

ANNOTATION
of the thesis work on the topic:
**«Medical and social care for diabetes mellitus in a large city and
forecasting economic consequences»**
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for the degree Doctor of Philosophy (PhD)
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Relevance of the research topic

Diabetes mellitus (DM) is a global threat that has no borders or social environment. The World Health Organization's Global Report on Diabetes highlights the magnitude of the diabetes problem and the enormous potential to change the current situation. The policy framework for concerted action on diabetes has been established and is at the stage of sustainable development, as outlined in the 2011 United Nations Political Declaration on Non-communicable Diseases and the 2013-2020 WHO Global Action Plan on Non-communicable Diseases. These principles will encourage action by all actors if applied [WHO, Global report on diabetes, Geneva, 2016].

According to the International Diabetes Federation (IDF), over the past 21 years, the global prevalence of DM in adults aged 20 to 79 years has increased from 151 million (2000) to 537 million (2021), that is, an increase of 3.5 times. No country in the world is immune to diabetes, and the epidemic is expected to continue. According to 2021 studies, there are 537 million people worldwide, or 10.5% of adults aged 20 to 79, who have diabetes. If this trend continues in the same way, 783 million people aged 20 to 79 will have diabetes by 2045 [IDF Diabetes Atlas 10th edition, Belgium, 2021].

The number of people with DM in the country is also steadily increasing from year to year. The arguments showed that the level of primary incidence of diabetes among the population as a whole compared to 1991 in Kazakhstan in 2020 increased by 3.1 times (68.3 versus 210.3 per 100 thousand people), in Almaty – 2.3 times (per 100 thousand people – 91.8 versus 207.8). It should be noted that in 1991 the level of primary incidence of diabetes among the population in Almaty was higher than the national average (per 100 thousand population – 91.8 versus 68.3), and in 2020 (per 100 thousand population – 207.8 vs. 210.3) at the same level. In the period from 1991 to 2020, an unfavorable trend in the level of primary incidence of diabetes among the general population is observed in Kazakhstan and Almaty [Statistical report of the Republic of Kazakhstan, 2020].

The social significance of DM lies in the fact that its early disability and chronic complications of the disease lead to death. In 2011, in the political declaration "On the Prevention and Control of Non-communicable Diseases", DM

was one of the four priority non-communicable diseases. [WHO, Resolution 66/2, New York, 2011].

WHO World Report on Disability, which states that the prevalence of disability is on the rise in the future is of great concern. However, this is due to an aging trend in the population, an increased risk of disability among older people, a result of the global increase in the number of chronic diseases such as diabetes, cardiovascular disease, cancer and mental disorders, [WHO, World Report on Disability, Geneva, 2011].

DM is one of the leading causes of blindness, kidney failure, heart attacks, strokes and leg amputations [WHO, Geneva, 2018].

The increased risk of developing cardiovascular diseases in diabetes is 2-3 times, chronic renal failure is 10 times, limb amputation is 10-20 times [Emerging Risk Factors Collaboration, 2010; Us Renal Data System, USA, 2014; Moxey P.W., et. al, 2011].

In 2010, 1.9% and 2.6% of cases of severe and moderate diabetic retinopathy worldwide were due to blindness [Bourne R.R., et al, 2013].

According to WHO data published in 2011, 15% of the world's population lives with some form of disability, while based on the 2015 European Union Labor Force Survey and the 2012 European Health and Social Inclusion Survey report, the prevalence of disability among the population of the Member States of the European Union aged 15 to 64 years was 14 [European comparative data on Europe 2020 & people with disabilities, Great Britain, 2013; Eurostat. Statistics explained, Luxembourg, 2015].

As of January 1, 2017, 3.7% of the total population (651.9 thousand people) in Kazakhstan are people with disabilities. The breakdown is men – 56.2% (366.6 thousand people), women – 43.8% (285.3 thousand people). Depending on age: 12.2% – children, 62.8% – people of working age, 25% – elderly people. 12.2% (79,662 children) of children with disabilities, 90.6% (72,149 children) are children with disabilities under 16 years of age. 55.2% of persons with disabilities live in urban areas, 44.8% in rural areas [UN Report on the Rights of Persons with Disabilities, Kazakhstan, 2017].

