



Analysis of Disability due to Diabetes Mellitus in a Large City

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ABSTRACT

Significance. A majority of people with diabetes are unaware of having diabetes complications. When not well managed, all types of diabetes can lead to complications in many parts of the body, resulting in disabilities and early death.

Purpose. To study the dynamics of the disability of the population of Almaty (Republic of Kazakhstan) due to diabetes

Material and methods. Data was collected from the registries of medical records in the Republic Center of Electronic Healthcare, Ministry of Health of the Republic of Kazakhstan and Department of Labor, social protection and migration in Almaty for the period from 2013 to 2017. The object of the study was 651 patients – residents of Almaty, suffering from diabetes mellitus, who were identified as a «disabled child», I, II and III disability groups during the initial examination in 2013-2017 by the territorial departments of medical and social expertise. There were 298 disabled people due to type 1 diabetes, and 353 disabled people due to type 2 diabetes. The study group consisted of 309 women and 342 men. The paper uses data from medical and social examination records, extracts from the medical history and outpatient cards of disabled people suffering from diabetes.

Statistical methods the analysis in the research was carried out on the basis of descriptive statistics: average values and standard deviations.

Results. Majority of disabled people had decompensated disease. Diabetic retinopathy observed in $29.63 \pm 0.06\%$, including among disabled people of 1st degree is 12.0%, among disabled people of 2nd degree is 42.0%, among disabled people of 3rd degree - 46.0%. Diabetic nephropathy (stage 3 or more) was detected in $22.92\% \pm 0.03\%$, including chronic renal failure. Diabetic foot syndrome over five years averaged $19.69 \pm 0.04\%$. Of these: 1st degree disabled people - 15.3%, 2nd degree - 76.3%, 3rd degree - 8.4%. In last 5 years amputations between people with disabilities due to diabetes averaged $12.63 \pm 0.02\%$. Amputation of one or both lower limbs is an irreversible process; it is also the most serious complication of diabetes.

Discussion. The results are stated that the indicator of disability due to diabetes among the population of the city of Almaty is affected by type II diabetes adult contingents of the population and type I diabetes more often by children and adolescents. Severe complications (diabetic retinopathy, diabetic nephropathy, diabetic foot syndrome and limb amputation), early disability, premature death put this disease on a par with global health problems.

Keywords: Diabetes mellitus, complications, disability, a large city

INTRODUCTION

According to the International diabetes Federation (IDF), no country is immune from diabetes and the epidemic is expected to continue. In 2017, about 425 million people worldwide, or 8.8% of adults between the age of 20 to 79, had diabetes. If this trend continues, by 2045, 629 million people between the ages of 20-79, will have diabetes [1].

Diabetes mellitus (DM) is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation [2]

Diabetic retinopathy is an important cause of blindness, and occurs as a result of long-term accumulated damage to the

small blood vessels in the retina. Diabetes is the cause of 2.6% of global blindness [3].

The risk of developing cardiovascular diseases in diabetes increases 2-3 times [4], end-stage chronic kidney failure-10 times [5], lower limb amputation-10-20 times [6].

Data from 54 countries reveal that more than 80% of end stage renal disease cases are caused by diabetes, hypertension or a combination of both [5].

Based on data from the UK, one-fifth of people with diabetes 90 and based on data from the US, 40% of people with diabetes will develop chronic kidney disease, whereas 19% show signs of stage 3 or higher [7].

Neuropathy is a frequently encountered complication of diabetes. Diabetic neuropathy affects the distal nerves of the

limbs, especially in the legs, which contributes to the development of ulcers (diabetic foot). Every 30 seconds a lower limb or part of a lower limb is lost to amputation somewhere in the world as a consequence of diabetes [8-10].

It has been shown that older women, those with lower education and non-European immigrants had a higher risk of work disability after acute myocardial infarction (AMI), particularly permanent work disability. ST-elevation myocardial infarction (STEMI), Coronary artery bypass grafting (CABG), diabetes mellitus, stroke, musculoskeletal disorders and CMDs provide important clinical information for work disability after AMI [11].

Utilizing Swedish populace based register information, the degree to which comorbid conditions add to the danger of inability benefits among individuals with diabetes was inspected. While diabetes was a danger factor for handicap annuity because of musculoskeletal issues and sicknesses of the circulatory framework, even subsequent to representing the previously mentioned conditions, the relationship between inability benefits because of mental issues and diabetes was weakened after alteration for mental issues. Along these lines, in spite of the fact that diabetes is an autonomous danger factor for handicap benefits, comorbid conditions add to this danger to a huge degree [12].

