

Improvement of Medical Aid for Endocrinological Patients in the Conditions of a Family Polyclinic and a Rural Medical Center

O. F. Yusupov¹, N. J. Ermatov^{2,*}

¹Independent Researcher, Tashkent Medical Academy, Tashkent, Uzbekistan

²Doctor of Medical Sciences, Tashkent Medical Academy, Tashkent, Uzbekistan

Abstract The article is devoted to general practitioners working in family polyclinics (FP) and rural medical centers (RMC), who do not possess sufficiently enough the skills of timely detection of risk factors and borderline conditions of diabetes mellitus and iodine deficiency diseases, at the initial preclinical stages, the diagnosis of which is carried out at screening methods, which is usually performed using cheap, simple, non-invasive diagnostic procedures with high sensitivity.

Keywords Risk factors, Obesity, Impaired glucose tolerance, Diabetes mellitus, Iodine deficiency states, Screening, Follow-up

1. Introduction

Reforming of healthcare is one of the important directions of state policy, - said the President of the Republic of Uzbekistan (RU), at a meeting with health care specialists on January 5, 2017. In his speech, he focused on issues related to the activities of FP / RMCs, which are sufficiently equipped with the necessary treatment and diagnostic resources. Indeed, today all the conditions have been created for conducting primary medical consultation in order to solve the problems of the population, to identify more effectively risk factors for non-communicable diseases, including diabetes mellitus and iodine deficiency conditions.

2. The Main Results and Findings

In the "Action Strategy in five priority areas of development of the Republic of Uzbekistan for 2017-2021", the tasks have been defined on "improvement the quality and availability of medical and social medical aid for patients with endocrine pathology" on the basis of high modern technologies, wider implementation of comprehensive measures to reduce the mortality of the population from complications of endocrinological diseases.

Increase in the effectiveness of primary and secondary

prevention and treatment of type 2 diabetes in the conditions of FP/RMC must be noted with particular importance.

It should be noted that endocrine diseases at the present stage are a serious health problem in many countries of the world; their relevance is due to their social significance and prevalence among population. The leading positions among endocrine pathology are occupied by disorders of carbohydrate metabolism (impaired fasting glycemia, impaired glucose tolerance (IGT), diabetes mellitus (DM) types 1 and 2), then - thyroid diseases (autoimmune thyroiditis, diffuse toxic goiter, nodular goiter, etc.) [1,2,3,4,5].

Disorders of carbohydrate metabolism, including pre-diabetic conditions and type 2 diabetes itself, especially in association with obesity are the most common in the world. Every year the number of patients with pathology of carbohydrate metabolism increases. Considering the prevalence of IGT on average in 20-25% of the population, as a rule, detected during routine examination for some other reason, the annual transformation in 1.5-10% of IGT into type 2 DM, latent course (a long period of imaginary well-being) development diabetes is becoming an epidemic [6,7,8,9,10]. According to the forecasts of the World Health Organization (WHO), by 2025 the number of patients with type 2 diabetes in the world will double and reach 333 million people. The DM problem is a priority in almost all developed countries of the world and in Uzbekistan is no exception.

Lack of iodine in the environment leads to the development of iodine deficiency diseases, which, according to WHO, are the most common endocrine pathology in the

* Corresponding author:

nizom.ermatov@tma.uz (N. J. Ermatov)

Received: Dec. 28, 2021; Accepted: Jan. 22, 2022; Published: Jan. 24, 2022

Published online at <http://journal.sapub.org/ajmms>

world, 1570 million people (30% of the world's population) are at risk of developing iodine deficiency diseases, including more than 500 million people living in the regions with severe iodine deficiency and a high prevalence of endemic goiter [11].

In Uzbekistan, according to an endocrinological study carried out in 2004, among all endocrine pathology, thyroid diseases turned out to be the most common. Their share is 69.8%, including diffuse endemic goiter - 61.3%, other non-toxic forms of goiter - 2.8%. hypothyroidism - 1.6 / o. hyperthyroidism. 2.7%. tirsoilite - 1.2%, diabetes mellitus - 19.0%, etc. [12,13].

Iodine deficiency conditions are an important medical and social problem. In areas with a pronounced iodine deficiency, perinatal mortality, the incidence of still births and congenital malformations are significantly increased [14,15,16,17,18].

To study the problem of protecting the health of endocrine patients, particularly of type 2 DM devoted a large number of studies by local and foreign authors. At the same time, there is an insufficient level of availability of high-quality endocrinological care for rural residents, which determines the need for further scientific and practical development of issues of organizing medical care for patients with type 2 diabetes, living both in the city and in the countryside. This led to the relevance, scientific novelty and predictive value of this study.

This study, to a certain extent, serves to fulfill the tasks provided for in the decree of the President of the Republic of Uzbekistan Presidential Decree (PD) No. -4947 "On the strategy of actions in five priority areas of development of the Republic of Uzbekistan for 2017-2021." dated February 7, 2017; Resolutions Presidential Order (PO)-3071 "On measures for the further development of the provision of specialized medical care to the population of the Republic of Uzbekistan in 2017-2021." of June 20, 2017, as well as other regulatory documents adopted in this area. The ongoing health care reforms in the republic, in particular the organization of FP / RMC, have created a real opportunity for primary and secondary prevention of all diseases, including endocrine diseases.

