

Ophthalmological Complications from Diabetes Mellitus: The Organization of Medical Care and Peculiarities of Disability Formation in Tashkent

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Abstract The state of organization of medical aid for patients suffering from diabetes mellitus at the first, ambulatory-policlinic stage has been studied with the aim of preventing its ophthalmological complications. An opinion poll held among general practice doctors, endocrinologists and ophthalmologists, as well as among patients, showed that level of the work of family polyclinic doctors for prophylaxis and early treatment of ophthalmological complications from diabetes mellitus is not quite satisfactory. There are also presented ten-year data on the disability caused by ophthalmodiabetes, peculiarities of its formation depending on a disability group, disabled person's age, the type of diabetes mellitus as well as a frequency of its detection by year. It is shown that the level of disability from ophthalmological complications of diabetes mellitus is relatively low, however, active working age people with a severe degree of disability, i.e. total loss of sight, prevail among the disabled people. In such cases, as a rule, not only the sick person himself drops out of labor activity, but some of their family members has to nurse him that causes significant economic loss.

Keywords Sight-disability, Ophthalmological complications from diabetes mellitus

1. Introduction

At the present time diabetes mellitus (DM) ranks among the paramount medical and social problems all over the world. According to the International Diabetes Federation, currently there are more than 300 million people with diabetes worldwide and, as predicted, by 2030 this number will additionally increase by 67% [2, 3].

One of the most frequent and severe DM complications is diabetic ophthalmopathy. Among the DM patients, a risk of blindness increases 25-fold as compared to the population. Most dangerous of them is believed to be diabetic retinopathy (DR) which is one of key causes of total loss of sight among the people of active working age between 20 and 65 in the economically developed countries [1, 2, 4].

A similar situation can be observed in Uzbekistan. According to experts of the CIS Executive Committee, over the last 10 years, in our country the number of DM patients annually increases by 8%. So, according to the data of the Republican Center of Endocrinology under the Ministry of Health of the RUZ, in the Republic the number of DM

patients amounts to about 130 000, however, taking into account that not less than 2% of the Central Asian population suffer from DM while the population of Uzbekistan amounts to about 30 million people, the actual number of people sick with DM is, at least, six time larger and, as estimated by the WHO experts, it amounts to, at least, 800 000. It is expected that by 2030 this number will exceed 1.5 million [5-7].

The reformation of the public health-care being implemented in Uzbekistan from 1998, has radically transformed the system of health care delivery to the republic population. According to a new model of health-care organization, it is just at the primary stage of ambulatory-policlinic treatment that the main bulk of medical services are provided including the preventive therapy of ophthalmological complications from DM. At the present time, it has become necessary to assess efficiency and rationality of organization of medical aid to the patients with diabetic ophthalmopathies in our country. Along with this, the problem of incapacitation caused by ophthalmological complications from DM, peculiarities of its formation and structure in Uzbekistan.

2. The Research Objective

In order to determine guidelines for reduction of disability

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caused by ophthalmological complications from DM, it is envisaged to study and assess the quality of medical aid (preventive therapy) for ophthalmological complications from DM provided at the ambulatory-polyclinic stage and also study the factors influencing the primary and recurrent disability caused by this pathology in Tashkent over 2003-2012.

3. Materials and Methods

In order to study and assess the primary health care of patients with DR a questionnaire survey was held among 711 doctors of Tashkent city family polyclinics. The group of respondents consisted of general practice doctors (82.8%), endocrinologists (9.6%) and ophthalmologists (7.6%). Their employment experience in the same occupation ranged from 7 months to 42 years. We have also conducted an opinion poll among 154 DM patients who were undergoing medical examination or treatment in the city clinics and had DR in their anamneses. Among the respondents there were 12.6% of patients with type 1 DM and 87.4% patients suffered from type 2 of the disease; 89 patients were residents of Tashkent and the rest (65 people) – of the Tashkent region and other regions of the Republic.

We have analyzed the data of 348 acts of examination of patients, whose disability resulted from ophthalmological complications from DM, by specialized ophthalmological medical-labor expert commissions (MLEC) of Tashkent over 10 years.

The study was complete, except children under 16 years of age (since capacity for work was under study) and patients suffering from malignant noncompensated hypertension which can also cause retinal angiopathy.

