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**CORRELATION ANALYSIS OF EPIDEMIOLOGICAL DATA
TO ASSESS THE TB SITUATION AND THE EFFECTIVENESS
OF THE TB PROGRAMME UNDER MODERN CONDITIONS****Abstract.**

Background: Worldwide, TB is one of the top 10 causes of death and the leading cause from a single infectious agent. Millions of people continue to fall sick with TB each year. In 2017, TB caused an estimated 1.3 million deaths (range, 1.2–1.4 million) among HIV-negative people and there were an additional 300 000 deaths from TB (range, 266 000–335 000) among HIV-positive people. Thanks to the internationally recommended TB control program, including diagnostics, treatment and care patients, burden of TB is reduced in 30 countries of Asia, Africa and Europe with high incidence and mortality rate.

Methods: An estimation of burden of TB in Kazakhstan, Almaty region and Almaty city, three level of TB control program based on Incidence, Prevalence and Mortality rates. It carried out research of epidemiologic pattern analysis using Pearson correlation coefficient in regional and national level based on period of time, estimated by main determinants.

Results: The results showed relationship between determinants and dynamics of TB epidemiological rates as Mortality, Incidence and Prevalence in observational areas.

Conclusion: TB epidemiological pattern depends on impact of many factors of the bio-social environment, which have a negative or positive impact on epidemiology of TB. Determining the real situation is important for evaluating the effectiveness of the TB program, identifying priorities and planning for TB measures.

Key words: TB, Mortality rate, Incidence rate, Prevalence rate, Pearson coefficient, DOTS strategy, WHO.

TB is one of the most common and studied infectious diseases. It reached epidemic proportions in Europe and North America during the 18th and 19th centuries. Then it began to decline thanks to discovery of the *mycobacterium* TB, anti-TB drugs, BCG vaccine and treatment regimens that led to the perception of TB as an eliminated disease.

As a result of the growth of the number of patients and deaths from TB by the end of the 20th century WHO announced TB as a worldwide emergency and recommended the DOTS Strategy in 1993 as the most cost-effective way to stop the spread of TB in communities with a high incidence. DOTS aimed at the detection of a TB case by sputum smear microscopy, standardized treatment regimen and a standardized recording and reporting system. DOTS is expanded to “Stop TB” strategy and DOTS-Plus. These actions of WHO led to the reduction of TB cases and deaths. And also, disease burden caused by TB is falling globally. So in 2018 all member states of WHO and UN are committed to the endorsement of “End TB” strategy and adoption of the UN Sustainable Development Goals.

Specific targets are set until the end of 2030. “End TB” strategy aims at 90% reduction in the absolute number of TB deaths and an 80% reduction in TB incidence (compared with levels in 2015).

In Kazakhstan there were similar trends in the epidemiological situation of TB, accompanied by the introduction of TB programs, in accordance with the current concepts of the TB control system (7). The time period from 1998 to 2002 is characterized as the implementation of the DOTS strategy; since 2002 the program has been adapted to the conditions of the country, and since 2007 has been strengthened by

elements of the program “Stop TB”. As a response to DOTS, Stop TB and DOTS-Plus the incidence rate of TB decreased from 118 to 48.2 per 100 000 people, mortality rate from 37.8 to 4.2 per 100 000 people (1998-2017) The result shows success of TB control programs in Kazakhstan. The introduction and activity of TB service in conditions of new programs are today an important issue of discussion in the medical society and the media (10, 11). The epidemiological pattern of TB is characterized by intense morbidity, prevalence and mortality, their level and changes are determined by the epidemic process. At the same time, the information capacity of epidemiological indicators are influenced by many factors that are not always taken into account in the analyses of the epidemiological situation of TB.

The purpose of the study was to conduct a scientific analysis of the epidemiological situation of TB and the effectiveness of TB control program in Kazakhstan in terms of evidence-based medicine using modern statistical methods.

The objectives of the study are: an analysis of the epidemiological situation of TB by assessing the level of the main indicators: incidence rate, mortality rate, prevalence rate and correlation analysis of incidence and mortality rates from 1973 to 2008 in certain periods of observation, determined by the presence of risk factors of the bio-social environment in the country.