Self-reported diabetes mellitus in grown-ups and older adults living in the city of São Paulo, Brazil was approved. Results showed that the utilization of the datum of self-revealed diabetes mellitus is substantial, particularly among more adults living in the city of São Paulo. Additionally, the need to follow diabetes mellitus in asymptomatic subjects who have at least one danger factors for it, primarily in the grown-up populace of this city has been featured [13].

Given the long lasting use related with diabetes and its entanglements, people, families and the general public can't adapt to the monetary, passionate and social infection trouble because of diabetes. The financial weight of diabetes can be diminished by giving all inclusive medical care inclusion, admittance to moderate drugs and early location and therapy of the confusion. This underscores the requirement for a multi-delayed system to limit the weight of diabetes and its entanglements [14].

The determination of diabetic neuropathy dependent on Clinical Neurological Examination (CNE) and the variables that impact the event of diabetic neuropathy in Type 2 DM patients at Amplas Primary Health Care (PHC) in Medan City were analyzed. It is shown that instruction and early identification with legitimate administration can forestall more serious complexities so the personal satisfaction of patients can be looked after better [15].

The primary ever worldwide appraisals recommend that diabetes-related lower-extremity complications (DRLECs) are a huge and developing supporter of the inability trouble worldwide and lopsidedly influence guys and center to more seasoned matured populaces. These discoveries ought to encourage strategy producers worldwide to target techniques at populaces excessively influenced by DRLECs [16]. Recently, a few information propose that diabetes is went with slightness just as handicap among the more seasoned grown-ups. Thinking about the clinical hugeness of slightness and inability, it is essential to comprehend the pathway from diabetes to fragility as well as incapacity. Furthermore, it is firmly prescribed to locate another restorative mediation are needed

to satisfy the expanding need of overseeing more seasoned diabetic patients with the populace maturing [17].

A scientific examination on 924 members matured 70 and more established from the Frailty and Dependence in Albacete (FRADEA) demonstrated that the danger of mortality progressively expanded toward the less practically free finish of the grouping [18]. The intellectual functioning and emotional well-being of the total Norwegian populace with KATP channel neonatal diabetes was evaluated. A solid genotype-phenotype connection was discovered, uncovering the p.V59M genotype as profoundly connected with considerable intellectual disability, with no huge relationship with the hour of sulfonylurea inception [19].

The motivation behind this investigation was to look at the relationship among handicaps and diabetes training program use for patients with diabetes was inspected and factors related with diabetes instruction program use were distinguished. Results indicated that individuals with disabilities were 14% more averse to utilize diabetes training programs than individuals without [20]. Paterson et al. compared the frequency and factors associated with diabetes medication-taking (depression, perceived side effects, self-efficacy and social support) in people with mild to moderate intellectual disability and those without intellectual disability. It is concluded that further examination of medication-taking and reactions may bring about the advancement of an evidence-informed mediation to improve drugs security in individuals with intellectual disabilities [21].

Obesity and type 2 diabetes are basic in grown-ups with a learning handicap. It isn't known whether the standards of self-administration can be applied in this populace. A case-discovering technique and an observational investigation of grown-ups with a learning handicap and type 2 diabetes were created and furthermore a practicality randomized controlled preliminary (RCT) of SSM versus treatment not surprisingly (TAU) was attempted. It is demonstrated that an authoritative RCT is practical and would need to select 194 members for every arm [22]. It was contemplated that how financial status, way of life factors and employment strain were identified with work incapacity in people with diabetes with and without comorbidity. Pooled information from three associate investigations indicated that low financial status, weight, and occupation strain are connected to both comorbidity and expanded work inability in representatives with diabetes [23].

The relationship between the beginning of frailty and the start of practical disability was determined. Results indicated that the commonness of frailty and prefrailty was 17.8% and 39%, separately, and were related with age, level of disability, and the presence of gastrointestinal sickness. Prefrail patients had beginning degrees of reliance, while the individuals who were not delicate were generally free [24]. Chemotherapy-induced peripheral neuropathy (CIPN) may continue after treatment closes and may prompt practical decrease and falls. Objective and self-report measures of physical function, gait patterns, and falls between women cancer survivors with and without symptoms of CIPN were compared to identify targets for functional rehabilitation [25].