The average age of the patients was 55; their sex structure was as follows: men - 59% (205), women – 41% (143). A proportion between the disabled people with types 1 and 2 of

DM was 13% and 87% respectively. In the paper are provided the data on the calculated specific weight of disability, registered as a result of both primary and repeated expert examination in their dynamics, as well as disability frequency with the confidence coefficient t determined (at $t \geq 2$, the error probability $p < 0.05$) [16].

Herewith, the average annual population in Tashkent was: in 2003 – 2137.3 thous; in 2007– 2168.6 thous; in 2012 – 2325.9 thous. Thus, the average annual population over the period under study amounted to 2269.5 thousand people.

4. Results and Discussion

As results of the questionnaire survey show, almost half of general practice doctors (43.5%) send the patients with new-onset diabetes to ophthalmological examination only if they have visual complaints. While endocrinologists as well as ophthalmologists (78.7% and 89.9% respectively) recommend that ophthalmological examination should be conducted immediately.

Similar is the situation with setting the regularity of patients' examination. In the opinion of the majority of general practice doctors, it is sufficient for a DR patient to undergo examination once a year (45.1%) or half-yearly (35.1%) though its regularity should be determined directly by the ophthalmologist (66.1%) and endocrinologists (58.5%), agree with this.

At that, if ophthalmological complications develop in the patient, in the therapists' opinion, patients themselves are responsible for it (78.2%), since they have not follow doctors' directions. Yet, endocrinologists and ophthalmologists, who in their majority examine DR patients in proper time, have another view of this problem and think that one of the reasons for DR patients late reference to doctor (almost in half of cases – 49.5%) is unsatisfactory work of primary health care doctors (See Table 1).

Table 1. The results of the questionnaire survey of doctors from Tashkent city family polyclinics

Issue under study	General practice doctors	Endocrinologists	Ophthalmologists
Patients with new-onset DM are examined by ophthalmologist:			
✓ immediately	34.8%	78.7%	89.9%
✓ when a patient has visual complaints	43.5%	15.9%	9.6%
✓ during planned medical examination	21.7%	5.4%	0.5%
How regular DM patients should be examined:			
✓ once a year	45.1%	17.7%	12.8%
✓ half-yearly	35.1%	23.8%	21.1%
✓ should be prescribed by ophthalmologist	19.8%	58.5%	66.1%
Reference to doctor of the patient with significant vision disorders is a result of:			
✓ patient's being uninformed	21.8%	43.3%	49.5%
✓ non-fulfillment of doctor's instructions	78.2%	56.7%	50.5%
What methods of DR treatment and prophylaxis do you recommend to your patients?			
✓ medicament therapy	78.8%	45.4%	23.2%
✓ laser surgery	16.3%	45%	58.4%
✓ vitreoretinal surgery	4.9%	9.6%	18.4%

We have also studied the degree of doctors' awareness of the up-to-date methods of treatment and prophylaxis of DR. As the survey results showed, almost 80 % of family doctors, as before, attach great importance to the medicament therapy (Emoxipinum, Taufonum and others), preferring it to other forms of treatment. At the same time, a considerable number of ophthalmologists send their patients to undergo laser and vitreoretinal surgery (58.4 and 18.4% of cases). Yet they also prescribe conservative treatment at different stages of DR actively enough.

According to the results of the DR patients survey, about 59 % of respondents had not been informed about the necessity of regular medical examination by an ophthalmologist, about potential visual complications from DM as well as about the necessity of implementation of preventive measures (considerable part of patients were the residents of remote regions). About one third of respondents (29%) had a notion of DR, however, for various reasons, they did not follow the doctors' recommendations. Only 7 patients (mainly, residents of the capital) were under oculist's observation and underwent laser coagulation of retina.

A number of patients primarily registered as disabled (PRD) is small, it ranges between 0.79 per 100 thousand people (35.4%) in 2003 and 0.31 (29.2%) in 2010. On the average over 10 years, it amounts to 12-13 disabled people per year (0.55 per 100 thousand people); over the entire period under study, 125 people were registered as disabled. A number of patients recurrently registered as disabled (RRD) is considerably higher (refer to Figure 2).