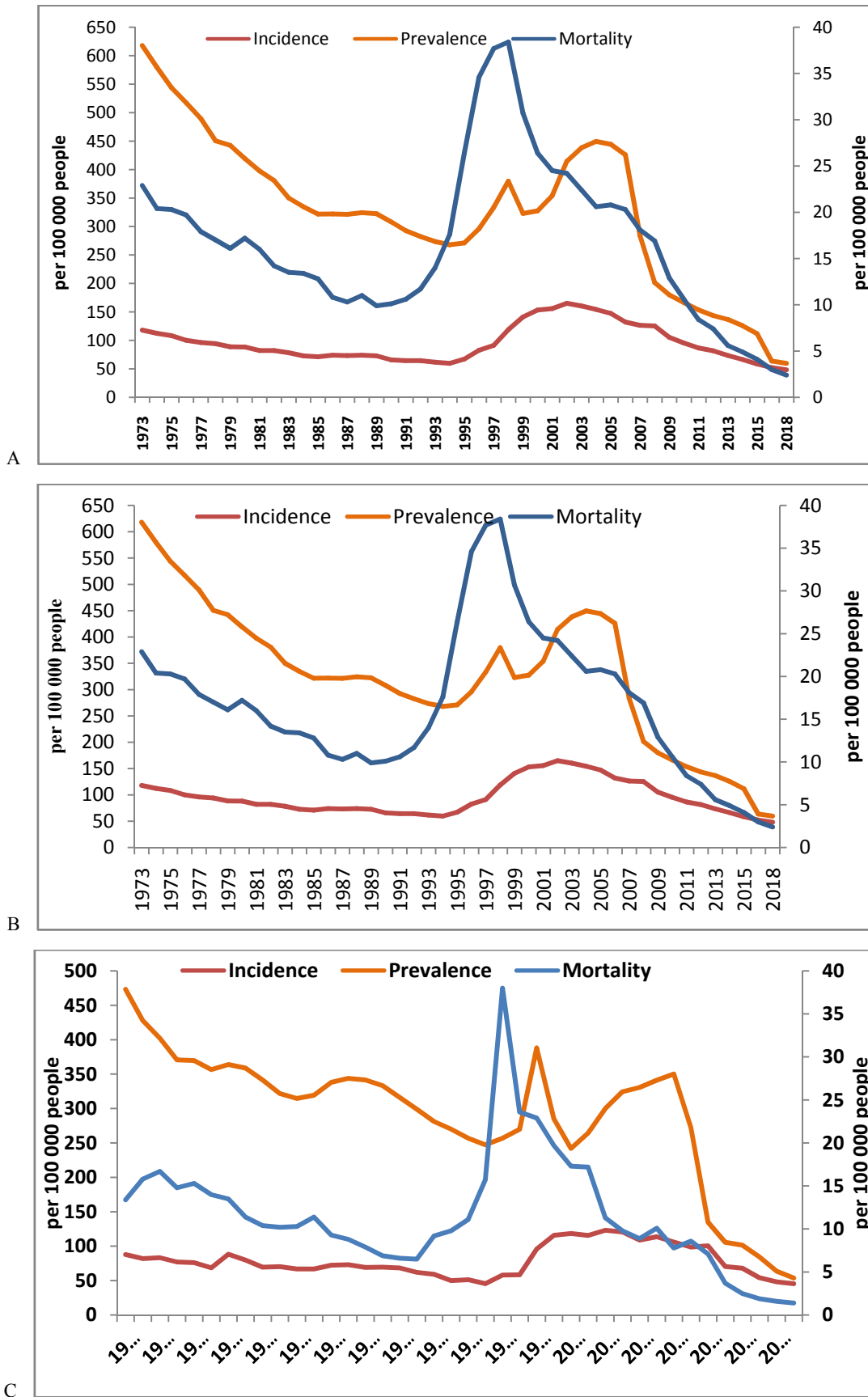
Incidence rate is one of the most important and reliable criteria for the intensity of the epidemic process. At the same time, the indicator is influenced by objective factors (preferential detection by the X-ray method, insufficient detection by the microscopy method, the absence of quick methods of evidence-based diagnosis of TB) and a subjective character (struggle to reduce an indicator. Today, the term “incidence index”, which reflects the program’s efforts to detect cases and the effectiveness of mainly microscopy and x-ray diagnostic methods. The ratio of patients with new cases of pulmonary TB to a positive smear for patients with a negative smear of sputum determines the success of the program as a whole in the task of identifying priority patients who influence to the epidemic process of TB.

