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INVESTIGATION OF ENDOCRINOLOGIST AND PATIENTS OPINION ABOUT EFFICIENCY AND SAFETY OF DIABETES MELLITUS TYPE 2 TREATMENT

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Abstract: The high prevalence of diabetes has taken alarming dimensions in the world; this epidemic is in constant progression especially the type 2 diabetes which represents 95% of diabetic patients. In Algeria, Diabetes occupies the fourth place in chronic noncommunicable diseases, and poses a veritable public health problem due to its prevalence and its chronic complications. The aim of this work is; to investigate the epidemiology and to develop practical recommendations for healthcare professionals to increase efficiency and safety of diabetes treatment. For this, a survey was conducted in Annaba region, which is considered as one of the biggest urban centers of Algeria. The number of surveyed patients was 50; whereas the number of endocrinologist was 25. The obtained results show a disbalance in doctor's and patient's beliefs and evaluation criteria in diabetes type 2 treatments. Endocrinologists use the objective criteria measured in laboratory (HbAc level, fasting and post-prandial glucose level), and safety criteria (decrease of hypoglycemia). This criterion was marked as main criteria for the effectiveness of diabetes type 2 treatment by 100%, 80%, 64% and 40% of endocrinologist respectively. Patients evaluate the efficiency of diabetes treatment by subjective criteria, as "I feel myself better", "I am more active". It is remarkable, that (55%) of patients evaluate the efficiency of diabetes treatment by low fasting glucose. Important factor for the patients "decrease of weight" is connected for 36% of patients with effectiveness of therapy. In contrast to this view, only 12% of surveyed endocrinologists evaluate the decrease of weight as therapy efficiency criteria. Only 24% of patients marked the HbAc level as effectiveness criteria, which show the misunderstanding by the patients the importance of this laboratory result. The obtained survey results enable to conclude that surveillance of patients is crucial for the improvement of diabetes control and prevention of diabetes complications.

Keywords: diabetes treatment, criteria, control and prevention

INTRODUCTION

Diabetes mellitus is a group of metabolic diseases, which are characterized by hyperglycemia due to insulin secretion deficiency, insulin action defect or to both of these factors [Sekiou et al.,2018]. Chronic hyperglycemia is associated with development of continuous injury and functions damage of different organs (eyes, kidneys, neural system and cardiovascular system).

Diabetes mellitus, often simply referred to as diabetes, is a group of metabolic diseases in which a person has high blood sugar, either because the body does not produce enough insulin, or because cells do not respond to the insulin that is produced. This high blood sugar produces the classical symptoms of polyuria (frequent urination), polydipsia (increased thirst) and polyphagia (increased hunger). There are two main types of diabetes: Type 1 diabetes (IDDM): referred to as insulin-dependent diabetes mellitus, and juvenile diabetes. results from the body's failure to produce insulin, and presently requires the person to inject insulin [7].

Type 2 diabetes NIDDM: results from insulin resistance, a condition in which cells fail to use insulin properly, sometimes combined with an absolute insulin deficiency. (Formerly referred to as non-insulin-dependent diabetes mellitus, and adult-onset diabetes.) [8-10]

Other forms of diabetes mellitus include congenital diabetes, which is due to genetic defects of insulin secretion, cystic fibrosis-related diabetes, steroid diabetes induced by high doses of glucocorticoids, and several forms of monogenic diabetes.

All forms of diabetes have been treatable since insulin became available in 1921, and type 2 diabetes may be controlled with medications. Both type 1 and 2 are chronic conditions that usually cannot be cured.

Diabetes without proper treatments can cause many complications. Acute complications include hypoglycemia, diabetic ketoacidosis, or nonketotic hyperosmolar coma. Serious long-term complications include cardiovascular disease, chronic renal failure, retinal damage. Adequate treatment of diabetes is thus important, as well as blood pressure control and lifestyle factors such as smoking cessation and maintaining a healthy body weight [14-17]. The high prevalence of diabetes has taken alarming dimensions in the world; this epidemic is in constant progression which concerns especially the type 2 diabetes which represents 95% of the diabetic patients.