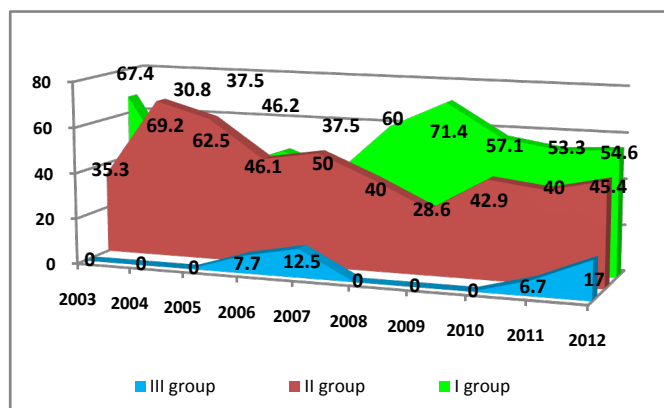


Figure 1. Distribution of visually impaired persons as a consequence of DM by disability groups among the PRD in Tashkent in 2003-2012 (per 100 thousand people)

In 2003, the number of patients recurrently registered as disabled amounted to 1.45 per 100 thousand people (65.6%), by 2011, it decreased to 0.69 (51.6%), and, on the average, it comes to 0.97 person per year. On the average over 10 years, the specific weight of PRD amounts to 35.9%, of RRD – 64.1%, that exceeds the number of patients primarily registered as disabled by 1.8 times. This is accounted for by a process of gradual accretion of disabled people in the population (refer to Figure 2).

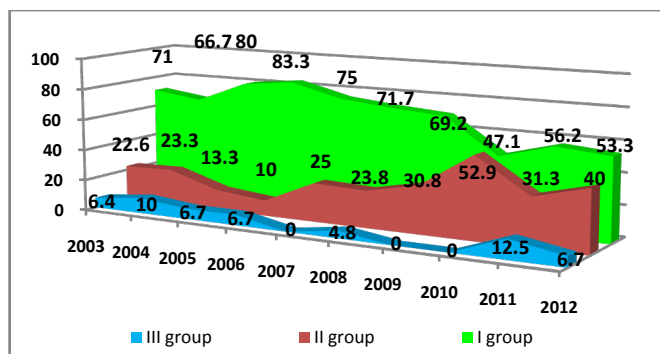


Figure 2. Distribution of visually impaired persons as a consequence of DM by disability groups among the RRD in Tashkent in 2003-2012 (per 100 thousand people)

Over 10 years of observations, the indices of dynamics of primary and recurrent disability were notable for great instability, lack of significant differences and spasmodic changes without viable objective causes. Most logically, such dynamics can be explained by the absence of objective criteria of persistent loss of ability to work (disability). registration. This is exactly a reason for a small number of sick people recognized group III disabled persons (a mild degree of disablement). In some years of the observation period this indicator came to 0%.

As is known, DR develops latently until a total loss of eyesight. That is a patient who did not present any visual complaints and showed high results of evaluation of visual function, all of a sudden becomes completely blind. It is clear that when there are no well-defined criteria of determination of II and III disability groups, an expert's conclusion will not be able to reflect an actual level of the risk of eyesight loss.

In Tashkent, the level of general invalidity caused by ophthalmological complications from DM is not high: in 2003–2006 it ranged from 2.3 to 2.0 per 100 thousand people, gradually decreasing to 0.9 by 2009; by 2012, the number of disabled people slightly increased to 1.1; an average over the period under study – 1.5 per 100 thousand people. Such decrease can be explained by two factors. On the one hand, by enhancement of efficiency of secondary and tertiary prophylaxis of ophthalmological complications from DM. On the other hand, as stated above, by imperfection of criteria of determination of disability and a degree of its severity.

Determination of the disability structure by groups showed that disabled persons of groups I and II prevail in the structure of both RRD and PRD. There are practically no disabled persons of group III in the structure of primary disability, their average specific weight is 3.2% of the total number. There are much more disabled persons of group II whose specific weight ranges from 28.6% to 69.2%; on the average – 47.2%, and of group I whose specific weight ranges from 30.8 to 71.4%; on the average 49.6% of the total number (Figure 3).