TB mortality rate is a reliable criterion reflecting the effectiveness of TB patients’ treatment to a greater extent and the time of detection of disease cases. The indicator is the most informative in case of correct registration of death and determination of cause of death with postmortem confirmation. The prevalence rate reflects an effectiveness of TB patients’ treatment, duration of follow-up, and depends on approaches of TB care service to solving terms and conditions of follow-up observation of TB center contingents. We used the ratio of morbidity to of an epidemic process: a smaller ratio means the worse TB situation. The ratio of prevalence to morbidity, which reflects a length of observation time for patients with active TB forms and an effectiveness of treatment. The smaller range of the ratio means the more effectiveness the TB control program (figure).

To assess the level of the main epidemiological indicators, the observational time is divided into five periods, taking into account an influence of socio-economic factors, public health measures to improve the population’s health (anti-alcohol company), and TB control strategies.

The first observation period (1973–1985), tentatively called the “Soviet period,” is associated with the period of Kazakhstan’s presence in the USSR, and is characterized by a stable economic system, an effective Health Care System and a TB program. Activity is regulated by Order "On measures to strengthen the fight against TB of the USSR Ministry of Health" No. 747 of September 7, 1972 and Order "On approval of a new classification of TB" No. 361 of April 23, 1974. During this period, in Kazakhstan there was a steady decline in the incidence rate, by 39.8% in general (range 118-71.1 per 100 000 people). The average ratio of Incidence to Mortality rates was 5.4 (5.2 to 5.6). There was a decrease in mortality by 2 times (the scale of .9 - 12.8 per 100 000 people) and PR. 1.9 times, the average value of the indicator was 449.7 per 100 000 people (range 321.7 - 618). A strong positive correlation was determined between morbidity and mortality in Kazakhstan ($r = 0.98$) and between prevalence and morbidity ($r = 0.99$), which reflects the relationship between indicators; a decrease in incidence leads to a decrease in mortality, a decrease in prevalence leads to a decrease in incidence (tables 1, 2).

In the Almaty region, there was a moderate decrease in the incidence by 23.8%, a prevalence of 32.5% and mortality by 14.9%. The average incidence rate was 76.4 per 100 000 people (range 87.8 - 66.9 per 100 000 people). The indicator of the ratio of morbidity for mortality was 6.7 (6.6-5.9). The mortality rate was also decreasing from 13.4 to 11.4 per 100 000 people, the average value was 13.1 per 100 000 people.



Mortality, Incidence and Prevalence rates of TB in Kazakhstan (A), Almaty region (B) and Almaty city (C), 1973-2018

Table 1 – Correlation analysis of Incidence and Mortality rates of TB in Kazakhstan, Almaty region and Almaty city, 1973–2009

Period	Observation time	Pearson correlation coefficient		
		Kazakhstan	Almaty region	Almaty city
1973-1985	Soviet period	0.98	0.57	0.84
1986-1991	Anti-alcohol campaign	0.13	0.29	0.46
1992-1998	Socio-economic crisis	0.84	0.25	0.91
1999-2004	Implementation of DOTS	-0.93	-0.54	0.94
2005-2008	Stabilization	0.81	0.73	- 0.49

Table 2 – Correlation analysis of Prevalence and Incidence rates of TB in Kazakhstan, Almaty region and Almaty city, 1973–2009

Period	Observation time	Pearson correlation coefficient		
		Kazakhstan	Almaty region	Almaty city
1973-1985	Soviet period	0.99	0.79	0.98
1986-1991	Anti-alcohol campaign	0.94	0.91	0.77
1992-1998	Socio-economic crisis	0.97	0.97	0.97
1999-2004	Implementation of DOTS	0.34	-0.19	-0.73
2005-2008	Stabilization	0.81	0.65	- 0.84

do not correlate with the incidence rate, which decreased in this period, the rate of decline was 6.7% in the period 1974-1975, increased by 1.6% from 1975-1976. Since 1977, there has been a steady decline in morbidity and mortality. The positive correlation of the average intensity of morbidity and mortality during this period was determined ($r = 0.57$). During this period, there was a decrease in the prevalence of 1.5 times, the average value was 368.5 per 100 000 people (range 314.6-473.3 per 100 000 people). A strong correlation was found between the prevalence and incidence rates ($r = 0.79$).