Conditions such as vascular complications such as diabetic retinopathy, diabetic nephropathy, diabetic polyneuropathy, diabetic foot, amputation of the lower extremities are the main causes of disability and mortality in diabetes.

Disability issues are important social issues in our society. Especially relevant today are medical and social rehabilitation. Full and timely rehabilitation is necessary to improve the quality of life of people with disabilities, and social adaptation to everyday life in society.

Purpose

To study the dynamics of the disability of the population of Almaty (Republic of Kazakhstan) due to diabetes.

MATERIALS AND METHODS

Data was collected from the registries of medical records in the Republic Center of Electronic Healthcare, Ministry of Health of the Republic of Kazakhstan and Department of Labor, social protection and migration in Almaty for the period from 2013 to 2017. The object of the study was 651 patients – residents of Almaty, suffering from diabetes mellitus, who were identified as a «disabled child», I, II and III disability groups during the initial examination in 2013-2017 by the territorial departments of medical and social expertise. There were 298 disabled people due to type 1 diabetes, and 353 disabled people due to type 2 diabetes. The study group consisted of 309 women and 342 men. The paper uses data from medical and social examination records, extracts from the medical history and outpatient cards of disabled people suffering from diabetes.

Statistical Methods

The analysis in the research was carried out on the basis of descriptive statistics: average values and standard deviations.

RESULTS

We examined electronic medical records for 651 people with disabilities due to DM from 2013 to 2017.

When analyzing the level of primary disablement due to diabetes, the percentage of disability tended to increase (in 2013 - 19.3%, 2014 - 22.5%, and 2015 - 27.2%) and only in 2016 it decreased slightly (26.9%), and by 2017 it increased again to 29.0%, moreover the growth was 66.6%.

The level of primary disablement due to diabetes in Almaty for the period from 2013 to 2017 ranged from 0.97 ± 0.001 to 1.23 ± 0.001 per 10 thousand of the adult population and averaged 1.09 per 10 thousand of the population.

The distribution of people with disabilities by gender was as follows: in 2013 - 54.5% of men and 45.5% of women, 2014 - 57.7% of men and 42.3% of women, 2015 - 51.8% of men and 48.2% of women, 2016 - 46.6% of men and 53.4% of women, 2017 - 54% of men and 46% of women. Over the entire period among the disabled, the overwhelming majority were males - an average of $53.0 \pm 4.0\%$, women - an average of $47.0 \pm 4.0\%$.

The average age of disabled people with type 1 diabetes was 11.08 ± 1.3 years, type 2 diabetes was 58.8 ± 1.3 years.

The statistically equal value of people with disabilities due to type 2 diabetes was $54.2 \pm 2.7\%$ compared with type 1 diabetes $45.8 \pm 2.7\%$.

For the analyzed period, the structure of the social status of people with diabetes is as follow: unemployed – $29.35 \pm 1.3\%$, pensioners – $20.60 \pm 2.1\%$, and employees $9.1 \pm 2.0\%$.

In this paper, an analysis was carried out on having an education, since there were about 30.0% of disabled people, however, the study showed, more than 30.0% had secondary specialized and higher education. The distribution is as follows: secondary education – $22.3 \pm 3.5\%$, secondary special education (technical school, college) – $11.5 \pm 0.9\%$, higher education – $21.3 \pm 3.6\%$.

The average duration of the disease before undergoing medical and social examination was 10.5 ± 0.5 years.

The study showed the predominance of the 2nd degree disability group of $28.69 \pm 0.04\%$. In 2013 and 2014, this amounted to 29.70% and 29.80, respectively, but 2015 showed a significant decrease to 21.90%, and in 2016 and 2017 an increase in the number to 30.13% and 31.90%, respectively. The disability of the 3rd degree group and the 1st degree was $16.66 \pm 0.03\%$ and $13.87 \pm 0.03\%$, respectively.

The causes of disability established that the «general disease» - $58.8 \pm 1.3\%$, in second place «disabled child» - $41.2 \pm 1.3\%$.

Majority of disabled people had decompensated disease during the examination: in 2013 – 72.27%, 2014 – 79.98%, 2015 – 74.45%, 2016 – 69.86%, 2017 – 69.33%. During the medical examination, in the stage of compensation were $3.18 \pm 0.009\%$, in the stage of sub compensation – $23.68 \pm 0.04\%$, in the stage of decompensation – $73.14 \pm 0.04\%$.