Every 10 seconds in the world is dying 1 patient due to reasons, connected with diabetes mellitus. Each year 1.3 million people are diagnosed with type 2 diabetes. The rapid increase in new cases of type 2 diabetes in persons 30 to 39 years of age and in children and adolescents is of special concern. This epidemic of type 2 diabetes global and closely reflects the epidemic of overweight, obesity, metabolic syndrome, and sedentary lifestyle. An urgent need exists for an authoritative, practical algorithm for management of patients with type 2 diabetes mellitus that considers currently approved classes of medications and emphasizes safety and efficacy, while also considering secondary factors such as the cost of medications or the number of years of clinical experience with use of any specific drug.

EPIDEMIOLOGICAL SITUATION OF DIABETIS

— In the world

The prevalence of diabetes for all age-groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. The prevalence of diabetes is higher in men than women, but there are more women

with diabetes than men. Moreover, the total number of affected people is expected to increase from 382 million in 2013 to 592 million in 2035 (Guariguata et al. 2014). The most important demographic change to diabetes prevalence across the world appears to be the increase in the proportion of people >65 years of age (CDC, 2010).

The following table (Table 1) shows the estimates of the expected diabetic population in the world, from: Wild et al., 2004

Table 1: Estimations of the expected number of diabetics worldwide

Region	2000	2030
Europe	33.3	48
Middle East	15.2	42.6
Africa	07	18.2
Americas	33	66.8
Asia and Australia	82.7	190.5

— In Algeria

In Algeria, diabetes poses a real public health problem because of its prevalence and its chronic complications dominated by cardiovascular complications, diabetic foot, chronic renal failure and retinopathy. According to a survey of the National Institute of Public Health, diabetes occupies the fourth place in chronic noncommunicable diseases.

The Table 2 represents several studies and surveys conducted by the National Institute of Public Health, WHO and others.

Table 2. Surveys and prevalence of diabetes in Algeria

Survey	Results
In 1992, during a survey of 1,302 families	In ORAN, the overall prevalence of diabetes was 2.17%.
In 1994, during his thesis in epidemiology, A Houti	In the region of Oran a prevalence of 6.8% among those aged 30 to 64 years
In 2002, among the Tuaregs of southern Algeria	The prevalence was 0.7% for IDDM; in 2003, the prevalence of NIDDM was 1.3%.
The incidence before age 15 is increasing	In the region of Constantine, the incidence goes from 9.1 in 1997 to 12.3 / 100000 in 2002.
Before the 2000s,	Surveys in the east and west of the country showed a prevalence of type 2 diabetes in the range of 6.4 to 8.2% in those aged 30 to 64 years.
The WHO-STEPS study conducted in 2003: prevalence with age.	In 2 pilot wilayas (Setif and Mostaganem) in subjects 25 to 64 years in both regions showed a prevalence of 4.9% per decade, 4.8%, 7.9% and 8% respectively.
The National Health Survey Algeria, TAHINA	<p>Reports a prevalence of:</p> <ul style="list-style-type: none"> The average blood glucose is 0.92g / l (DNS according to sex, middle). 85.41% normal blood glucose, 5.30% moderate fasting hyperglycemia and 9.29% hyperglycemia. Hyperglycemia is more frequent in the 60-70 age groups, in urban areas and in the highlands. The frequency of diabetes detected is 3.50% (DNS sex and environment), frequently detected in 60-70 years old and in tell.

	• The prevalence of diabetes is 12.29% (DNS sex), prevalent among people aged 65 to 70, in urban areas and in the highlands.
A study carried out in 2006,	In Sidi Belabbes noted a prevalence of 10.5%.
According to the records of type 1 diabetes, among young people under 15,	The incidence in Constantine in 2010 was 17.44 / 100,000 and in Oran in 2011 of 26/100 000 and in Algiers from 22.8 / 100,000 children.
A study conducted in 2012 in the Wilaya of Mila and presented in 2013,	Revealed that more than 14% of people diagnosed with diabetes are at risk for diabetes

According to the World Health Organization - Country Profiles for diabetes, 2016, the prevalence of diabetes and risk factors related thereto and shows in the following Table 3.