However, it is impossible to obtain accurate statistics on persons with disabilities in Kazakhstan. The number of persons with disabilities in our country is carried out by counting persons receiving a disability pension. The urgency of the problem lies in the fact that an increase in the incidence of diabetes, severe and irreversible complications determine the medical and social essence of this disease. At the same time, the dynamics and structure of disability, indicators of quality of life have not been assessed in the city of Almaty.

The purpose of the study is to scientifically substantiate the prediction of the medical, social and economic consequences of morbidity with an analysis of the control and organization of care for diabetics in health care system

Objectives of the study:

1. To study and forecasting of the dynamics of the incidence of diabetes mellitus in Kazakhstan and in the city of Almaty for 1991-2020
2. To study of the dynamics and assessment of the viability of disability caused by exposure to diabetes mellitus in Almaty
3. Analysis of medical, social and economic consequences of health and health status of people with diabetes mellitus
4. Creation of evidence-based recommendations with a forecast of medical, social and economic consequences of the incidence of diabetes mellitus

Research methods: bibliographic, information-analytical, statistical, prognostic, survival analysis, sociological, economic analysis

The object of the study: patients with DM

Subject of research: medical and social consequences, economic consequences, prognosis

Academic novelty

In the period from 1991 to 2020, statistical data on the incidence of diabetes in Kazakhstan and in the city of Almaty were studied, and a forecast of the incidence of diabetes until 2025 was made.

In the city of Almaty, a comprehensive assessment of disability caused by exposure to diabetes and an analysis of the viability of patients was carried out.

A comprehensive assessment of the health and health status of patients with diabetes is given with a multivariate analysis of the medical, social, economic consequences of morbidity.

Practical and theoretical significance

At the level of the healthcare system:

The results of the thesis work will contribute to the improvement of medical and social assistance to patients with diabetes, creating a database on morbidity in city hospitals and medical and social examination services of the city of Almaty, allowing them to dynamically monitor, identify medical and social problems.

At the level of a medical organization:

The risk factors identified as a result of the study can be analyzed as decisive in the development of prognosis and prevention of diabetes in medical organizations providing medical and social assistance.

In the course of the thesis work, a specially compiled questionnaire program (appendix A and appendix B) can be used as a means of identifying medical and social problems of patients or disabled people and patients suffering from the effects of diabetes.

Recommended rules for protection

1. At the present stage, there is an unfavorable trend in the level of primary incidence of diabetes mellitus in Kazakhstan and its regions. According to the principle of reliability, it is substantiated that even in the forecasts for 2025, the primary incidence of diabetes mellitus increases in terms of the age and sex composition of the population.

2. Features of the primary clinical, social and medical characteristics of patients with diabetes mellitus are the main source of information for improving their medical and social expertise and rehabilitation.

3. Since various severe complications of diabetes mellitus lead to huge socio-economic losses, compensation for the need for medical and social assistance can prevent its serious consequences and a decrease in the quality of life.

Conclusions:

1. Between 1991-2020 in Kazakhstan and the city of Almaty, there was an unfavorable trend in the level of primary incidence of diabetes among the population as a whole: the level of primary incidence of diabetes among the population in Kazakhstan ranges from 68.3 in 1991 to 210.3 in 2020 (per 100 thousand people), that is, 3.1 times, and in Almaty - 2.3 times, respectively, from 91.8 to 207.8 (per 100 thousand per person). In 1991, in Almaty, the level of primary incidence of diabetes among the general population exceeded the level.

2. An increase in the primary incidence of diabetes in Kazakhstan as a whole per 100 thousand population is projected from 226.85 in 2021 to 253.71 in 2025, among women it is expected to increase from 268.83 in 2021 to 300.96 in 2025. It is expected that the incidence of diabetes in adults (18 years and older) of the population of the country will increase from 322.18 (2021) to 359.88 (2025). Among adolescents (15-17 years old), it is noted that by 2025 the incidence of diabetes will increase from 13.89 to 14.26, and among children (0-14 years old) - by 100 thousand children, in 2021 it is predicted that by 2025 - from 11.81 to 12.89.