In the structure of disability with a mild degree of severity, the course is $3.31 \pm 0.02\%$, with moderate degree $33.04 \pm 0.04\%$, and with a severe degree $63.65 \pm 0.03\%$.

The study analyzed the main complications of diabetes among disabled people, namely: diabetic retinopathy, diabetic nephropathy, terminal chronic renal failure resulted from the introduction of chronic dialysis, diabetic polyneuropathy, diabetic foot and amputation of the lower limbs.

Diabetic retinopathy observed in $29.63 \pm 0.06\%$, including among disabled people of 1st degree is 12.0%, among disabled people of 2nd degree is 42.0%, among disabled people of 3rd degree - 46.0% (Figure 1).

Diabetic nephropathy (stage 3 or more) was detected in $22.92\% \pm 0.03\%$, including chronic renal failure. Diabetic nephropathy between disabled people of 1st degree occurred in 46.3%, 2nd degree - in 37.6%, 3rd degree - 16.1% of cases (Figure 2).

The proportion of end stage renal disease receiving chronic dialysis in the period from 2013 to 2017 averaged - $9.68 \pm 0.03\%$. All 100% of patients have 1st degree of disability this is the most serious complication (Figure 3).

Diabetic neuropathy was detected in $64.40 \pm 0.04\%$ of disabled people, 1st degree of disability in 12.0% of cases, 2nd degree of disability in 38.0%, 3rd degree of disabled people - 50.0% (Figure 4).

Diabetic foot syndrome is a serious chronic complication. In the structure, diabetic foot syndrome over five years averaged $19.69 \pm 0.04\%$. Of these: 1st degree disabled people - 15.3%, 2nd degree - 76.3%, 3rd degree - 8.4% (Figure 5).

In last 5 years amputations between people with disabilities due to diabetes averaged $12.63 \pm 0.02\%$. Disabled people of 1st degree make up - 23.4%, 2nd degree - 76.6%, disabled people of 3rd degree - not found (Figure 6).

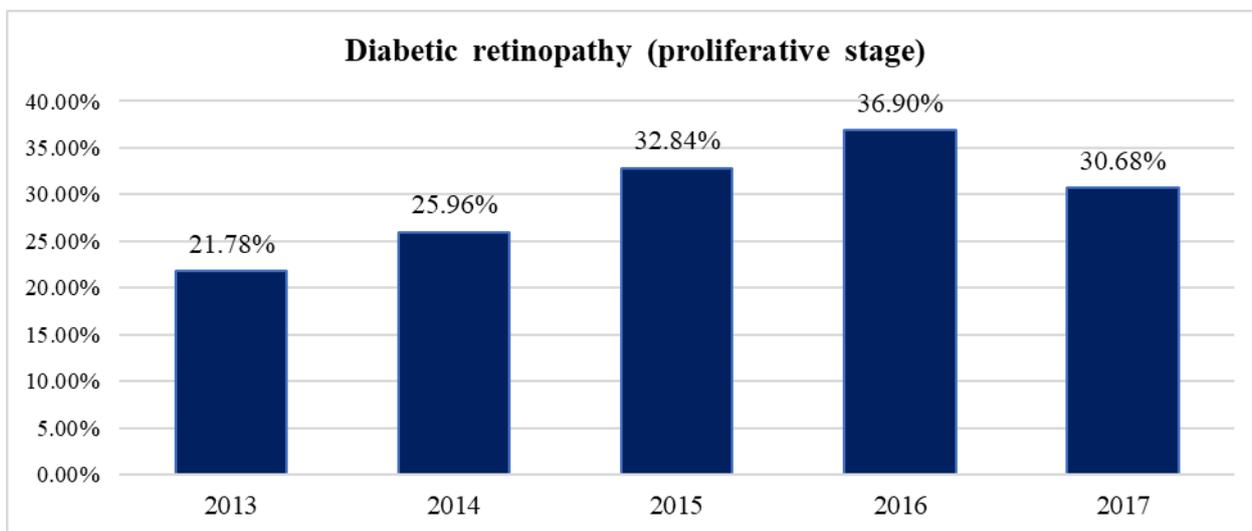


Figure 1. The structure of complications of diabetic retinopathy (preproliferative stage) in the period from 2013 to 2017 (%)