Table 3. Prevalence of diabetes and risk factors of diabetes in Algeria

	Men	Women	Total
Diabetes	10.2%	10.7%	10.5%
Overweight	53.9%	60.3%	57.1%
Obesity	18.0%	29.3%	23.6%
Insufficient physical activity	25.8%	39.4%	32.5%

Corresponding to data from the new International Diabetes Federation (IDF) 2017 report, "The Atlas of Diabetes", about 1.8 million people have diabetes in Algeria, with a national diabetes prevalence of 6.9 %. In detail, the statistical uncertainty margin for people with diabetes in Algeria is between 1.25 and 2.45 million, corresponding to a national prevalence rate between 4.9 and 9.5%. In neighbouring countries, approximately 1.65 million people are affected by diabetes in Morocco while 762,000 people are diabetic in Tunisia.

SUBJECTS

For the purposes of survey were pooled 25 endocrinologists and 50 patients with diabetes mellitus type 2 (not insulin-users), that were hospitalized in the endocrinology department of Annaba Regional Hospital Algeria". (March, 2017)

The questions concerning the criteria of efficiency of treatment and about the factors, that from the point of patient are the most important for the effectiveness of the treatment were in both questionnaires (for endocrinologists and patients) same. In the questionnaire for patients the questions and answers were adopted for better understanding by patients.

All of survey participants (endocrinologists and patients) were asked about their opinion (their experience) concerning evaluation of the efficiency of diabetes mellitus type 2 treatment.

METHODS

— Survey of endocrinologist concerning efficiency of diabetes mellitus type 2 treatment

The questionnaire for endocrinologists consists from 2 chapters (table 4). The chapter I included questions concerning demographic data, professional stage of the doctor. The chapter II included questions concerning the criteria of efficiency of the diabetes treatment as well as about the factors, that from the point of doctor are the most important for the effectiveness of the treatment (for example, to follow the dietary recommendations, regularly measure glucose and HbAc, take medication regularly,

visit endocrinologist regularly, use herbal medicines with hypoglycemic effect). Doctors were asked to fill the structured survey, choosing not more than 3 criteria from 8 listed.

Table 4: Questionnaire for endocrinologists

Sex
Professional experience, years
Which 3 factors indicate the effectiveness and safety of diabetes treatment?
Decrease of HbAc
Low fasting glucose
Low post-prandial glucose
Decrease of weight
Increase of weight
Patient has less hypoglycemia
Patient feels himself better
Patient is more active
Which 3 factors are most important for diabetes treatment to be effective?
To follow dietary recommendations
More physical activity
Right medication
To take medication regularly
To measure blood glucose regularly
To measure HbAc regularly
To visit endocrinologist regularly
To use herbal medicines with hypoglycemic effect

— Survey of patients with diabetes type 2 concerning efficiency of diabetes treatment

For conducting of patient survey also was developed a questionnaire. The questionnaire for patients included 2 chapters (Table 5). Chapter I included information concerning the demographic data, data about longitude of disease (how many years ago patient was diagnosed with diabetes), about the frequency of measurements of blood glucose and visits of endocrinologist. Patients were also asked if they follow the dietary recommendations. The chapter II included questions concerning the criteria of efficiency of the diabetes treatment as well as about the factors, that from the point of patient are the most important for the effectiveness of the treatment (for example, to follow the dietary recommendations, regularly measure glucose and HbAc, take medication regularly, visit endocrinologist regularly, use herbal medicines with hypoglycemic effect).

Table 5: Questionnaire for patients with diabetes

Sex
Age
Years since diabetes was diagnosed
Average amount of drugs taken
How many times a day do you measure blood glucose?
1. more often than 1 time a day
2. 1 time a day
3. 2-3 times a week
4. I don't remember
How often do you visit endocrinologist?
1. 1 time per month
2. 1 time per 2 months
3. 1 time per 6 months
4. I don't remember

Do you follow the dietary recommendations?
1. yes, regularly
2. yes, not regularly
3. no
Which 3 factors indicate the effectiveness and safety of your treatment?
Decrease of HbAc
Low fasting glucose
Low post-prandial glucose
Decrease of weight
Increase of weight
You have less hypoglycemia
You feel yourself better
You are more active
Which 3 factors are most important for your treatment to be effective?
To follow dietary recommendations
More physical activity
Right medication
To take medication regularly
To measure blood glucose regularly
To measure HbAc regularly
To visit endocrinologist regularly
To use herbal medicines with hypoglycemic effect

RESULTS

— Characteristics of surveyed endocrinologists

For the purpose of this work were surveyed 25 endocrinologists, between the surveyed specialists 64% were female (16 doctors) and 36% male (9 doctors). The average professional stage of the survey participants was 15 ± 7 years. The minimal stage of participant was 5 years and the maximal 31 years. The main characteristics of surveyed endocrinologists are presented in table 6.

