ABSTRACT

Objective: The objective of this research was to study the opinion of therapists and highly specialized doctors (cardiologist, neuropathologist, and oculist) in Almaty polyclinics on the provision of endocrinological care for patients with type 2 diabetes.

Methods: A sociological study was conducted on the basis of a specially developed questionnaire. The questionnaire consisted of 23 questions. The database was created in the Microsoft Access 2010 program. Statistical processing of data was carried out using the SPSS 22.0 software package. The average relative values have been calculated with the value of their standard error.

Results: Most patients with type 2 diabetes mellitus are observed in primary health care by therapists and endocrinologists. According to 86.7% of therapists, the number of patients with diabetes exceeds the number of registered patients and the determination of blood glucose level in the daily practice of therapists will reveal a large part of them. Most of the interviewed doctors believe that they have difficulties in servicing patients due to the presence of concomitant disease in patients, low adherence of patients, and a narrow choice of drugs for treatment. According to the opinion of doctors of different specialties (endocrinologists, cardiologists, neurologists, and oculists), when examining patients with type 2 diabetes, complications from the cardiovascular system, nervous system, and organ of vision are identified.

Conclusion: The organization of outpatient care for patients with type 2 diabetes mellitus should be interrelated by therapists and cardiologists, neurologists, and ophthalmologists. It should be based on continuity and interdisciplinary approach and is aimed to ensure patient satisfaction with the quality of care and adherence to treatment and to improve the quality of life.

Keywords: Primary care, Type 2 diabetes, General practitioners, Specialists.

INTRODUCTION

Today, there are about 451 million people with diabetes in the world, and by 2045, the number of people with this disease will increase to 693 million, while the national cost of diabetes per year is 850 billion U.S. dollars [1]. Annually, 4 million people die from diabetes due to cardiovascular disease [2], and the costs of treating a diabetic patient increases by 60–90% as the vascular problems progress [3]. According to the National Health Service (NHS), the UK spends £ 9.8 billion annually (up to 80% of costs) for treating complications of diabetes [4]. The Berlin Declaration notes that “The policy currently implemented in relation to diabetes and its complications are not sufficient to solve this problem at its root” and stresses the need to maintain and strengthen health at the primary level in the context of primary health care, as described in the Alma-Ata Declaration. The Berlin Declaration acts as a global call for action by all countries on diabetes and identifies four main strategies that are measurable and internationally applicable: Disease prevention, early detection, timely monitoring, and access to appropriate health services.

The above mentioned four directions cover the whole range of primary health care, as described in the Alma-Ata Declaration [5-7]. Maintaining adequate glycaemic control in patients with diabetes is necessary to prevent micro- and macrovascular complications and premature death [8]. In connection with the ever-increasing number of people with diabetes and the lack of endocrinologists, [9] in the context of primary health care, general practitioners carry out diabetes management while endocrinologists manage just 20% of the patients. [10]. Family doctors play a significant role in the treatment of patients with diabetes, in changing their lifestyle and preventing complications [11,12].

Diabetes management is, especially, difficult in primary health care due to the need for significant resources and the necessary knowledge of specialists. Questionnaires were completed by 362 family physicians (79% response rate). And as surveyed by family doctors, only 9% refer their patients with diabetes to secondary care [13]. The American Association for the Study of Diabetes in 2018 published standards for the provision of medical care for diabetes, based on evidence-based recommendations aimed at managing risks, in particular, cardiovascular diseases, including hypertension, integration of new technologies in diabetes management, and screening in a group increased risk [14]. The review [15] found that multicomponent professional interventions (e.g., audit and feedback, decision-making by consensus and peer review, central computerized tracking systems, and nurses who regularly contacted patients) can improve the effectiveness of the provided medical services to patients with diabetes.

MATERIALS AND METHODS

Materials
The sociological study was conducted on the basis of a specially developed questionnaire. The questionnaire consisted of 23 questions. The database was created in the Microsoft Access 2010 program. Statistical processing of data was carried out using the SPSS 22.0 software package. The average relative values have been calculated with the value of their standard error.

