growth among women. Especially noticeable differences were recorded in the age group of the working-age population of 18 years and older, which is associated with a higher rate of women seeking medical help and their greater responsibility caused by reproductive aspects of health, and possibly a greater response to social stresses [25, 26].





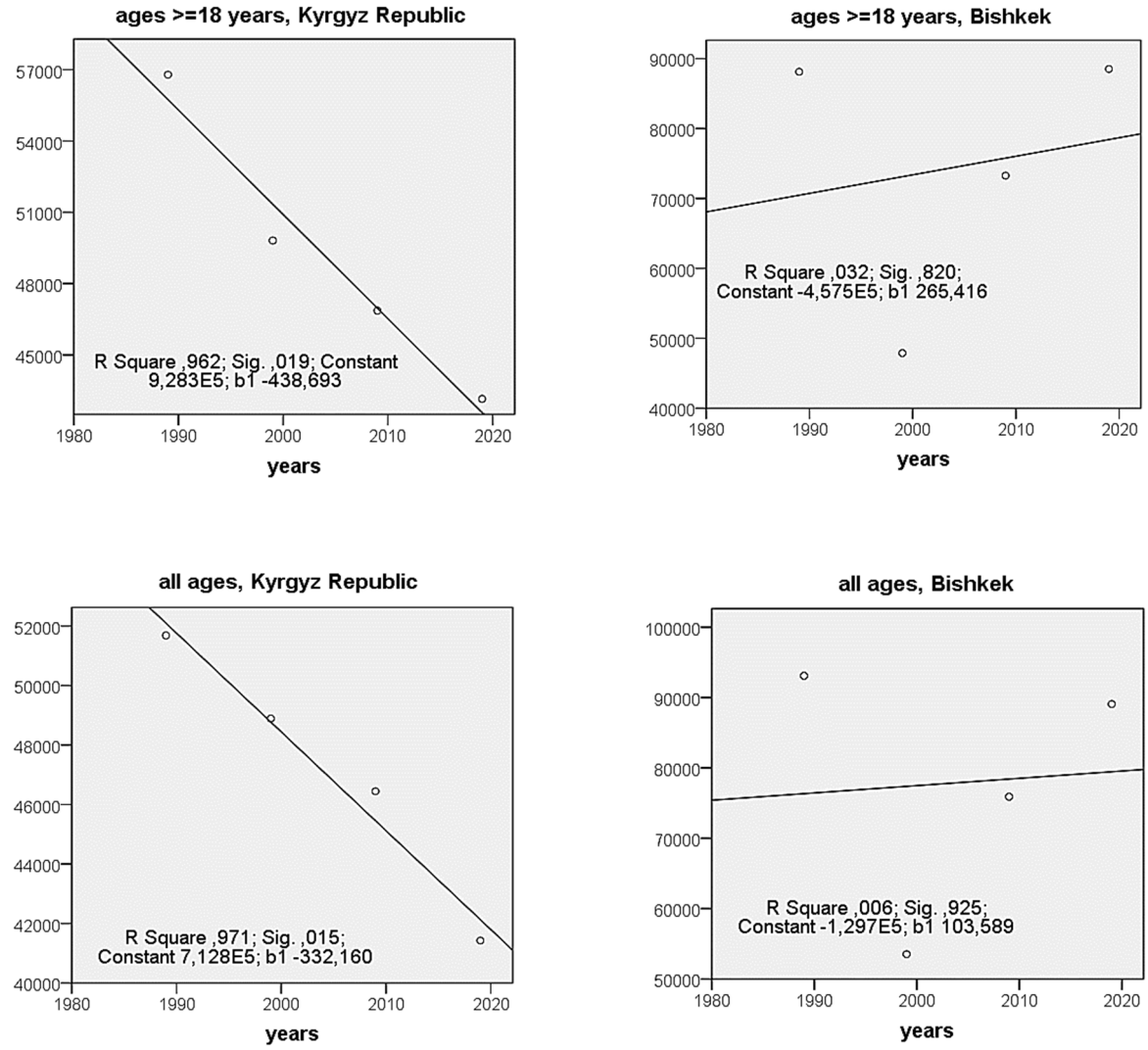


Fig. 1. Trends in the disease prevalence in the population of the Kyrgyz Republic and Bishkek, per 100 000, 1989-2019

The disease incidence in Bishkek is growing much faster than in the whole country. The upward trend dynamics in the capital are not statistically significant, whereas at the national level, a statistically significant decrease is observed, which warrants further monitoring (Fig. 2). First of all, this indicates the better diagnosis and access to primary medical care for the urban population and simultaneously insufficient implementation of preventive measures at the level of Family Physician Groups, contributing to an increase in the number of new cases of diseases. It should be noted that significant differences in the disease prevalence and incidence between Bishkek and the entire country may to some extent be related to the processes of urbanization of the city's environment. In recent decades, there has been an increase in the population of the metropolitan area due to internal migration, increasing adverse environmental factors together with an increasing access of the assigned population to the city's primary health care services, which leads to an increase in the detection of diseases [21, 27].