Table 6: Characteristics of surveyed endocrinologists

Endocrinologists characteristics	Indicator	% from total amount
Sex		
Female	16	64
Male	9	36
Professional stage, years	15 ± 7	
Minimal professional stage, years	5	
Maximal professional stage, years	31	

— Characteristics of surveyed patients

The total number of surveyed patients was 50. The inclusion criteria were: diagnosis with diabetes mellitus type 2; use at least of 1 hypoglycemic medicine; not insulin-users; volunteering to take part in the survey.

The main characteristics of the surveyed patients are presented in the table 7. From all surveyed patients, 32 are male (64%) and 18 females (36%). The average age was 54 ± 8 years, the youngest respondent was 37 years old and the oldest – 65 years old. The average diabetes stage (the amount of years since diabetes was diagnosed) was 7 ± 4 years, the minimal stage was 2 years and the maximal stage was 18 years. From all surveyed patients 82% take more than one hypoglycemic drugs (41 respondents).

Table 7: Characteristics of surveyed patients

Patients characteristics	Indicator	% from total amount
Sex		
Female	18	36
Male	32	64
Average age, years	54 ± 8	
Minimal age, years	37	
Maximal age, years	65	
Years since diabetes was diagnosed	7 ± 4	
Minimal age, years	2	
Maximal age, years	18	
Patients, that take more than 1 drug	41	82
Total amount of patients surveyed	50	100

— Criteria of effectiveness of diabetes treatment (endocrinologists and patients perspectives)

Efficiency criteria indicate the effectiveness and safety of diabetes treatment for the patients and endocrinologists perspective

The results of the survey concerning the factors that indicate the effectiveness and safety of diabetes treatment for the patients and endocrinologists perspective is presented in Figure 1.

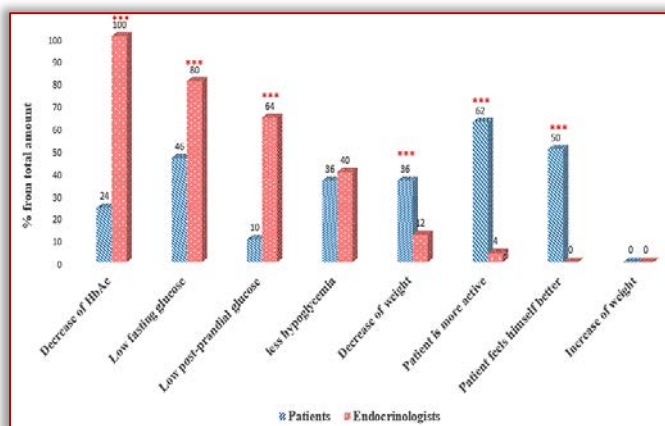


Figure 1: Criteria of diabetes treatment efficiency

* Significantly different from the values of endocrinologist's opinions compared to those of the patients at $p < 0.05$.

The values are expressed as the percentage from the total amount of 25 endocrinologists and 50 patients concerning the efficiency criteria of diabetes treatment.

As show the results of the survey, all doctors marked the "decrease of the HbAc" as main criteria of effectiveness of diabetes treatment (25 participants, 100%), This criterion was noted only by 12 patients, that is around quarter from all of patients (24%). The laboratory criteria "Low fasting glucose" was marked as important criteria of effectiveness and obtained 2 places in 80% of doctors, and marked 46% of respondents (23 patients). Decrease of post-prandial glucose was marked as important effectiveness criteria by 16 respondents, that is more than a half of all surveyed specialists (64%), a minimal amount of points has got the criteria "Low post-prandial glucose", by patients only (5 patients 10%).

Safety aspect "Patient has less hypoglycemia" was mentioned by 10 endocrinologists (40%). and 18 patients (36%).