RESULTS AND DISCUSSION

A survey of doctors was conducted in almost all polyclinics in Almaty. The number of specialists in polyclinics varied. There could
In most cases, patients with type 2 diabetes come to the therapists by the referral from the endocrinologist constitute 60.0%, the percentage of patients by the records of emergency medical care is amounted to 33.3%, and those who come independently comprise 6.7% (Fig. 1).

As 86.7% of therapists think on the question of the need to determine the level of blood glucose in the routine practice of therapists, it will be possible to identify the majority of cases of type 2 diabetes at an early stage, whereas 13.3% of specialists responded negatively (Fig. 2). 100% of the respondents responded negative to the question: “Is there a glucose meter in the office?”.

In the view of 53.3% of therapists, the use of screening scales and questionnaires will allow to timely detect complications of type 2 diabetes. At the same time, 26.7% of therapists believe that timely preventive examinations (eye and leg examinations) will make it possible to identify these complications in a timely manner, and only 13.3% of therapists presume that the introduction of an interdisciplinary approach will help in identifying complications of diabetes mellitus and the number of some other methods used for this purpose is amounted to 6.7% (Fig. 3).

According to the opinion of 33.3% of therapists, when advising patients with type 2 diabetes, difficulties arise due to the presence of concomitant disease, 30.0% of therapists consider low adherence of

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**Table 1: Personal details of the respondents**

| Characteristics                        | Absolute number | % Total $\pm$SD |
|----------------------------------------|-----------------|-----------------|
| Gender                                 |                 |                 |
| Male                                   | 3               | 10.0±5.48       |
| Female                                 | 27              | 90.0±5.48       |
| Total                                  | 30              | 100.0±0.0       |
| Age                                    |                 |                 |
| Under the age of 30                    | 2               | 6.6±4.55        |
| 30–39 years old                        | 6               | 20.0±7.30       |
| 40–49 years old                        | 13              | 43.3±9.05       |
| 50–59 years old                        | 9               | 30.0±8.37       |
| 60–69 years old                        | -               | -               |
| Over the age of 70                     | -               | -               |
| Total                                  | 30              | 100.0±0.0       |
| Length of service in the profession    |                 |                 |
| Under 1 year                           | 2               | 6.6±4.55        |
| From 2 to 5 years                      | 17              | 56.7±9.05       |
| Over 5 years                           | 9               | 30.0±8.37       |
| Over 10 years                          | 2               | 6.6±4.55        |
| Total                                  | 30              | 100.0±0.0       |
| Possession of qualification grades by the specialists | | |
| I qualification grade                  | 7               | 23.3±7.72       |
| II qualification grade                 | 3               | 10.0±5.48       |
| The highest qualification grade        | 12              | 40.0±8.94       |
| No qualification grade                 | 8               | 26.7±8.07       |
| Total                                  | 30              | 100.0±0.0       |

*Means±SD
patients, 20.0% of therapists believe that it is due to a narrow choice of medications, 13.3% of therapists consider an insufficient choice of diagnostic methods, and 3.3% of therapists noted other difficulties (Fig. 4).

**Cardiologist**

A total of 22 cardiologists participated in the survey, 86.4% of whom were female and 13.6% male. Among cardiologists, specialists aged 40–49 years were predominant, accounting for 45.5%. 40.9% of cardiologists had a work experience of >10 years. The number of doctors with the highest category made up 45.5%, while 31.8% had no qualification category as shown in Table 2.