The structure of recurrent disability somewhat differs from the primary disability. Disabled persons of group III are

also not numerous and their average specific weight is only 5.8% of the total number. The specific weight of disabled persons of group II substantially fluctuates over the period of 10 years: from 10% in 2006 to 52.9% in 2010, being on the average 24.7%. There are many disabled persons of group I, on the average - 69.5% over 10 years (Figure 4).

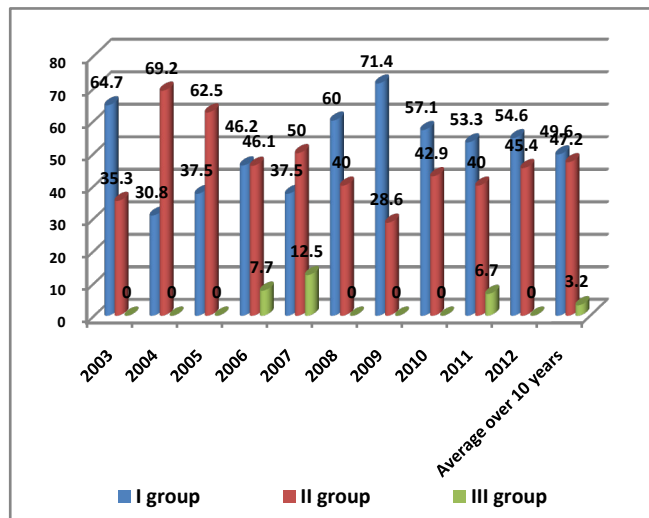


Figure 3. The structure (specific weight in %) of primary disability caused by ophthalmological complications from DM by disability groups in Tashkent over the 10-year period

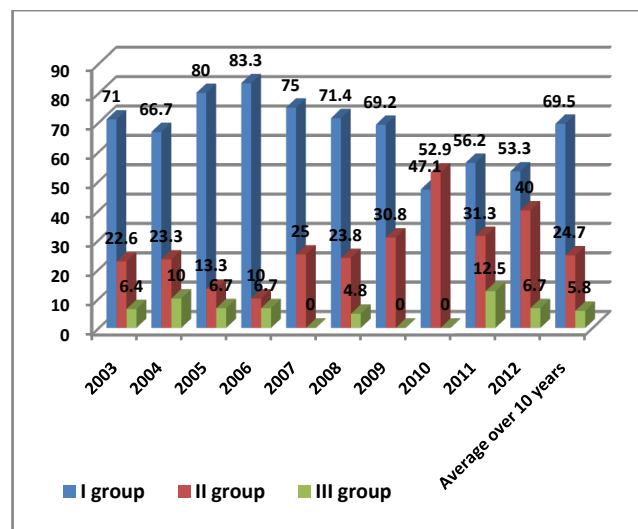


Figure 4. The structure (specific weight in %) of recurrent disability caused by ophthalmological complications from DM by disability groups in Tashkent over the 10-year period

The calculated level of PRD based on groups is higher than that of RRD: the average disability level of group I came to 0.7 per 100 thousand people, of group II - 0.2, of group III - 0.1; of the entire recurrent disability - 1.0. Among the primary disability there are no disabled persons of group III, in groups II and I группа - by 0.3, on the average it is 0.6 per 100 thousand people. Thus, the general level of disability is not high, though it should be noted that the disability of severe groups I and II prevails including those among primary disability.

We can explain a high level of disabled persons of severe groups among the RRD patients by, first of all, one-sided approach of the MLEC experts who consider acuity of vision to be the main criterion for identification of disability without regard to the condition of the organ of vision as a whole. This requires that the criteria for identification of disability should be revised by expanding the list of indications that will allow effecting arrangements of tertiary prophylaxis and, consequently, help to defer the onset of not only total loss of working capacity but also of falling into a position of dependence on nursing care and this, in the long run, will lessen economic damage.

Distribution of disabled people depending on the DM type by groups as a result of primary examination was the following. Type 1 DM: 30.8% of patients were diagnosed with disability group I, 57.3% of patients - group II, and 11.9% of cases - group III. Type 2 DM: 44.78% cases - disabled persons of group I, 49.25% of patients - group II, and only 5.9% of cases had disability group III. Thus, irrespective of the DM type, a major part of patients were diagnosed with disability groups I and II, i.e. severe degrees of disease followed by not only significant restriction of working capacity, but also deterioration of quality of life.