Other criterias, such as "decrease of weight" with 3 specialists (12%), and increase of physical activity of patient ("Patient is more active")

marked 62% of respondents as main criteria for the effectiveness of the diabetes treatment (31 patients), and one specialists (4%). The subjective criteria "I feel myself better" was marked by 50% of surveyed patients indicate as the effectiveness criteria of the diabetes treatment (25 patients). It is important to admit, that criterias "Increase of weight" that is not specific for patients diabetes type 2 were not mentioned by surveyed specialists and none of patients indicated "Increase of weight" as efficiency criteria.

Factors that are most important for the effectiveness of diabetes treatment for the patients and endocrinologists perspective

The results of survey concerning the factors, that are most important for the effectiveness of diabetes treatment, are presented in the Figure 2.

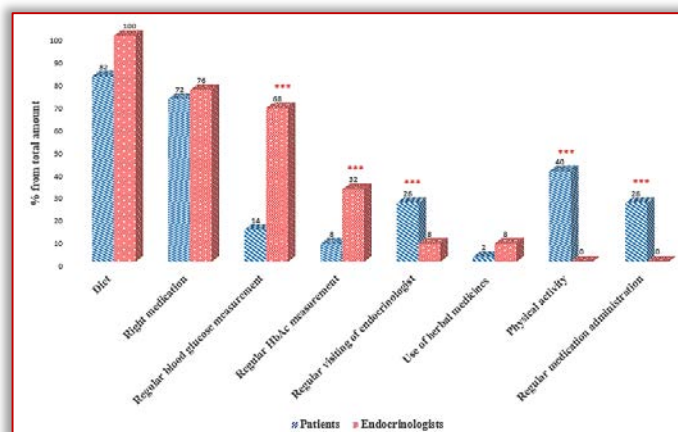


Figure 2: factors that are important for efficiency of diabetes treatment

* Significantly different from the values of endocrinologist's opinions compared to those of the patients at $p < 0.05$

The values are expressed as the percentage from the total amount of 25 endocrinologists and 50 patients concerning the factors that are most important for the effectiveness of diabetes treatment

As show the results of the survey, the following of the dietary recommendations was marked by all specialists as the most important factor for the effectiveness of diabetes treatment (25 doctors, 100%), 82% of respondents (41 patients) marked this factor as important for the effectiveness of diabetes treatment

It was remarkable, that 19 endocrinologists (76%), and 36 patients (72%) marked "Appropriate medication" necessary to ensure desired clinical result.

17 of the surveyed endocrinologists, that is three quarters of all respondents (68%) noted "Regular blood glucose measurement" and 8 specialists (32%) marked "Regular HbAc measurement" necessary for fulfillment for good diabetes control. Patients show low compliance to "Regular blood glucose measurement" (7 patients, 14%) and "Regular HbAc measurement" (4 patients, 8%). Factors "Regular visiting of endocrinologist" and "Use of herbal medicines with hypoglycemic effect" were marked only by 2 specialists (8%), that shows that doctors support the opinion about high importance of the self-management of diabetes by patients. Also, doctors show low compliance to use of herbal medicines with hypoglycemic effect. 21 of the surveyed patients, that is almost a half of all respondents (42%) noted "Use of herbal medicines with hypoglycemic effect" as important factor for the efficiency of the

diabetes treatment. 20 respondents (40%) marked “Physical activity” necessary for fulfillment for good diabetes control. On the other hand the regular use of medication is not seen by the patients as important.

— **Diabetes control and recommendations fulfillment by patients with diabetes**

Blood glucose measurements

The results of survey concerning the frequency of blood glucose measurements that is important for the effectiveness of diabetes treatment, are presented in the Figure 3.

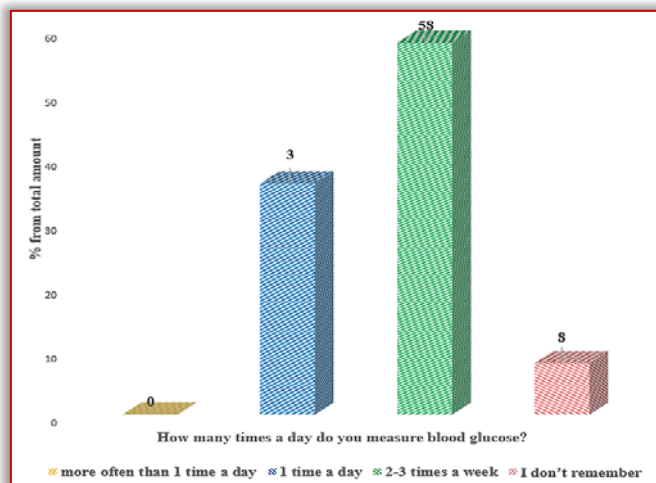


Figure 3: Frequency of blood glucose measurements

The values are expressed as the percentage from the total amount of 50 patients concerning frequency of blood glucose measurements.