In Almaty city - 2.4 times decrease in incidence rate (range 119.5-49.2 per 100 000 people), the average value was 72.6 per 100 000 people; a decrease in the mortality rate by 2.1 times (range 14.1 - 6.8 per 100 000 people), the average value was 10.3 per 100 000 people. The indicator of the ratio of morbidity to mortality is 4.8 (8.5-7.2). The average mortality rate is 10.0 per 100 000 people (range 6.8-14.1 per 100 000 people). During this period, the prevalence of TB was also halved, the average value was 330.6 per 100 000 people (239.7- 488.5 per 100 000 population), the annual rate of decline was 2.9%. The ratio of prevalence to morbidity averaged over a period of 4.6 (a range of 4.1–5 years). A strong positive correlation between the morbidity and mortality were determined. ($r = 0, 84$) and between prevalence and morbidity ($r = 0.98$).

The second observation period (1986-1991) was marked by an anti-alcohol campaign. On May 7 and 16, 1985 legislative acts of the Central Committee of the CPSU and the Council of Ministers of the USSR on strengthening the fight against drunkenness and home brewing were published. Since 1960, in the USSR, there has been an increase in alcohol mortality associated with the highest use of legal and illegal alcoholic beverages in the world and low life expectancy compared with other countries of the world (10). During the ban on the use of alcoholic beverages in Kazakhstan, the most favorable situation is observed in terms of the ratio of the incidence rate for mortality, the average value of which was 6.6 ± 0.3 times (6.8-6.1). The incidence rate between the 1986 level by 1991 decreased by 9.4% (range 64.4 - 73.9 per 100 000 people) with an annual decrease of 1.9%; the prevalence rate is 9.0% (the range is 308.2-292.6 per 100 000 people) with an annual decrease of 1.8% and the mortality rate 17.2% (12.8-9.9 per 100 000 people)) with an annual decline of 3.4%. During this period of time in Kazakhstan, there was a weak positive correlation between morbidity and mortality rates ($r = 0.23$) and ($r = 0.91$). There was a significant reduction in mortality with a fairly high annual rate of decline against the background of consistently high rates of morbidity and prevalence.

In Almaty region there was a 1.8-fold decrease in mortality from TB (range 6.5–11.4 per 100 000 people) with an annual decrease of 6.1% against the background of relatively stable incidence rates (-7.2%, scale 62.1 - 66.9 per 100 000 people) with an annual decline of 1% and prevalence (+ 6.4%, the magnitude of the indicator 299.1 - 319.4 per 100 000 people) with an annual decrease of 0.9%. The ratio of morbidity to mortality was 8.5 (range 5.9-10.4), and the ratio of the prevalence of incidence 4.7 (range 4.7 - 4.9 years). A weak positive correlation between morbidity and mortality ($r = 0.29$) and prevalence and morbidity ($r = 0.91$) was determined.

In Almaty city there was a significant decrease in prevalence of 29.2%, the scale of the indicator was 169.6 - 239.7 per 100 000 people, and the annual decline of the indicator was 4.2%. The ratio of prevalence and incidence was 4.1 (range 3.7-4.9 years). During this period, an increase in the mortality rate was determined in the megalopolis (by 17.6%), the scale was 6.2 - 8 per 100 000 people with an annual growth rate of 2.5%; and a slight increase in the incidence rate of 7.1%, the scale of the indicator was 45.7 - 55.3 per 100 000 people). The ratio of morbidity and mortality was 7.5 (range 5.71 - 9.2). The Pearson correlation analysis determined a moderate relationship between morbidity and mortality ($r = 0.46$) and a strong degree of positive correlation between prevalence and morbidity ($r = 0.77$). Differences in the rate of decline in TB rates, especially mortality, are associated with different degrees of alcohol consumption and the correctness of the calculation of epidemiological indicators.