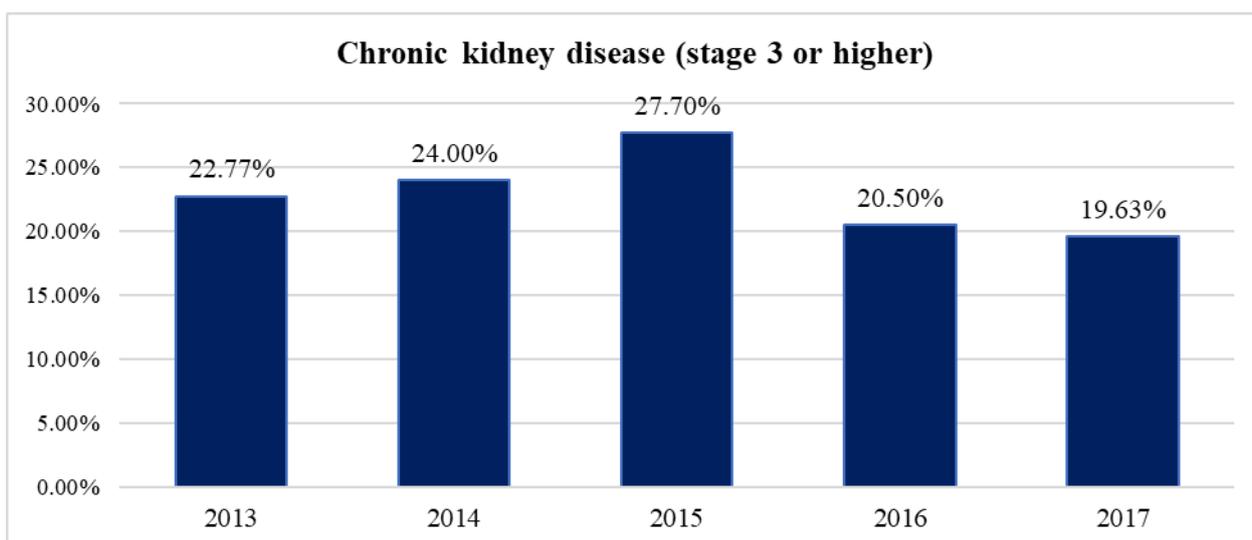


Figure 2. The structure of complications of diabetic nephropathy (stage 3 or more) in the period from 2013 to 2017 (%)

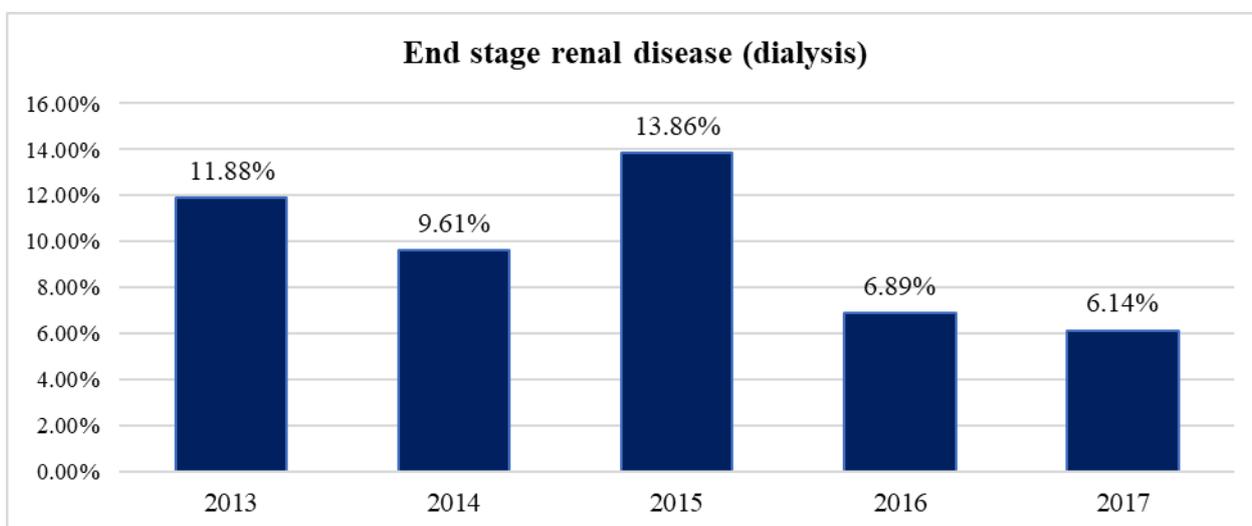


Figure 3. The structure of complications of terminal chronic renal failure, including chronic dialysis in the period from 2013 to 2017 (%)