As show the results of the survey, about frequency of blood glucose measurements none of patients marked “more ofter than 1 time per day” (0%, 0 patients). 18 patients answered, that they make it “1 time a day” (36%). The biggest part of respondents marked the frequency of blood glucose measurements as “2-3 times a week” (29 patients). And only 4 answered “I don’t remember” (8% of surveyed patients).

Endocrinologist visits

The results of survey concerning the frequency of endocrinologist visits that is important for the effectiveness of diabetes treatment, are presented in the Figure 4

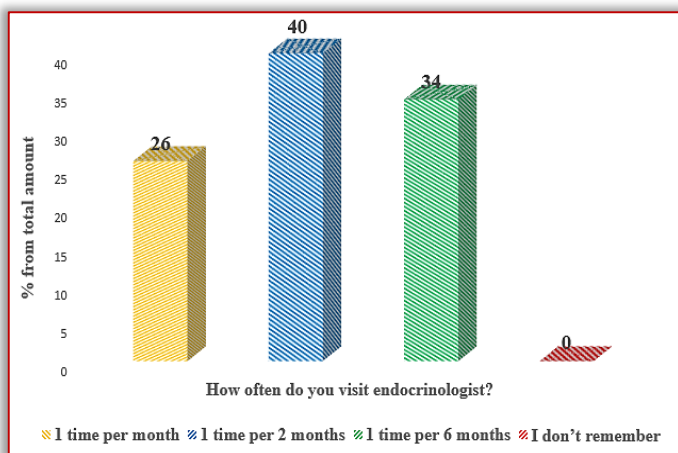


Figure 4: Frequency of endocrinologist visits

The values are expressed as the percentage from the total amount of 50 patients concerning the frequency of endocrinologist visits.

The results of the survey, concerning the question about frequency of endocrinologist visits, show that 26% of respondents marked “1 time per month” (13 patients). Other 20 patients (40%) marked that they visit endocrinologist “1 time per 2 months”. One-third of surveyed patients (17 respondents, 34%) have consultation by the specialist “1 time per 6 months”.

Follow the dietary recommendations

The results of survey concerning the following of the dietary recommendations that is important for the effectiveness of diabetes treatment, are presented in the Figure 5.

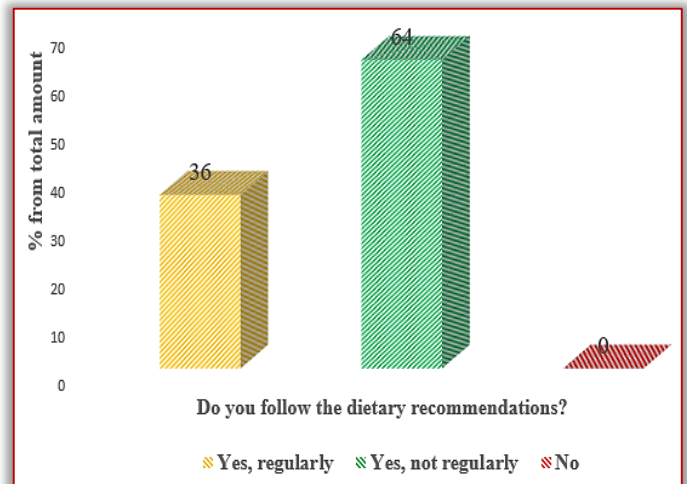


Figure 5: Frequency of follow the dietary recommendations

The values are expressed as the percentage from the total amount of 50 patients concerning the following of the dietary recommendations.

According to the survey results, 36% of respondents follow the dietary recommendations (18 patients). The biggest part (64%) estimate adherence to the dietary recommendations as “unregular” (32 patients). And none of them answered, that they do not follow the dietary recommendations.