The third observation period (1992-1998) is connected with socioeconomic crisis and the policy of reconstruction, which was supposed to improve the state of the economy and liberalize the political life of the country. Restructuring period led to the collapse of the USSR into independent republics. Independent countries continued to undergo socioeconomic changes, accompanied by a decrease in funding for the health care system, including the TB service. During this period, there is a 3.3-fold increase in mortality in Kazakhstan (the magnitude of the indicator is 11.7 - 38.4 per 100 000 people) with an annual growth rate of 38%; an increase in the incidence of 1.8 times (range 59.7 - 118.8 per 100 000 people) with an annual growth rate of 14.1%. The ratio of morbidity and mortality averaged 3.4 (2.4 - 5.5), which was the lowest in 36 years of observation.

The lowest ratio of persons who fell ill with deaths from TB was observed from 1995 to 1997 (2.5-2.4), when the number of deaths was the highest. At the same time, the incidence rate remains stable during 1992-1995. (64.4 -67.1 per 100 000 people), which is explained by a decrease in diagnostic measures to detect cases of TB. From 1996 to 1998 there is an increase in the incidence of 1.5 times (82.5-118.8 per 100 000 people), the annual growth rate was 38%. The prevalence rate increased by 34.4%, the scale of the indicator was 268 - 379.6 per 100 000 people, and the annual growth rate was 5.7%. The ratio of prevalence and incidence averaged 4 (range 3.2 - 4.5 years). The growth of epidemiological indicators to TB occurred against the background of destabilization of the TB service: poor funding, lack of anti-TB drugs, reduced detection of cases, and an uncontrolled increase in TB mortality. During this period, there was a strong positive correlation between morbidity and mortality ($r = 0.84$), between prevalence and morbidity ($r = 0.97$). There is a 2.5-fold increase in mortality (a range of 9.2-38 per 100 000 people) with an annual growth rate of 24.8%; incidence of 61.6% (range 45.5 - 95.8 per 100 000 people) with an annual growth rate of 10.3% and prevalence of 38.1% (range 247.4 - 388.3 per 100 000 people) with an annual growth rate 6, 4% in Almaty region. The ratio of morbidity and mortality was 3.9 on average (1.5-6.4). The worst TB situation was noted in 1996, when the death rate was 38 per 100 000 people, and the ratio of the sick, of the dead was 1.5. The ratio of prevalence and incidence averaged 4.8 (range 4.1-5.4 years). During the socioeconomic crisis, there was a weak positive correlation between the incidence and mortality rates ($r = 0.25$) and a strong positive relationship between the prevalence and incidence rates ($r = 0.97$). There is a 2.5-fold increase in the death rate (11-27.5 per 100 000 people) with an annual growth rate of 25%; an increase in the incidence rate of 1.6 times (range 50 - 78.7 per 100 000 people) with an annual growth rate of 9.6% in Almaty. The ratio of morbidity and mortality averaged 3.4 (range 2.6-4.5). During this period, there was a 1.4-fold increase in the prevalence rate (range 164.3 - 228.6 per 100 000 people) with an annual growth rate of 5.9%. The ratio of prevalence and incidence averaged 3.1 (range 2.9-3.4 years). A strong positive relationship between morbidity and mortality ($r = 0.91$) and between prevalence and morbidity ($r = 0.97$) was determined. The increase in deaths from TB is associated with an increase in the number of persons with newly diagnosed forms and individuals with active forms of TB. The sharp deterioration of the situation on TB in Kazakhstan caused

the introduction of the DOTS strategy recommended by WHO to countries with a severe situation of TB in October 1998.