Analysis of the age structure of disability by year showed that there are relatively few young-age people among those primarily registered as disabled - from a total absence of this category persons to 0.04-0.05 per 100 thousand people; an average of the total number over 10 years is 0.04. The numbers of disabled persons among people of middle and retirement age turned out to be equal: the occurrence rate among the middle-age persons ranges from 0.14 in 2004 - 2005 to 0.37 in 2009: on the average - 0.26 per 100 thousand people over the period under study. Among the retirement age people, the occurrence rate ranges within 0.09 to 0.6, being on the average equal to that of middle-age people - 0.26 per 100 thousand people (Figure 5).

The structure of the recurrent disability somewhat differs from that of the primary. The number of middle-aged persons prevails there; the occurrence rate fluctuates from 0.3 to 0.79, on the average over 10 years it is 0.53 per 100 thousand people. The number of young age disabled persons is higher (by 4.5 times) than in PRD, on the average over the period under study - 0.18 per 100 thousand people. It is because this group comprises the patients with type 1 DM whose disease was diagnosed at an early age and who have been disabled from childhood. The number of retirement age persons ranges from the lowest in 2008 - 0.14, to the highest in 2004 - 0.52, on the average - 0.26 per 100 thousand people. The analysis of the disability age structure showed that middle age persons, i.e. working-age population, constitute a considerable share in both RRD and PRD (Figure 6).

The study of medical examination acts showed that the main disabling pathology in 100% cases of type 1 DM was DR; in type 2 DM, in 86.1% of cases it was DR, and 13.9% of patients had diabetic cataract. Among the persons with achrestic DM (type 1), laser coagulation of retina was

executed in 33.2% of cases, and 1.1% of disabled persons underwent vitreoretinal surgery. Among the patients with type 2 diabetes mellitus, laser coagulation of retina was executed in 11.4% of cases, 5.22% of persons have

vitrectomy in their anamnesis, 9.13% underwent cataract extraction and thus, the number of disabled persons who have undergone a course of laser coagulation of retina is not high.

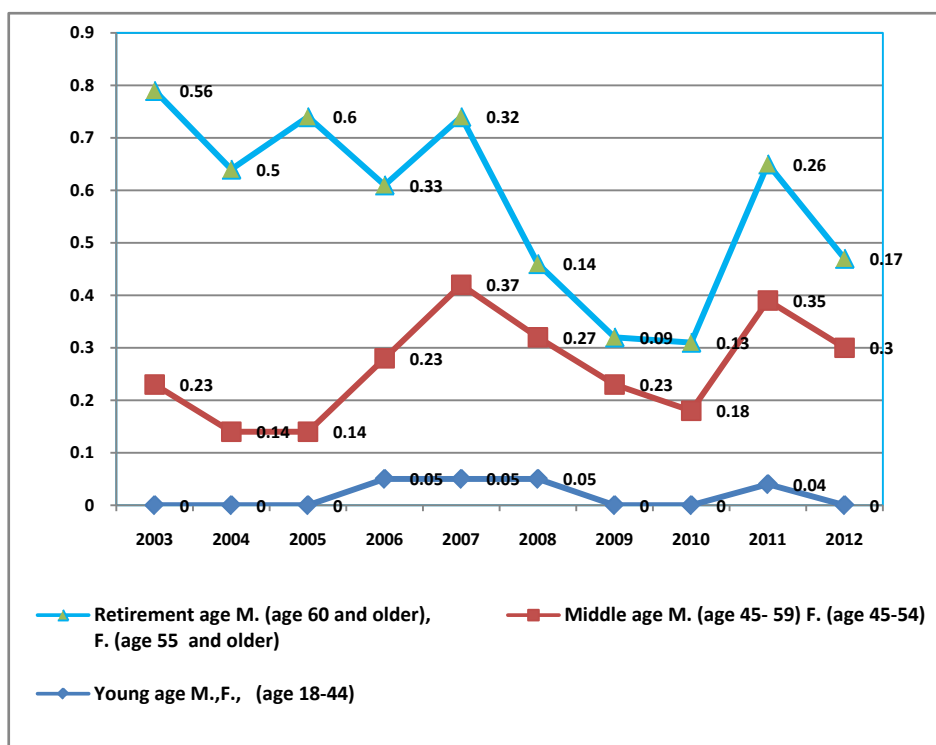


Figure 5. The level of primary disability caused by ophthalmological complications from DM by age groups in Tashkent within 2003-2012 (per 100 thousand people)