DISCUSSION

The survey results highlighted the disbalance in doctor’s and patient’s beliefs and evaluation criteria in the diabetes type 2 treatment. As representatives of the traditional medicine, for the evaluation of the diabetes treatment result doctors use the objective instrumental data, such as HbAc level, fasting and post-prandial glucose. It resembles the international guidelines. This criterion was marked as main criteria for the effectiveness of the diabetes type 2 treatment by 100%, 80% and 64% of endocrinologist respectively. As soon as according to the UK Prospective Diabetes Study study decrease of the HbAc level to 1% is associated with decrease of the cardiovascular risk, stroke risk and with significant lower development of the microvascular complications that ensures higher quality if patient’s life.

According to the international guidelines (EASD, European Association for study of diabetes, ADA, American Diabetic Association) the essential elements of the diabetes control include the change of the life style (following of the dietary it is remarkable, that surveyed doctors showed high adherence to the international

guidelines also in the aspect of the post-prandial glucose control. It was proven in many studies that exactly the post-prandial glucose is for 60% responsible for the HbAc level. On the other hand, exactly this indicator is very difficult to control by in- and outpatients.

The safety aspects of the diabetes treatment, as amount of hypoglycemia was mentioned by 40% of surveyed specialists, that shows understanding of the role of the hypoglycemia in the development of micro- and macrovascular risk. It was proven in several studies (such as the Diabetes Control and Complications Trial DCCT and UKPDS) that exactly variations of the glucose level are more harmful than the hyperglycemia itself. That's why several approaches to the diabetes type 2 control describe the criteria for the diabetes control in elderly care higher than in adult's diabetes treatment.

It is remarkable, that patients although having some diabetes stage (the average time since diabetes was diagnosed was 7 ± 4 years) showed very low adherence to the objective efficiency criteria.

By the evaluation of the efficiency of the diabetes treatment patients were usually guided by the subjective criteria, such as "better self-feeling" and "increase of the physical activity" that were marked by 62% and 50% of patients respectively. The good tendency was showed by the patients in understanding of the role of the fasting glucose, it was marked by 46% of patients as diagnostic criteria. It is worth to mention, that hypoglycemia is problem for 36% of patients that mentioned it as efficiency criteria for the diabetes type 2 treatment.

The survey results enable to conclude, that only 24% from surveyed patients with diabetes type 2 understand the importance of the HbAc level for the evaluation of their treatment.

The survey results show the significant gap between the beliefs and understanding of the efficiency criteria for the diabetes type 2 treatment from endocrinologists and patient's perspectives. The misunderstanding between them enhance the decrease of the compliance of the patient, lower diabetes control and development of complications.

Regular exercise has been shown to improve blood glucose control, reduce cardiovascular risk factors, contribute to weight loss, and improve well-being. ADA technical reviews on exercise in patients with diabetes have summarized the value of exercise in the diabetes management plan. Regular exercise has been shown to improve blood glucose control, reduce cardiovascular risk factors, contribute to weight loss, and improve well-being. Identification of areas of concern will allow the design of an individualized physical activity plan that can minimize risk to the patient. All levels of physical activity, including leisure activities, recreational sports, and competitive professional performance, can be performed by people with diabetes who do not have complications and have good glycemic control.

It is essential for the diabetes treatment to ensure the regular control of blood glucose (1-2 times a day), regular measurement of HbAc (1 time per 3 months if patient has de-compensation or sub-compensation and 1 time per 6 months if patient has compensation).

The existing guidelines provide recommendations concerning the rational hypoglycemic medicines choice. But it is also evident, that compliance of patients to the treatment is decreasing with increase

of medicines taken and with time. This means that to ensure the therapeutic result, it is necessary not only choose the appropriate medication, but ensure the regular administration of prescribed medicines.

It is necessary to note, that the use of herbal medicines is not included into the Guidelines of ADA and EASD, due to absence of evidence of their effectiveness.

The results of the survey show high adherence of endocrinologists to the International Guidelines. This was proven by obtained results of endocrinologist survey concerning the factors that are important for the effectiveness of diabetes type 2 treatment. All specialists marked following of the dietary recommendations (100%) essential for the effectiveness of diabetes treatment. It is notable, that patients also evaluated diet important (was marked by 82% of patients). On the other hand, according to the survey results, only 36% of patients follow the dietary recommendations regularly.