3. In Almaty in 2013-2017, the level of primary disability caused by diabetes disease per 10 thousand adult population increased from 0.97 ± 0.001 to 1.23 ± 0.001 and averaged 1.09. In addition, when analyzing the level of primary disability due to diabetes, there was a tendency to increase the percentage of disability. The average duration of illness before the medical and social expertise stage is 10.5 years; The study showed a predominance of disabled people of the «II group», which is equal to $28.69 \pm 0.04\%$. Disabled people of group III and group I accounted for $16.66 \pm 0.03\%$ and $13.87 \pm 0.03\%$, respectively. The average life expectancy is 63.6 ± 1.004 , and the maximum observation time for disabled people is 76 months. The number of terminal cases was recorded in the first two years (39 people died in the first year, and 40 people died in the second). The survival rate of persons with disability due to type II diabetes is lower than that of type I diabetes.

4. In the period from 2013 to 2020, the number of patients registered at the dispensary with a diagnosis of diabetes in Almaty increased from 26220 to 45181, the incidence increased 1.7 times, that is, an increase of 58%. Indicators for assessing the quality of life of patients with diabetes were assessed based on the results of sex differences. The values of PF, RP, GH, VT, MH were lower in women than in men. Grouping the quality of life indicators according to the PH and MH criteria, the assessment depending on the severity of the disease shows a proportional decrease in the values of the corresponding quality of life indicators depending on the severity.

5. The survey data served as the basis for creating a medical and social portrait of improving diabetic care: according to the severity of the disease, «severe» – 41.6%, «medium» – 57.3%, «mild» – 1.1%. Of these, the share of «medium» current women (58.7%) and «severe» current men (43.1%) prevails. Patients, except for diabetes, are under dispensary observation for «AH» – 71%, «CHD» – 37.8%, «myocardial infarction» – 12.9%. More than half (57.1%) take sugar-lowering pills, 21.2% take insulin, and 21.7% take dual form. 70% of patients complained about frequent interruptions in the provision of drugs and insulin as part of the guaranteed volume of free medical care. He spends his money on the purchase of drugs in various volumes: the share of those who buy insulin is 19.1%. During the year, 66.3% of patients did not have the opportunity to be hospitalized; and «1 time» – 24.5%, «2 times» – 6.7%, «3 times and more» – 2.5% were hospitalized. Temporary disability, on average – 21.97 ± 23.65 days. 25.5% of respondents have a disability group: «I group» – 8.4%, «II group» – 61.3%, «III group» – 30.3%. For medical rehabilitation treatment, 77% said they needed help.

6. The severity of diabetes directly affects the self-assessment of the physical health of patients: the more serious the degree of the disease, the worse the medical consequences of it are assessed. At the same time, it was shown that there is a relationship between the severity of DM and the social activity of diabetic patients. The higher the severity of diabetes, the higher the cost of its treatment. A severe degree of DM leads to serious medical and social consequences for patients and an increase in material costs. These findings should be taken into account when organizing care for patients with diabetes and justify the need for measures to prevent these consequences in patients.

Publications

9 scientific papers have been published on the topic of the dissertation, including 3 in publications recommended by the Committee for Quality Assurance in Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan, 1 in an international publication indexed in the Scopus database (CiteScore 2021 – 3.3, percentile – 78). 5 scientific papers have

been published in collections and materials of international scientific and practical conferences. Received 2 copyright certificates, 4 acts of implementation.

Implementations

Acts of implementation of «Indicators for assessing the viability of disability caused by the influence of diabetes mellitus» were received from the departments of medical and social expertise № 1, № 2, № 5, № 6 of the Department of Control and Social Protection of Population in Almaty.

Innovative patents, copyright certificates

Author's certificates 2 «On entering information into the State Register of Rights to Objects Protected by Copyright of the Republic of Kazakhstan» № 35589 from 11 May 2023., № 35695 from 15 May 2023.

The structure and scope of the thesis work

The thesis work is presented on 130 pages of computer text, consists of an introduction, 4 sections, conclusion, practical recommendations, a list of references, including 168 sources, of which 29 are in russian and 139 in foreign languages. The thesis is illustrated with 63 tables, 24 figures, contains 8 appendices.