

Original Research

Diabetes mellitus and disability

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Abstract

Diabetes mellitus (DM) is not only a major medical but also an economic problem worldwide. Significant economic costs and social damage are caused by the increasing prevalence of diabetes, comorbid pathology, complications, high disability, and mortality. In this article, we analyzed the indicators of disability in patients with diabetes in Dnepropetrovsk region and in Ukraine and identified methodical approaches to determining the degree of disability. Results of the study showed that the indicators of disability due to diabetes in Dnepropetrovsk region and Ukraine are stable and average 1.7 and 1.5 per 10 thousand population, respectively, in 2014–2019. The intensive indicator of primary disability due to DM among the employable population in Dnepropetrovsk region is growing every year. It's become much higher than disability indicator among the total adult population. In our study, we proposed criteria for determining the signs of disability based on criteria of life limitations.

Key words: indexes of disability, diabetes mellitus, medical and social expertise.

Background and aims

Diabetes mellitus (DM) is not only a major medical but also an economic problem in the world. According to the International Diabetes Federation (IDF), today there are 463 million people with diabetes registered in the world, it's about 8% of the world's population [1]. The number of DM patients annually increases by 5–7%, and every 12–15 years are doubles. By 2045, the number of people with diabetes is predicted to increase up to 700 million [2]. It is important that about 50% of all patients with DM are persons of the most active, able-bodied and creative age – 30–59 years. Such dramatic indicators make society says that diabetes is a non-infectious epidemic. The epidemiological situation is described also by other facts. Thus, according to WHO, almost 50% of deaths under 70 years are due to high blood glucose; in 2030, DM will be the seventh cause of death worldwide [3, 4].

Epidemiological studies in Ukraine also indicate an ongoing increase number of patients with DM [5]. According to the Ministry of Health of Ukraine, there are about 1.3 million people with DM in Ukraine, about 200 thousand of them need daily insulin injections. Last year, this diagnosis was first established by nearly 104,000 Ukrainians. It is important to emphasize that, according to some experts, the number of DM patients is twice as high, due to undiagnosed cases.

It is clear that a growing number of patients require significant economic costs for treatment. The USA is investing more than 200 billion dollars, Germany more than 40 billion euro for the treatment of diabetes and its complications today. At the same time, the economic burden of diabetes increases significantly due to the onset of disability [6]. Significant economic costs and social damage caused by the increasing prevalence of diabetes, comorbid pathology,



complications, high disability, and mortality were the reasons for the adoption of the United Nations Resolution (UN) in 2006. The resolution was announced diabetes as a global threat [6].

So, this topic is very relevant. Therefore, in this article, we analyzed the indicators of DM disability in Dnepropetrovsk region and in Ukraine in order to identify methodical approaches to determining the degree of disability.

Materials and methods

We conducted a retrospective analysis of the dynamics of DM disability according to the data of the Municipal Institution (MI) “Regional Clinical Center of Medical and Social Expertise of Dnipropetrovsk Regional Council” and in Ukraine for the period 2016–2019. We analyzed medico-social cases and referrals for medical and social expertise of patients who were examined by doctors of regional specialized medical and social commissions evaluating patients’ disability. Statistical processing was performed by parametric and non-parametric statistics methods implemented in STATISTICA 6.1 software packages (StatSoftInc., Serial No. AGAR909E415822FA).

Results and discussion

Primary disability due to DM in adult and the working population was stable - 1.5–1.6 per 10 thousand in 2016–2019 in Ukraine.

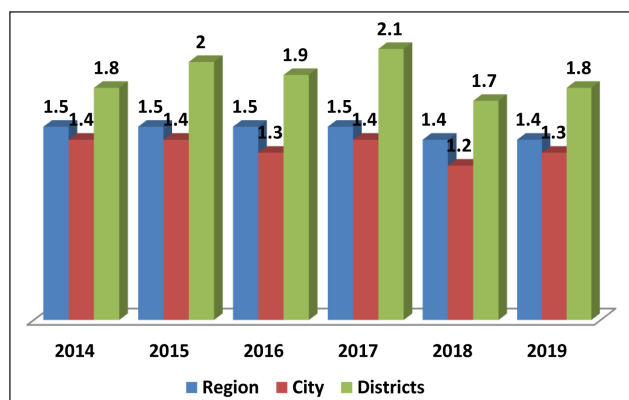


Figure 1: Intensive indicator of primary disability among the adult population of Dnipropetrovsk region in 2014–2019.

The dynamics of the intensive indicator of primary disability among the adult population of Dnipropetrovsk region in 2014–2019 is shown in Figure 1.