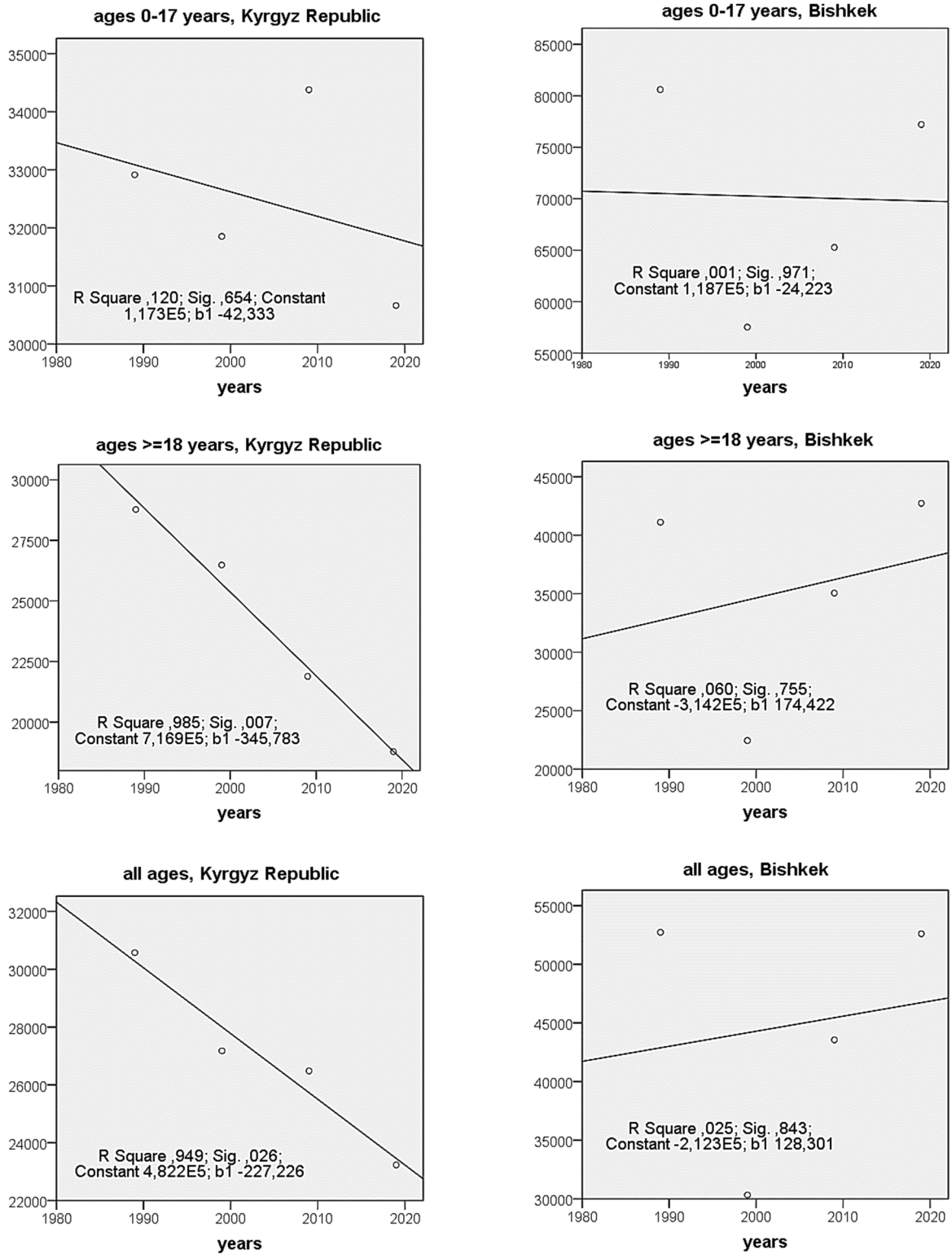


Fig. 2. Trends in the disease incidence in the population of the Kyrgyz Republic and Bishkek, per 100 000, 1989-2019

CONCLUSIONS

1. A retrospective analysis of the disease prevalence and incidence rates in the metropolitan population compared to the entire country revealed different levels of these indicators as well as their different trends and rates of change in population groups.

2. The multidirectional dynamics of the morbidity of both the city's and the entire country's population indicates shortcomings in the formation of the network of healthcare organizations and problems in primary health care access.

3. On the whole, the disease prevalence and incidence as well as their dynamics indicate the need to revise existing health strategies. Special attention needs to be paid to prevention, early diagnosis, improvement of access to medical care and provision of medicines for all age and social groups of the population by expanding the package of services under Program for State Medical Care Guarantees of the Kyrgyz Republic.

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Naizabekova S.D. – conceptualization, methodology, investigation, writing - original draft;

Kurmanova A.R. – gathering literature sources;

Baitova G.M. – consulting, final editing.

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