The fourth observation period (1999–2004) is related to the activity of TB service and implementation of the DOTS strategy. The period is characterized by a further increase in the incidence in Kazakhstan by 29.9% (range 141 - 165.1 per 100 000 people) with an annual growth rate of 5%. The increase in incidence is associated with a significant increase in the efficiency of detecting cases of TB by microscopy of sputum smears and other methods (mainly by X-ray), which is confirmed by the proportion of new cases with a positive smear in 1/3 and 2/3 with a negative smear of sputum. In 2002 - 2003 the highest incidence rates are observed (165.1 - 160.4 per 100 000 people). At the same time, the mortality rate decreased by 1.9 times (range 20.6 - 38.8 per 100 000 people) with an annual rate of decline of 7.7%. The ratio of morbidity and mortality in this period was 5.9 on average (3.1–7.5). The prevalence rate increased by 18.4% (range 323 - 449.5 per 100 000 people) with an annual growth rate of 5%. The ratio of prevalence and incidence rates was 2.6 on average (range 2.1–3.2 years). There was a strong negative correlation between mortality and morbidity in Kazakhstan ($r = -0.93$) and a weak negative relationship between prevalence and morbidity ($r = 0.34$). There is a decrease in mortality by 2.6 times (the range of 8.9 - 22.9 per 100 000 people) with an annual rate of decline of 10.2%; a decrease in incidence of 13.7% (range 95.8 - 123.1 per 100 000 people) with an annual rate of decline of 2.3% in the Almaty region. The ratio of morbidity and mortality averaged 8.4 (range 4.2–12.3). During this period, there was a decrease in the prevalence of 14.8% (range 242 - 388.3 per 100 000 people) with an annual rate of decline of 2.5%. The ratio of prevalence and incidence averaged 2.7 (range 2 - 4.1 years). The negative correlation between the incidence and mortality rates ($r = -0.54$) and the weak negative correlation between the prevalence and incidence rates ($r = -0.19$) were determined. There was a 1.6-fold decrease in mortality (12-27.5 per 100 000 people) with an annual decline rate of 6.3%; a decrease in the incidence rate of 11.2% (range 67.9 - 78.7 per 100 000 people) with an annual decline rate of 1.9% and a decrease in prevalence rate of 12.8% (range 133.8 - 228.6 per 100 000 people) with an annual rate of decline of 2.1%. The ratio of morbidity and mortality over the entire period was 4.3 (range 2.9-5.7), while the ratio of prevalence rates was 2.5 (range 1.9-2.9 years) in the Almaty. There was a strong positive correlation between mortality and morbidity rates ($r = 0.94$) and a strong negative relationship between prevalence and morbidity ($r = -0.73$). A significant reduction in mortality is accompanied by a relatively moderate decrease in morbidity and prevalence.

The fifth observation period (2005–2009) is characterized by a further decrease in epidemiological indicators in Kazakhstan. There was a decrease in mortality by 1.6 times (span 12.9 - 20.8 per 100 000 people) with an annual rate of decline of 7.5%; a 1.5-fold decrease in the incidence (105.3 - 154.3 per 100 000 people) with an annual decrease rate of 6.4%. The ratio of morbidity and mortality was 7.3 (range 6.5–8.2), which was the most favorable ratio in Kazakhstan. The present observation period is comparable in intensity of morbidity and mortality with the Soviet period (1973 - 1985). During this period, a decrease in prevalence of 2.5 times (a range of 180 - 449.5 per 100 000 people) with an annual rate of decline of 12% was determined. The ratio of prevalence and morbidity averaged 2.5 (the range of 1.6-3.2 years), which is largely associated with organizational approaches to the definitions and duration of observation of dispensary groups. A strong positive correlation was determined between morbidity and mortality ($r = 0.84$) and between prevalence and morbidity ($r = 0.81$).

In the Almaty region, there was a decrease in the incidence rate of 16.5% (a range of 90.9 - 113.7 per 100 000 people) with an annual rate of decline of 3.3% and a mortality rate of 1.8 times (range of 4.9-10, 1 per 100 000 people) with an annual rate of decline of 9%. The ratio of morbidity and mortality averaged 13.5 (range 11.5 - 18.6). During this period, there was a decrease in the prevalence of 2.9 times (range 113.3 - 350.2 per 100 000 people) with an annual rate of decline of 13.1%. The ratio of the prevalence of incidence averaged 2.4 (range 1.2 - 3.3 years). A strong positive correlation was found between the incidence and mortality rates ($r = 0.73$) and the average strength; the positive correlation relationship between the prevalence and incidence rates ($r = 0.65$). Until 2006, in Almaty, there was a decrease of 6.7% (span 65.2 - 65.2 per 100 000 people) with an annual decline rate of 3.4%, since 2007 an increase in the incidence rate has been determined by 15% with an annual growth rate / decrease of 5%. During this period, there was a further decrease in the death rate, which decreased by 2.1 times (range 8-17.1 per 100 000 people) with an annual rate of decline of 10.6%. The ratio of morbidity and mortality averaged

8.6 (4.1 - 24). A 2-fold decrease in prevalence (97.9 - 199.4 per 100 000 people) with an annual decline rate of 10.2% was determined. The ratio of prevalence and incidence averaged 2 years (range 0.5 - 2.9 years). The negative correlation between the incidence and mortality rates ($r = -0.49$) and the strong negative relationship between the prevalence and incidence rates ($r = -0.84$) were determined. The data of the correlation analysis demonstrate the disconnection between the intensive indicators, which, possibly, is connected with the change in the conditions of registration and observation in dispensary contingents; and what is important with the correctness of the data obtained.