According to the expert cases and referrals to medical expertise in Dnipropetrovsk region, the intensive indicator of primary disability among the adult population was 1.5 per 10 thousand population in 2014–2017; 1.4 in 2017–2019 (Figure 1).

Comparison of primary disability among adults showed that this indicator was higher by 60% in the Dnipropetrovsk region districts compared to the Dnipropetrovsk city (2.16 vs. 3.7).

The dynamics of intensive indicator of primary disability among the employable population of Dnipropetrovsk region in 2014–2019 is shown in Figure 2.

According to the expert cases and referrals to medical expertise in Dnipropetrovsk region, the intensive indicator of primary disability among the able-bodied population in 2017 was 2.3 per 10 thousand people; in 2015 - 2.5; in 2016 - 2.4 in 2017 - 2.6; in 2018 - 2.2; in 2019 - 2.4.

Results of the study showed that primary disability among the employable population was higher by 25% compared with primary disability in the adult population (1.9 vs. 2.4) in the Dnipropetrovsk region in 2014–2019.

Comparison of primary disability among the employable population showed that this indicator was higher by 58.3% in Dnipropetrovsk region districts compared to Dnipropetrovsk city (3.08 vs. 5.28).

According to the epidemiological study, 8.3% of the people aged 20–65 years have diabetes

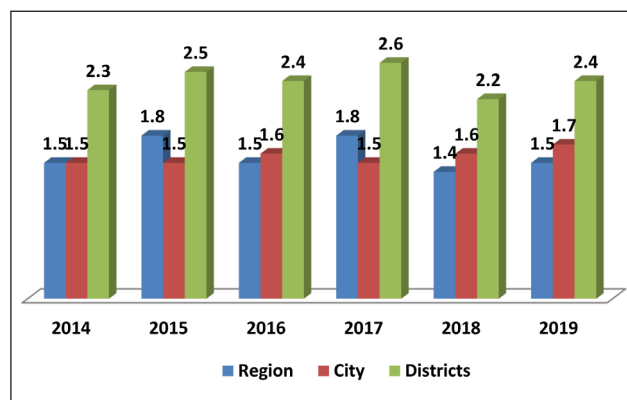


Figure 2: Intensive indicator of primary disability among employable population of Dnipropetrovsk region in 2014–2019.

in Dnipropetrovsk region. However, researchers believe that these figures are different from the real picture [8].

Based on these data we may suggest that not all patients obtain medical and social assistance. The composition of the primarily recognized persons with disabilities due to DM by disability groups in the Dnipropetrovsk region in 2014–2019 is shown in Figure 3.

The highest number of persons with primary disability due to DM is persons of 3rd group. Their specific gravity in different years ranges from 57.0% in 2018 to 70.5% in 2014. These figures are consistent with the disability pattern of other chronic diseases. More patients are recognized by persons with disabilities in the early stages of complications for active rehabilitation treatment through the development of a personalized disability rehabilitation program, including free rehabilitation activities provided by the state. The specific gravity of persons with group II disability is stable, which is approximately one-third among the primarily recognized persons with disabilities due to DM. Unfortunately, the specific gravity of 1st group disability persons is increasing. Thus, this indicator increased by 2 times due to the period from 2014 to 2018: from 6.6% - in 2014 to 12.9 - in 2018. This trend is unfavorable because it indicates an increase in severe complications of diabetes.

Our study has developed modern approaches to medical and social expertise of patients with diabetes and its complications which include assessing life limitations. These

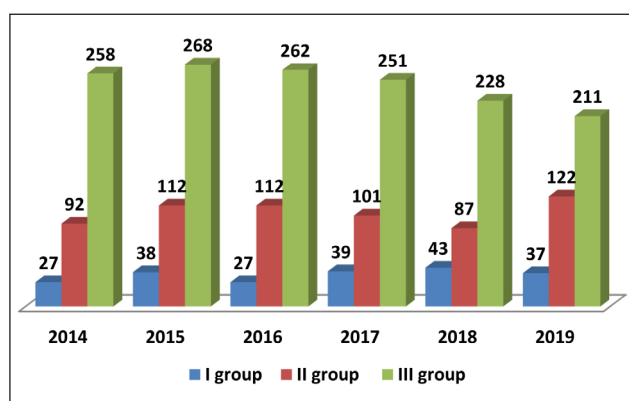


Figure 3: Composition of primary recognized persons with disabilities due to DM by disability groups in Dnipropetrovsk region in 2014–2019.

approaches developed in accordance with the concept of disability in Ukraine, which is based on WHO recommendations [4, 9, 10]. In patients with diabetes, the following vital criteria are most often violated: the ability to work, ability to move and ability to self-care; ability to learn, and orientation.