It is notable, that endocrinologists make bigger ascent on the choice of the appropriate medication (76%) and do not pay attention on the frequency of administration of prescribed medicines (this factor was not marked at all). It is worth to admit, that patients also put appropriate medication as the most important factor of the diabetes control (this factor was marked by 72% of patients). And understanding of role of regular medication administration was shown only by 26% of patients.

Endocrinologists also mark regular blood glucose and HbAc measurements as important factors for the diabetes treatment that was marked by 68% and 32% doctors respectively. From the patients' perspective, regular blood glucose measurement is evaluated very low (only 14% of patients) and HbAc measurement has got only 8% of points (only 4 patients marked this factor).

The survey results enable to conclude that patient show high adherence to the herbal medicines use. 42% of patients marked it as important factor of diabetes control. By the doctors, the use of herbal medicines with hypoglycemic effect is not seen important for patients with type 2 diabetes mellitus (only 8% of doctors marked this factor), that is resembles the principles of evidence-based medicine.

It is necessary to admit, that increase of physical activity is seen as important factor by 40% of patients, but between doctors nobody marked this factor.

The regular visiting of endocrinologist was marked as essential factor for the diabetes treatment by 8% of doctors and by 26% of patients that shows the overestimation of the role of the endocrinologist in the diabetes treatment.

According to actual guidelines, the best result can be achieved only by implementation of the model of active involvement of the patient into the diabetes treatment. It means, that educated and responsible patient can conduct self-management of the diabetes and be not dependent from the doctor.

The obtained survey results show, that only 36% of patients with diabetes mellitus type 2 measure blood glucose 1 time a day. More than a half of patients (58%) measure blood glucose 2-3 times a week. And 8% of patients do not even remember when they measured the blood glucose last time.

CONCLUSIONS

The presented survey enables to conclude, that endocrinologists and patients have different perspectives for evaluation of the effectiveness of the diabetes treatment. Endocrinologists usually use the objective criteria that are measured in laboratory (fasting and post-prandial glucose level, HbAc level) and safety criteria (decrease of the hypoglycemia). The subjective factors as for example self-feelings of patients, their physical activity are not estimated by the endocrinologists as efficiency criteria.

Patients usually evaluate the efficiency of the diabetes treatment by subjective criteria, as "I feel myself better", "I am more active". It is remarkable, that around half of the surveyed patients evaluate the efficiency of the diabetes treatment by the low fasting **glucose (55%)**. Important factor for the patients "decrease of weight" is connected for 36% of patients with effectiveness of therapy. In contrast to this view, only 12% of surveyed endocrinologists evaluate the decrease of weight as therapy efficiency criteria.

The objective criteria HbAc level is evaluated as effectiveness criteria by all endocrinologists (100%) and only by 24% of patients that shows the misunderstanding by the patients the importance of this laboratory result.

For the treatment of diabetes mellitus type 2, the doctors' endocrinologists can use the theoretical approach that means the use of international and national Guidelines, clinical protocols, hospital protocols etc. Other approach is setting a background for the experimental approach, that means the use of self-experience and experience of competent colleagues as guideline for development of strategy for diabetes mellitus treatment for each patient.

To provide the intensive and efficient treatment of DM type 2, it is necessary to involve recommendations and efficiency criteria that are known and used in the country. Provision of the effective diabetes treatment has positive effect not only on the health status of the individual patient. It results in the decrease of adverse effects, prevents complications that in the case of diabetic patients include diabetic foot, diabetic neuro- and encephalopathic, chronic renal failure, retinopathic. This complications cause patient's disability that has not only social effect, but also financial effect on the individual, city and state budget.

As all over the world recognized and evident efficiency criteria for the diabetes type 2 treatment are known the decrease of **HbAc**, provision of control of fasting glucose and post-prandial glucose. As safety aspect of the diabetes treatment is recognized decrease or absence of day and night hypoglycemia.

The change of patient's weight is recognized as supporting criteria of diabetes treatment, as soon as by long state of decompensation patients are losing weight. In this case increase of weight is a supporting efficiency criteria of diabetes treatment. In case of overweight patients, by the use of metformin decrease of weight will be also indicated as efficiency criteria (supporting criteria as soon as it is connected with the change of patient's life style. The patient's physical activity and self-feeling are not indicated as evident criteria of diabetes treatment efficiency, because they have subjective character and can not be measured.

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