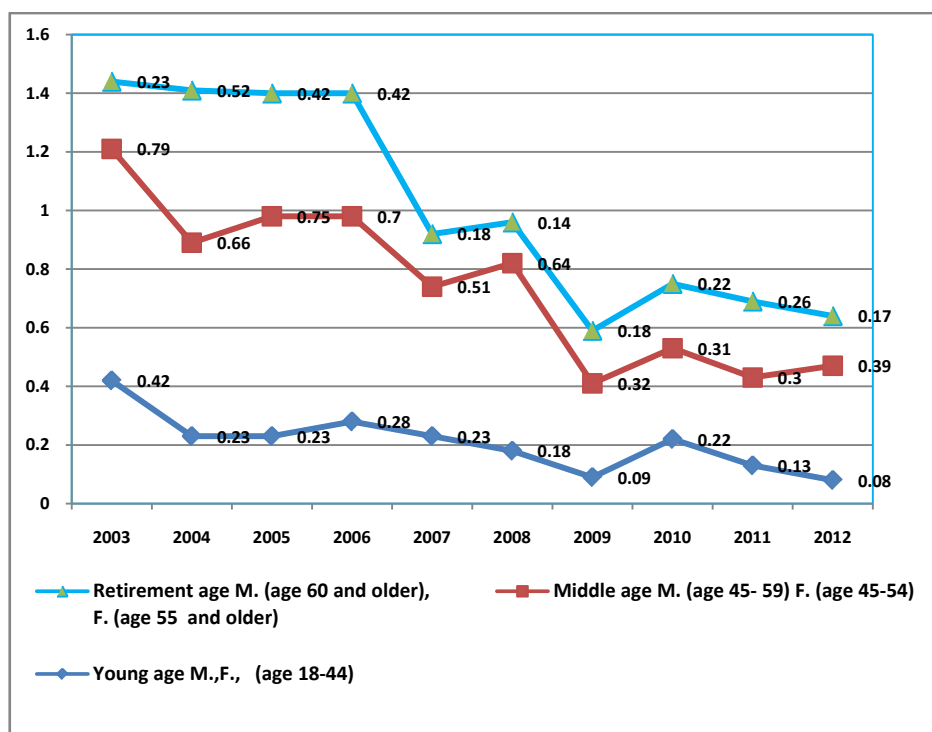


Figure 6. The level of recurrent disability caused by ophthalmological complications from DM by age groups in Tashkent within 2003-2012 (per 100 thousand people)

5. Conclusions

Summarizing the questionnaire survey results as a reserve for further reduction of ophthalmological complications from DM causing disability, the following principal areas should be emphasized:

- early referral of all newly diagnosed DM patients for advice of ophthalmologist;
- activate explanatory work on the importance of early and regular examination by an ophthalmologist among the DM patients;
- focus attention of general practice doctors and narrowly focused specialists on importance of forehanded diagnostics and treatment of this group of sick people.

The following peculiarities of primary and recurrent disability caused by ophthalmological complications from DM in Tashkent:

- number of RRD is higher than number of PRD;
- disabled persons of group II prevail among the patients suffering from type 1 DM; among the patients suffering from type 2 DM, distribution between disabled persons of groups I and II is nearly the same. It is explained by the fact that type 1 DM is diagnosed at an early age when children are under more tight medical supervision which help to prevent the development of complications and also by the fact that at a young age measures of secondary prophylaxis turn out to be more efficient.
- on a whole, the level of disability caused by ophthalmological complications from DM is not high, however, disabled persons of groups I and II prevail among the patients with this diagnose who need greater social support;

- persons of middle age, i.e. working-age population, prevail among the disabled that also causes economic damage;
- it is necessary to have revised the criteria for identification of disability of patients with ophthalmological complications from DM at the stage when it is still possible to adjust a disabling factor and restore working ability.

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