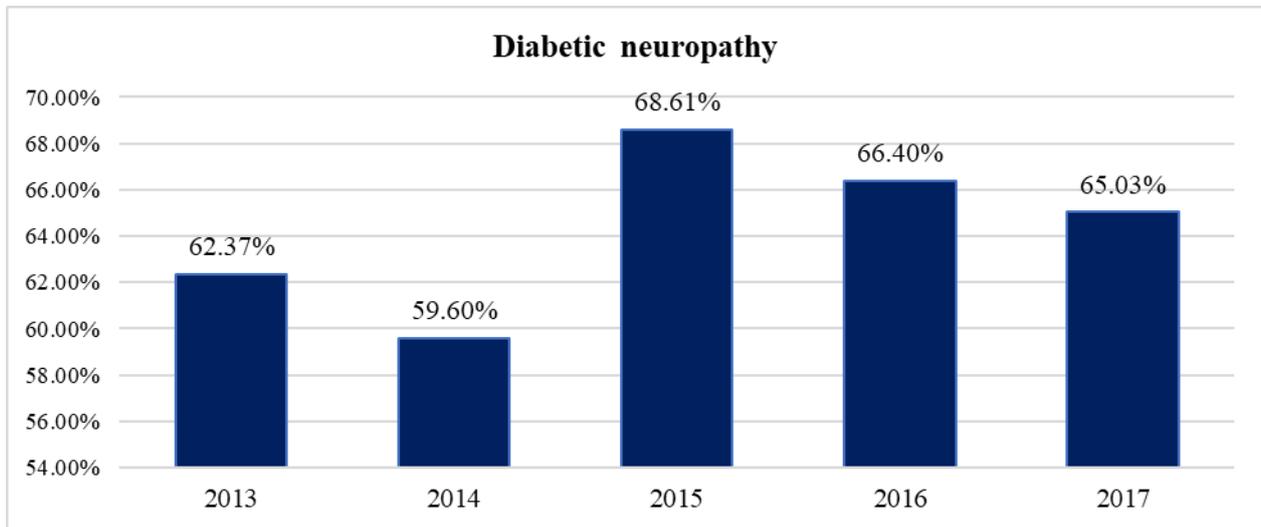


Figure 4. The structure of complications of diabetic neuropathy in the period from 2013 to 2017 (%)

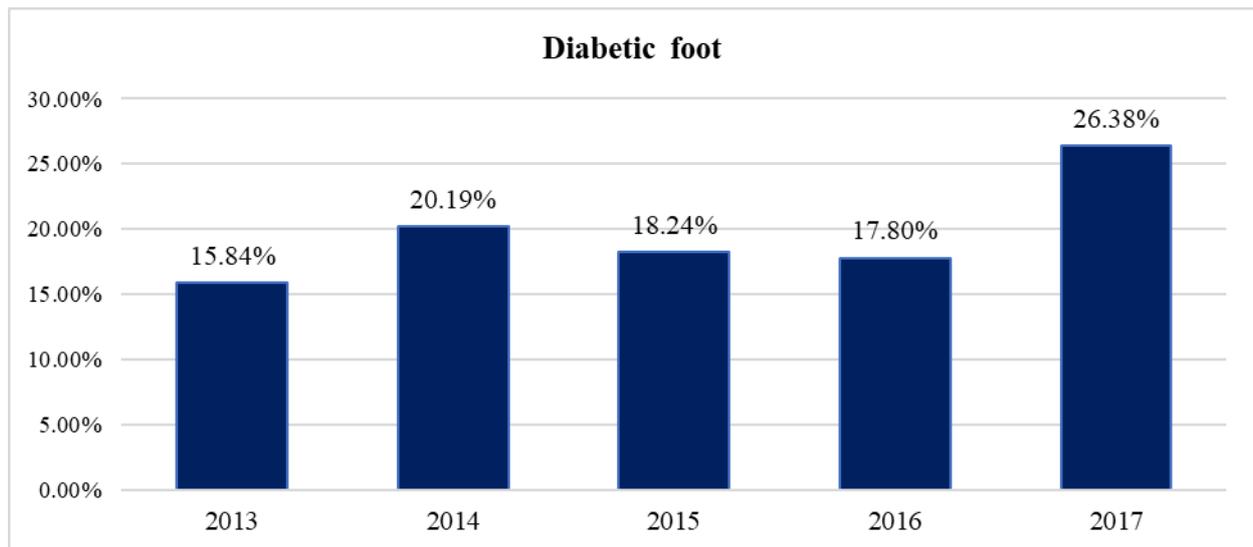


Figure 5. The structure of complications of the diabetic foot in the period from 2013 to 2017 (%)