Patients with type 2 diabetes do not periodically undergo examination by cardiologists, which leads to the development of complications in the cardiovascular system. The interaction and continuity in the work of doctors of different specialties in the care of patients with type 2 diabetes will reduce the incidence of complications in these patients. The results of the survey showed that 59.1% of patients apply to a

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**Table 2: Personal details of the respondents**

| Characteristics                          | The absolute number | % к “Total,” $\equiv \frac{X}{n} \cdot 100$ |
|------------------------------------------|---------------------|------------------------------------------|
| Gender                                   |                     |                                          |
| Male                                     | 3                   | 13.6±7.32                                |
| Female                                   | 19                  | 86.4±7.32                                |
| Total                                    | 22                  | 100.0±0.0                                |
| Age                                      |                     |                                          |
| Under the age of 30                      | -                   | -                                        |
| 30–39 years old                         | 5                   | 22.7±8.93                                |
| 40–49 years old                         | 10                  | 45.5±10.6                                |
| 50–59 years old                         | 7                   | 31.8±9.93                                |
| 60–69 years old                         | -                   | -                                        |
| Over the age of 70                       | -                   | -                                        |
| Total                                    | 22                  | 100.0±0.0                                |
| Length of service in the profession     |                     |                                          |
| Under 1 year                             | -                   | -                                        |
| From 2 to 5 years                        | 5                   | 22.7±8.93                                |
| Over 5 years                             | 8                   | 36.4±10.3                                |
| Over 10 years                            | 9                   | 40.9±10.5                                |
| Total                                    | 22                  | 100.0±0.0                                |
| Possession of qualification grades by the specialists |       |                                          |
| I qualification grade                    | 2                   | 9.09±6.13                                |
| II qualification grade                   | 3                   | 13.6±7.32                                |
| The highest qualification grade          | 10                  | 45.5±10.6                                |
| No qualification grade                   | 7                   | 31.8±9.93                                |
| Total                                    | 22                  | 100.0±0.0                                |

*Means±SD

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**Fig. 4: The opinion of therapists on counseling patients with type 2 diabetes**

**Fig. 5: Encounter of patients with type 2 diabetes to the cardiologists by the referral from other specialists**

**Fig. 6: Complications of the cardiovascular system in patients with type 2 diabetes**

**Fig. 7: Information on the level of glycosylated hemoglobin and fasting glycemia**
cardiologist at the direction of general practitioners, 31.8% of patients visit cardiologists according to the direction of an endocrinologist, and 9.1% of patients refer to a cardiologist only from emergency medical records (Fig. 5).

It should be noted that all cardiologists identified that there are complications from the cardiovascular system in the treatment of patients with type 2 diabetes. In the opinion of 45.5% of cardiologists, coronary heart disease is most often detected in patients, and the cases with arterial hypertension are amounted to 40.9%. At the same time, 9.1% of the respondents noted myocardial infarction and 4.5% had a stroke (Fig. 6).

About 63.6% of cardiologists believe that when the patient was treated, information about the level of glycosylated hemoglobin (HbA1c) and fasting glycemia was absent. However, in the opinion of 36.4% of cardiologists, there was information on the level of HbA1c and fasting glycemia in the patient (Fig. 7).

About 64.7% of respondents think that patients with type 2 diabetes mellitus should visit cardiologists’ office at least once every 6 months,
whereas 23.5% of cardiologists believe that once a year is enough for them. In this case, according to 11.8% of cardiologists, it is necessary to visit cardiologists by the referral from and indications of the endocrinologist (Fig. 8).

Neurologists

In total, 25 neuropathologists took part in the survey. 79.4% of them were females and 20.6% of males. By the age groups, the largest proportion (38.2%) constituted neurologists aged 40–49 years. The percentage of neuropathologists with >10 years of work experience

