Original Article

Dynamics of Disability Indices and Professional Rehabilitation of Diabetes Patients

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Abstract

Introduction: The article presents results of the study about dynamics of disability indicators due to diabetes mellitus and their peculiarities in Dnipropetrovsk region and in Ukraine and presents recommendations for the professional rehabilitation of such patients and persons with disabilities. **Material and Methods:** We conducted a retrospective analysis of the dynamics of DM disability according to the data of the Municipal Institution "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. **Results:** It was determined that the most common reasons for referral of patients with medical expertise were: insufficient glycemic control with the formation of chronic foot ulcers, which led to disorders of the feet musculoskeletal functions - 37.6%; lower limb amputation at different levels - 21.8%; impaired vision - 40.6%. Indicators of disability due to diabetes in Dnipropetrovsk region was stable in 2014-2019, but raised the average level of disability in Ukraine and ranges from 1.5 - 1.7 per 10 thousand population in 2014 vs 1.4-1.5 per 10 thousand in 2019. Persons with 3rd group disability made the largest part among persons with primary disability due to diabetes in 2014-2019: specific gravity ranged from 57.0% in 2018 to 70.5% in 2014. The unfavorable tendency of disability indicators is characterized by an increase of persons who were initially recognized as having disability due to DM with 1st group disability by 2 times from 6.6% - in 2014 to 12.9 - in 2018. **Conclusion:** This can be explained by the increased number of DM complications and their severity. The indicator of total rehabilitation among of persons who were initially recognized as having disability due to DM in Dnipropetrovsk region in 2014-2019 does not exceed 3%.

Keywords: Disability, diabetes mellitus, glycemic control, chronic foot ulcers

Introduction

Today, diabetes mellitus (DM) is a global problem that spreads to different countries over the years. According to statistics, there were 425 million patients worldwide in 2017, International Diabetes Federation experts estimate that their number will increase to 629 million in 2045, around 90% of them will be type 2 DM.[1,2]

The main reason for disease growth is a dramatic change in lifestyle. In the ranking of countries by the number of people with DM are: 1. India - 50,8 million ; 2. China - 43.2 million; 3. USA - 26.8 million; 4. Russia - 9.6 million; 5. Brazil - 7.6 million; 6. Germany - 7.6 million; 7. Pakistan - 7.1 million; 8. Japan - 7.1 million; 9. Indonesia - 7 million.; 10. Mexico - 6.8 million.

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The prevalence of DM in Ukraine has increased by half over the past 10 years. In 2016, there were over 1.2 million people with diabetes in Ukraine. At the same time, almost 3% of the primary disability of adult population in Ukraine is due to DM.[3] However, according to the estimations of leading experts-endocrinologists these figures are twice bigger.[4]

DM is different from all other endocrine diseases not only significant prevalence but also the frequency and severity of complications. In 70%–80% of cases DM leads to the development of cardiovascular, cerebrovascular diseases, pathology of vision organ, this is increases the risk of heart

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disease by two times, blindness by ten times, gangrene and lower limb amputations by 15–40 times. According to the World Health Organization, nearly 50% of deaths under the age of 70 are due to high blood glucose, which is thought to be the seventh cause of death in the world by 2030.[5,6] The economic losses due to diabetes are caused not only by the costs of treatment but also by disability and the cost of rehabilitation.[4]

People with disabilities due to DM and patients with DM require medical and social rehabilitation. Thus, they must be on the dispensary account. There are 66.8% of persons with disabilities need psychological help; 78.6% of persons with disabilities need vocational rehabilitation, the largest part of them– 88.2%– are persons with the 3rd group disability. Social rehabilitation is required by 48.6% of persons with disabilities (most of them are persons with the 1st and 2nd groups disabilities) and 17% with the 3rd group disability.[7]

The aim of the study

The study aim is to estimate the dynamics of disability indicators due to DM and their peculiarities in the Dnipropetrovsk region and in Ukraine and to determine recommendations for vocational rehabilitation.

Materials and Methods

We conducted a retrospective analysis of the dynamics of DM disability according to the data of the Municipal Institution "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 nonparametric statistics methods implemented in STATISTICA 6.1 software packages (StatSoftInc., Serial No. AGAR909E415822FA). The study was conducted according to the ethical principles of the Helsinki Declaration with the permission of the Bioethical Commission of the SE "Dnipropetrovsk Medical Academy of the Ministry of Health of Ukraine."