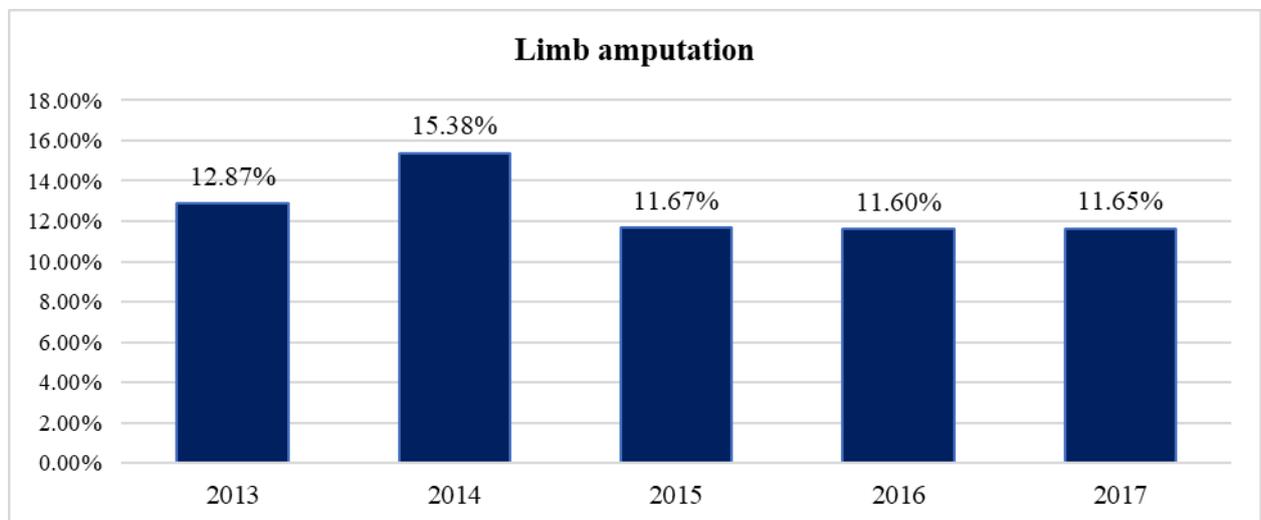


Figure 6. Structure of the complication of amputation due to diabetes in the period from 2013 to 2017 (%)

Survival rate among patient diabetes mellitus type II with complication is very low. From the sample, 18.6% (n=121) died during the study period, and 81.4% (n=530) patient were survived.

The number of patients age group 0-17 years is 266 (40.9%), 18-29 years is 11 (1.7%), 30-39 years is 12 (1.8%), 40-49 years is 53 (8.1%), 50-59 years is 157 (24.1%), 60-69 years is 102 (15.7%), 70-79 years is 45 (6.9%), ≥ 80 years is 5 (0.8%). Moreover, the number of deaths in the age group of ≥ 80 years 4 (80.0%), then 70-79 years is 28 (62.2%), 60-69 years is 36 (35.3%), 50-59 years is 42 (26.8%), 40-49 years is 8 (15.1%), 30-39 years is 2 (16.7%), 18-29 years is 1 (9.0%). As we noticed, age is increases then survival lifetime of patients is gradually decreases. Out of 651 diabetes mellitus patients, number of male patients are 342 (52.5%), female patients are 309 (47.5%). However, the number of male deaths is more 71 (20.8%), than the female deaths 50 (16.2%). The number of deaths among type II diabetes patients 115 (32.5%) are higher than the type I diabetes 6 (2.0%).

DISCUSSION

The results are stated that the indicator of disability due to diabetes among the population of the city of Almaty is affected by type II diabetes adult contingents of the population and type I diabetes more often by children and adolescents. Severe complications (diabetic retinopathy, diabetic nephropathy, diabetic foot syndrome and limb amputation), early disability, premature death put this disease on a par with global health problems.

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Declaration of interest: No conflict of interest is declared by authors.

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