Consequently, the analysis of TB epidemiological patterns of traditional assessment of epidemiological indicators for TB and correlation analysis of a relationship between morbidity and mortality and prevalence with morbidity at different periods of time revealed certain trends associated with complexes of determinants as socioeconomic factors, Health System measures and the effectiveness of TB programs.

The Soviet period of observation characterized by a decreasing of mortality, incidence and prevalence rates in the country and regions, and had the presence of a strong positive correlation between epidemiological indicators that is associated with an effective TB control program. The then existing program had broad objectives for prevention, diagnostics, treatment and survey over TB patients that was developed against the background of socioeconomic stability. During the anti-alcohol campaign registers a further decrease in intensive indicators and a weak correlation between morbidity and mortality rates, which shows the impact of other factors on the epidemiology of TB, namely the improvement in the overall health of people associated with a sharp decrease in alcohol consumption across the country.

The period of socioeconomic crisis and restructuring against the background of deteriorating socioeconomic conditions and the collapse of the health care system, including the TB service, marked the development of a TB epidemic in the country in terms of intensive morbidity, prevalence and mortality rates and the presence of a positive relationship between indicators at the national, regional and metropolis. The DOTS strategy implementation period was marked by a significant decrease in TB mortality (in Kazakhstan by 1.9 times, in Almaty oblast/region by 2.6 times and in Almaty city by 1.6 times), a slight decrease in prevalence (14.8%, 14.6% and 12.8%, respectively) against the background of an increase in the incidence in Kazakhstan and Almaty region (29.9%, 13.7%) and a decrease in Almaty (11.2%). This situation follows the objectives of the DOTS program the detection at least 70% of TB cases and cure 85% of these cases. At the same time, a decrease in TB mortality associated with effective treatment does not correlate with an increase in the number of new cases of TB, due to an increase in the recorded incidence. During this period, there was a negative correlation between the indicators in Kazakhstan ($r = -0.93$) and the average power in the Almaty region ($r = -0.54$). The strong positive correlation between morbidity and mortality in Almaty ($r = 0.91$) reflects the features of registering new cases and deaths. The same tendency is typical for the correlation analysis of the relationship between prevalence and incidence rates: weak positive in Kazakhstan, weak negative in Almaty region and strong negative relationship in Almaty ($r = 0.34$, $r = -0.19$, $r = -0.73$).

The period from 2005 to 2009 is characterized by the most favorable situation for TB; the country for the first time approached the epidemic threshold in terms of incidence of 105.3 per 100 000 people. There was a decrease in all major indicators of TB, especially the prevalence and mortality rate of more than 2 times in the country, in the Almaty region and in Almaty city; and morbidity in Kazakhstan by 1.5 times, by 16.5% in Almaty oblast. In Almaty, the trend of increasing incidence (+ 7.9%) continues. In this period, a statistically significant relationship was established between morbidity and mortality rates, prevalence and morbidity in Kazakhstan and Almaty oblast and the lack of communication in Almaty, which demonstrates a somewhat special approach to registering cases of disease and death. The informativeness of data in Almaty requires monitoring of the tasks of identifying and determining lethal outcomes.

Thus, the TB epidemiological pattern depends on the impact of many factors of the bio-social environment, which have a negative or positive impact to the epidemiology of TB. Determining the real situation on TB is as important as evaluating the effectiveness of the TB program, identifying priorities and planning for TB measures. New approaches to analytical epidemiology to assess the situation of TB and the effectiveness of anti-epidemic measures are necessary to determine the reliability of intensive indicators and to improve prompt response to them.

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ТУБЕРКУЛЕЗГЕ ҚАРСЫ ЭПИДЕМИОЛОГИЯЛЫҚ ДЕРЕКТЕРДІҢ АУЫТҚУЫ

Абстракт.