Results of the Study

The study included 2342 patients with DM. It was determined that the most common reasons for referring patients for medical and social expertise were:

- Poor glycemic control with frequent hypoglycemia, diabetic neuropathy with sensorimotor and autonomic disorders, chronic foot ulcers, including Charcot foot, skin and bacterial infections of lower extremities that poorly healed, which leads to disorders of the musculoskeletal functions of the feet - 37.6%
- Lower-limb amputation at different levels due to diabetic macroangiopathy and chronic arterial insufficiency, which leads to violations of vital criteria such as the ability to move and self-care - 21.8%
- Impaired vision or complete loss of vision, as the main cause of disability identified in 40.6% of studied patients. About 45% of studied patients have impaired vision as a concomitant DM complication. According to the literature, diabetic retinopathy is found in 85% of patients, severe stages of retinopathy in 10%–18%.[8]

It is important to note that diabetic nephropathy is not analyzed as an indicator of disability due to DM in this study. We analyzed diabetic nephropathy as indicator that characterizes the kidneys condition. Therefore, the severe diabetic nephropathy with symptomatic arterial hypertension and chronic renal failure, and the need for hemodialysis were not considered in this study. According to scientists, diabetic nephropathy occurs in 35%–60% of patients and is the most common cause the need for hemodialysis.[9]

The intensive indicator of primary disability among adults in the Dnipropetrovsk region was 1.5/10,000 population in 2014–2017; 1.4– in 2017–2019.

The intensive indicator of primary disability among the employable population in 2017 was 2.3/10,000people; in 2015-2.5; in 2016-2.4 in 2017-2.6; in 2018-2.2; in 2019-2.4.

We have determined that specific gravity of older people is much higher, which is understandable because the number of complications and their severity increases progressively depending on DM duration.

Table 1 presents the composition of persons who were initially recognized as having disability due to DM in the Dnipropetrovsk region in 2014–2019 by disability groups.

Specific gravity of persons with the 3rd group disability due to DM ranged from 57.0% in 2018 to 70.5% in 2014. Specific gravity of persons with the 2nd group disability was stable in 2014–2019 and was approximately 30% of the primary recognized persons with disabilities due to DM. 2nd group disability of person 1st group disability increased by 100%: From 6.6% in 2014 to 12.9 in 2018, indicating an increase in disabling complications of DM.

Today's task of medical and social expertise is to turn a person with a disability to a full life in society. The solution to this problem is a clear adherence and qualified drawing up of an individual rehabilitation program, which consists of medical, psychological, social, and particular vocational components.

The main task of medical rehabilitation is glycemic control (drug therapy) and lifestyle modification. These include therapeutic, prophylactic nutrition, diet therapy, changes in diet and preferences, increased physical activity, in particular, therapeutic exercise to normalize excess weight.

Also, important to educate patient and/or person with a disability to live with his chronic disease, teach self-control of blood sugar and blood pressure, foot care, to quit smoking. An indicator of successful rehabilitation in medical and social expertise is the indicator of total rehabilitation.

Table 1: The composition of persons who were initially recognized as having disability due to diabetes mellitus in Dnipropetrovsk region in 2014-2019

Year	Total number of persons who were initially recognized as having disability	1st group disability (%)	2nd group disability (%)	3rd group disability (%)
2014	404	27 (6.9)	92 (22.7)	258 (70.5)
2015	418	38 (9.0)	112 (26.8)	268 (64.1)
2016	401	27 (6.7)	112 (27.9)	262 (65.3)
2017	391	39 (9.9)	101 (25.8)	251 (64.2)
2018	358	43 (12.0)	87 (24.3)	228 (63.7)
2019	390	37 (10.0)	122 (33.0)	211 (57.0)

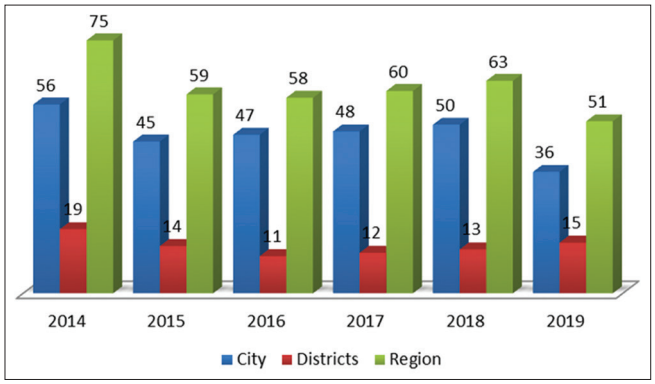

Figure 1: The indicator of total rehabilitation among of persons who were initially recognized as having disability due to diabetes mellitus in the Dnipropetrovsk region in 2014–2019

The indicator of total rehabilitation among of persons who were initially recognized as having disability due to DM in the Dnipropetrovsk region in 2014–2019 is shown in Figure 1.