Neurologists

In total, 25 neuropathologists took part in the survey. 79.4% of them were females and 20.6% of males. By the age groups, the largest proportion (38.2%) constituted neurologists aged 40–49 years. The percentage of neuropathologists with >10 years of work experience.
The absolute number

| Characteristics | % \( \bar{X} \pm SD \) |
|-----------------|------------------|
| Gender Male     | 5 17.9 ± 7.24    |
| Female          | 23 82.1 ± 7.24   |
| Total           | 28 100.0 ± 0.0   |
| Age Under 1 year| -                |
| From 2 to 5 years| 9 32.1 ± 8.83    |
| Over 5 years    | 13 46.4 ± 9.42   |
| Over 10 years   | 6 21.4 ± 7.75    |
| Total           | -                |
| Under 1 year    | -                |
| From 2 to 5 years| 28 100.0 ± 0.0   |
| Length of service in the profession |
| Under 1 year    | -                |
| From 2 to 5 years| 8 28.6 ± 8.54    |
| Over 5 years    | 13 46.4 ± 9.42   |
| Over 10 years   | 7 25.0 ± 8.18    |
| Total           | 28 100.0 ± 0.0   |
| Possession of qualification grades by the specialists |
| I qualification grade | 4 14.3 ± 6.61 |
| II qualification grade | 7 25.0 ± 8.18 |
| The highest qualification grade | 9 32.1 ± 8.83 |
| No qualification grade | 8 28.6 ± 8.54 |
| I qualification grade | 28 100.0 ± 0.0 |

*Mean±SD

The majority of 76.5% of neurologists do not apply complex scales to assess the clinical symptoms of complications of type 2 diabetes in their practice, while 23.5% of neurologists use the neuropathy disability score scale (Fig. 12).

About 70.6% of the interviewed respondents believe that patients should visit the neuropathologists at least once every 6 months. However, 23.5% of neurologists assume that only once a year should be enough for them, whereas 5.9% of neuropathologists claim that there is a need to refer to the direction from and indications of the endocrinologist (Fig. 13).

**Vision specialists**

A total of 28 ophthalmologists were participated in the survey. Among them, the number of women was 82.4% and men 17.6%. By age groups, the largest proportion was made up of specialists aged 40–49 years (46.4%). Among vision specialists, the number of those with >5 years of work experience prevailed and accounted for 46.4%. The number of doctors with the highest qualification grade was 32.1%, the number of those who did not have the qualification grade was 28.6%, with the respondents having the second qualification grade comprising 25.0%, and the percentage of doctors who had the first qualification grade constituted 14.3% as mentioned in Table 4.

As the results of the survey have shown, 53.6% of the respondents claim that patients come to see the oculist by the referral from the endocrinologist, 32.1% of patients turn to the oculists for the appointment of the GP, and only 14.3% of patients are enrolled in emergency medical records (Fig. 14).

Nearly 94.1% of the ophthalmologists claim that, when patients were treated, there were complications from the eyes, while 5.9% of the respondents noted their absence (Fig. 15).

According to the survey, at the time of the examination, 70.6% of oculists in patients with type 2 diabetes revealed diabetic retinopathy, while 20.6% revealed cataracts, 2.9% revealed glaucoma, 5.9% - others. This provision indicates the development of eye complications in patients with type 2 diabetes (Fig. 16).

About 91.2% of the surveyed ophthalmologists record patients with diabetic retinopathy, while 8.8% of the respondents gave a negative response (Fig. 17).

According to 70.6% of ophthalmologists, patients with type 2 diabetes should visit the ophthalmologists once a year, and if there are some medical reasons, they should see a doctor more often. Moreover, 20.6% of the surveyed ophthalmologists believe that it is necessary to be examined by a doctor 2 times a year. Furthermore, 8.8% of the interviewed specialists think that patients see the oculists by the referral from the endocrinologists (Fig. 18).

**CONCLUSION**

Therefore, as the results of the study have shown, the doctors of different specialties have difficulties in counseling patients with type 2 diabetes and this situation might be due to the presence of existing complications in patients and insufficient knowledge of specialists. The situation is complicated by the fact that, in some clinics, there are no necessary specialists. To improve the level of care, patients should be referred to refresher courses for physicians and doctors of various specialties (endocrinologists, cardiologists, neurologists, and oculists).

**CONFLICTS OF INTEREST**

All authors have none to declare.

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