Алғышарттар. Туберкулез (ТБ) әлемінде өлім-жітімнің 10 жетекші себептерінің бірі және біржұқпалы агент болған кезде негізгі себеп болып табылады. Жылсайын миллиондаған туберкулезбен науқастар анықталады. 2017 жылы індетін жұқтырғандар арасында 1,1 өлім (1,2-1,4 миллион диапазонда) және 300 мыңадам (266 000-335 000 диапазонында) өлімге әкелді. Пациенттерді диагностикалауда, емдеу және күтуді қамтитын Халықаралық туберкулезге қарсы бағдарламаның арқасында туберездің ауыртпалығы жоғары ауру мен өлім-жітіммен Азия, Африка және Еуропа елдерінде 30-ға жуық жерде орналасқан.

Әдістері: Қазақстанда, Алматы облысында және Алматыда туберкулезбен ауыратындарды бағалау, елде, облыста және қала деңгейінде науқастану, таралу және өлім жағдайында туберкулезге қарсы бағдарлама. ТБ эпидемиологиялық жағдайын талдау негізгі детерминанттармен бағаланған уақыт кезеңіне қарай аймақтық және ұлттық деңгейлерде Pearson корреляция коэффициентін қолдану арқылы жүргізілді.

Нәтижелер: Нәтижелер детерминанттар мен туберкулездің эпидемиологиялық көрсеткіштерінің динамикасын, мысалы, өлім-жітім, ауру-сырқау және байқау салаларында таралуы сияқты қатынастарды көрсетті.

Қорытынды: Туберкулездің эпидемиологиялық жағдайына және эпидемиологиясына теріс немесе жағымсыз әсер ететін көптеген факторлар бар. Нақты жағдайды анықтау туберкулездің тиімділігін бағалау, туберкулезбен күрестің басымдықтарын және жоспарлау шараларын анықтау үшін маңызды.

Түйін сөздер: туберкулез, өлім-жітім, науқастанудеңгейі, таралуы, Pearsonкоэффициенті, DOTS стратегиясы, ДДҰ.

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КОРРЕЛЯЦИОННЫЙ АНАЛИЗ ЭПИДЕМИОЛОГИЧЕСКИХ ДАННЫХ В ОЦЕНКЕ СИТУАЦИИ ТУБЕРКУЛЕЗА И ЭФФЕКТИВНОСТИ ПРОГРАММЫ БОРЬБЫ С ТУБЕРКУЛЕЗОМ В СОВРЕМЕННЫХ УСЛОВИЯХ

Абстракт.

Предпосылки. В мире туберкулез (ТБ) является одной из 10 основных причин смерти и основной причиной при наличии одного инфекционного агента. Ежегодно выявляются миллионы больных ТБ. В 2017 году ТБ стал причиной 1,3 смертей (в диапазоне 1,2–1,4 миллиона) среди ВИЧ-отрицательных людей, и 300 000 смертей (в диапазоне 266 000–335 000) среди ВИЧ-позитивных людей. Благодаря Международной программе борьбы с ТБ, включающей диагностику, лечение и уход за больными, бремя ТБ локализовано в 30 странах Азии, Африки и Европы с высоким уровнем заболеваемости и смертности.

Методы: оценка бремени ТБ в Казахстане, Алматинской области и г. Алматы, программа контроля ТБ по показателям заболеваемости, распространенности и смертности на уровне страны, области и города. Был проведен анализ эпидемиологической ситуации по ТБ с использованием коэффициента корреляции Пирсона на региональном и национальном уровнях в зависимости от периода времени, оцененного по основным детерминантам.

Результаты: Результаты показали взаимосвязь между детерминантами и динамикой эпидемиологических показателей туберкулеза, таких как смертность, заболеваемость и распространенность в областях наблюдения.

Заключение. Эпидемиологическая ситуация по ТБ зависит от воздействия многих факторов биосоциальной среды, которые оказывают негативное или положительное влияние на эпидемиологию туберкулеза. Определение реальной ситуации важно для оценки эффективности противотуберкулезной программы, определения приоритетов и планирования мер по борьбе с туберкулезом.

Ключевые слова: туберкулез, уровень смертности, уровень заболеваемости, коэффициент распространенности, коэффициент Пирсона, стратегия DOTS, ВОЗ.

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