The indicator of total rehabilitation among of persons who were initially recognized as having disability due to DM in the Dnipropetrovsk region in 2014–2019 does not exceed 3%. It is important that the rehabilitation rate of persons with disability in districts is almost three times lower, compared to the city and is 39 patients versus 14, respectively. Unfortunately, this may indicate a much lower level of patient's accessibility to qualified medical care.

Thus, the results of this study show that the intensive indicator of primary disability among adults in the Dnipropetrovsk region was 1.5/10,000 populations in 2014–2017; 1.4–in 2017–2019. The indicator of primary disability due to DM among the adult population and employable population remained at a stable level in Ukraine in 2014–2019-1.5–1.6/10,000 populations.[10]

Comparison of indicators of primary disability among adults in city and districts of Dnipropetrovsk region revealed that this indicator is on an average 60% higher in districts. The indicator of primary disability due to DM among the employable population was at a stable level in Ukraine in 2014–2019-1.6/10,000populations.[10]

Comparison of indicators of primary disability among the employable population showed that in Dnipropetrovsk region districts it is almost two times higher than in the city.

Discussion

Professional rehabilitation is required to return patients with diabetes to a full life in society, especially to patients with DM complications.

Physical work of moderate severity and mental work with high neuro-emotional stress; work, the sudden termination of which is dangerous due to the possibility of accidents or disruption of the production process (work on the conveyor, near the moving mechanisms, at altitude, in hot shops, drivers, transport, dispatcher on the remote control, etc.) are contraindicated for patients with moderate severity of diabetes and those who receiving insulin. Patients with lesions of the vessels of the lower extremities are contraindicated work associated with prolonged standing, walking, vibration; in the case of vascular lesions of the retina is contraindicated work associated with long-term focus. Young patients should be advised to study and further employ in the specialties: Accountant, clerk, archivist, draftsman, watchmaker for repairing mechanical watches, watchmaker, secretary-printer, laboratory assistant, and photographer.

For people with the 3rd group disability are available the professions of mental work related to moderate nervous-mental stress (engineer, technologist, accountant (with the diploma of specialist), accountant, doctor, economist, librarian, lawyer, laboratory assistant, as well as professions of physical labor, associated with mild or moderate stress (locksmith, assembler, electrician, meter, operator, debugger). For people with the 2nd group disability are available professions that can be performed in specially created conditions (special equipment, special, and adaptation); at businesses where they worked before disability (with professional skills) or at home.

Patients with diabetes without complications to prevent the occurrence of disability is contraindicated physical work of considerable stress; working at altitude, near moving mechanisms; in hot shops; underground; in contact with toxic substances; with vibration; mental work of considerable tension, at a given pace; work at night shift; works related to traffic safety or the possibility of injury; work related to the impact of industrial poisons, relocations, business trips, unregulated working days, in adverse microclimatic conditions. The following professions are recommended: Design engineer (urban planning, civil engineering); structural

engineer (electrical engineering); engineer-technologist in mechanical engineering; food technology engineer; engineer-technologist in light industry (technology and design of garments); architect; technical engineer; veterinarian; land management engineer; economist; accountant; manager in financial activity; merchant; statistician; lawyer; notary; investigator; doctor; pharmacist; philologist; physiologist; psychologist; journalist; musicologist; painter; sculptor; art critic.

Conclusions

1. The study shows that dynamics of disability indicators due to diabetes in the Dnipropetrovsk region was stable in 2014–2019, but the average level of disability in Ukraine increases and ranges from 1.5 to 1.7/10,000 population versus 1.4–1.5/10,000, respectively. Taking into account epidemiological studies of the increasing number of DM patients worldwide, gives the opportunity to expect an increase of disability indicators due to diabetes in the country, in Ukraine and in the Dnipropetrovsk region
2. In the structure of primary disability due to diabetes predominated persons of retirement age, their specific gravity averaged 64.4%, which may be explained by an increased number of DM complications and its severity which progressively increases depending on DM
3. The highest number of persons with primary disability due to diabetes in 2014–2019 was with the 3rd group disability: specific gravity in different years ranged from 57.0% in 2018 to 70.5% in 2014. The unfavorable tendency of disability indicators is characterized by an increase of persons who were initially recognized as having disability due to DM with the 1st group disability by two times from 6.6% - in 2014 to 12.9 - in 2018
4. The indicator of total rehabilitation among the persons who were initially recognized as having disability due to DM in the Dnipropetrovsk region in 2014–2019 did not exceed 3%. In districts, the rehabilitation rate was on almost three times lower than in the city, which may indicate a much lower level of patients accessibility to qualified medical care. To overcome the trend identified in our study, it is necessary to apply comprehensive measures of individual medical and social rehabilitation program for persons with disabilities due to diabetes, which involves activities on medical, professional, and social aspects.

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Conflicts of interest

There are no conflicts of interest.

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