According to the expert cases and referrals to medical expertise in patients with diabetes life-threatening disorders lead to DM complications, in particular:

- diabetic neuropathy (with sensorimotor, autonomic disorders, with the formation of chronic foot ulcers, including Charcot's foot, with impaired locomotor functions of the feet);
- diabetic retinopathy (with impaired visual function or complete loss of vision). Diabetic retinopathy is found in 85% of DM patients, proliferative diabetic retinopathy in 10–18% of patients);
- diabetic kidney disease (DKD) with symptomatic arterial hypertension and end-stage renal disease (ESRD), which requires hemodialysis. According to scientific data diabetic kidney disease, occurs in 35–60% of DM patients and includes 5 stages (C.E.Mogensen, 1983);
- diabetic macroangiopathy of the lower extremities with chronic arterial insufficiency. This pathology is often complicated by poorly healed cutaneous bacterial infections up to the amputation of the lower extremities. This pathology leads to a decrease in the ability to move and self-care.

Concomitant diseases complicate the diabetes course and form a higher degree of life limitation. This is a concomitant cardiovascular pathology (ischemic heart disease, atherosclerosis, hypercholesterolemia, cerebral disorders, consequences of stroke, rhythm disorders, circulatory failure, etc.).

According to the normative state documents, a person with a disability due to diabetes is recognized as a person who has a health disorder with a persistent disorder of body functions, which leads to a limitation of life and necessitates its social protection.

The first group of disability in diabetes is established in patients with persistent health disorders due to impaired body functions, leading to a marked pronounced limitation of one of the following categories of life or their combination: the ability to work severe degree; ability to a self-service severe degree, ability to move severe degree; ability to orient severe degree; the need for constant third-party care or assistance. Such limitations of life occur in patients with severe retinopathy (blindness of both eyes); neuropathy, manifested by persistent paralysis, ataxia; diabetic encephalopathy with severe mental disorders; diabetic cardiomyopathy against stage III heart failure; severe angiopathy of lower extremities with gangrene, formation of the diabetic foot; ESRD, need for hemodialysis, with complications of renal replacement therapy; without DM compensation with frequent hypoglycemia and diabetic coma.

The second group of disability is established for patients with persistent impaired health disorders, caused by an impaired organism, leading to a pronounced limitation of one of these types of life, or their combinations: the ability to work moderate degree; ability to a self-service moderate degree; ability to move moderate degree; ability to work moderate degree; ability to learn moderate degree; ability to orient moderate degree. Such life limitations occur in patients with diabetic retinopathy II–III stages (with visual acuity of the better-sighted eye or single eye with a correction of 0.1–0.05; field of view - from 10° to 20°), initial DKD, neuropathy II stage (pronounced paresis), encephalopathy with persistent mental changes.

The third group of disability is established in patients with persistent health disorders due to impaired body functions, which lead to a moderately pronounced limitation of one of the following life categories or their combination: the ability to work in the mild degree; ability to a self-service mild degree; ability to move mild degree; ability to learn mild degree, ability to orient mild degree. Such life limitations occur in patients with diabetes with mild and moderate disorders of target organs function: DKD 3b stage; diabetic retinopathy with visual acuity of the better-sighted eye or single eye with a

correction > 0.1–0.3; field of view - within 20–40°; expressed sensorimotor neuropathy with paresis and/or with imbalance, and/or with a high risk of foot ulcer recurrence.

Conclusions

1. Results of the study showed that the indicators of disability due to diabetes in Dnepropetrovsk region and Ukraine are stable and average 1.7 and 1.5 per 10 thousand population, respectively, in 2014–2019. Global tendency to increase the number of DM patients given the opportunity to expect an increase of disability indicators in the country. The only way to prevent disability growth is strict glucose control in DM patients, which will reduce the severe complications that cause life limitations.
2. We have identified an unfavorable tendency to increase intensive indicators of primary disability due to DM among the employable population in Dnipropetrovsk region. This indicator averaged 2.4 per 10 thousand population, which is much higher than among the adult population in Dnipropetrovsk and Ukraine.
3. Medical and social expertise of persons with disabilities due to diabetes based on determining the criteria of life limitations. In the study, we proposed criteria for determining the signs of disability, taking into account the DM severity, DM control, presence of complications, the nature and degree of impairment, the nature and degree of life limitations, rehabilitation potential, and rehabilitation prognosis, need for different types of social protection.

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