Considering the often very poor clinical picture of type 2 diabetes and sometimes complete absence of symptoms, in a significant part of patients by the time of diagnosis, the duration of the disease is 7-12 years, while a high percentage of vascular complications are revealed. A UK. PDS prospective study conducted in the UK showed that 50% of patients with newly diagnosed type 2 diabetes already have signs of vascular lesions, which are the main cause of disability and mortality. According to the City Diabetes Center of St. Petersburg, during routine, non-screening detection of type 2 diabetes, in 57.1% cases patients had macrovascular diseases, and 54.4% had microvascular complications, and their later stages were recorded more often. Considering such high prevalence of chronic vascular complications by the time type 2 DM is diagnosed, the interest of doctors and healthcare providers in programs for

the early detection of diabetic patients and those at increased risk of developing of it is growing.

The purpose of the study there was an assessment of the quality of medical care in primary health care, provided by general practitioners to patients with endocrine pathology, with the development of measures to improve its quality. In accordance with the set goal of the study, the following tasks were solved:

1. To study the incidence and prevalence of obesity in urban and rural populations.
2. To assess the quality of medical care provided to patients with endemic goiter and hypothyroidism in the conditions of FP / RMC.
3. To study the state of screening and control of type 2 DM in the conditions of FP / RMC and the possibilities of a general practitioner in the implementation of preventive measures.
4. To study the satisfaction of the population with the quality of medical care for patients with endocrine pathology in the conditions of FP / RMC.
5. To develop an electronic algorithm for early diagnosis with personal dynamic monitoring of patients with endocrine pathology and improve the system of measures to combat risk factors in primary health care.

Interviewed general practitioners of the FP in Tashkent and RMCs of the Tashkent, Fergana, Namangan, Syrdarya, Surkhandarya and Kashkadarya regions, who underwent 10-month retraining courses at educational medical centers No. 1,2 at the Tashkent Medical Academy in the 2011/12 academic year. Before and after training on the skills of early detection of endocrine diseases (impaired fasting glycemia, impaired glucose tolerance (IGT), type 2 DM, autoimmune thyroiditis, diffuse toxic goiter, nodular goiter, etc.), 175 doctors were questioned. Among them, 57 (32.8%) doctors worked in the FP in Tashkent, 118 (67.2%) - in the RMC. After receiving instructions, groups of trained doctors filled out questionnaires anonymously. In the next stages of the study, a survey, clinical examination and the necessary laboratory and instrumental examinations of the adult population was carried out in four areas from FP/RMCs in total in the amount of 2610 people. 800 people among them were from the FP No. 37, located in Chilanazar district, city of Tashkent; in the FP No. 38 – 510 people respectively; in the Tashkent region of the Kibray district in the RMC "Dzhambul" * 510 people; in the Fergana region of the Uchkuprik district in the RMC "Yakkamulla" - 790, respectively. An algorithm for an electronic program aimed for an early diagnosis of prediabetes and type 2 DM has been developed at primary health care level.

General practitioners working in FP / RMCs are not sufficiently skilled in the timely identification of risk factors and borderline conditions for diabetes mellitus and iodine deficiency diseases, at the initial preclinical stages, diagnosed by screening, which is usually carried out using cheap, simple, non-invasive diagnostic procedures with high sensitivity.

A certificate of 12.10.2018 (No. DGU 05726) was received on the official registration of the algorithm of the electronic program for an early diagnosis of prediabetes and type 2 diabetes mellitus in primary health care level.

In our study, with the help of the questionnaire that we have compiled, we interviewed doctors of the FP in Tashkent and doctors of RMCs of Tashkent, Fergana, Namangan, Syrdarya, Surkhandarya and Kashkadarya regions, who

underwent 10-month retraining courses at educational and medical centers No. 1, 2 at the Tashkent Medical Academy in the 2011/12 academic year. Before and after training on the skills of early detection of endocrine diseases (impaired fasting glycemia, IGT, type 2 diabetes, autoimmune thyroiditis, diffuse toxic goiter, nodular goiter, etc.), 175 doctors were questioned. When analyzing the questionnaires, the main indicators indicated in Table 1 were assessed.

Table 1. Comparative characteristics of the data obtained from a survey of general practitioners of FP / RMC on early diagnosis of diabetes mellitus and iodine deficiency conditions before training in early detection and management skills at the outpatient stage

No.	Relevantquestion	General practice doctors of the FP (n = 57)		General practice doctors of RMC (n = 118)	
		Qty.	%	Qty.	%
1	What risk factors contribute to the onset and development of type 2 diabetes?				
	Hereditaryburden	38	66.6	68	57.6
	History of the birth of a child weighing 4 kg or more	19	33.3	35	29.6
	Impropernutrition	17	29.8	28	23.7
	Obesity	21	36.8	27	22.9
	Hypodynamia	10	17.5	15	12.7
	Lowsociallevel	6	10.5	12	10.2
2	Indicate what risk factors contribute to the onset and development of iodine deficiency states?				
	Endemiczone	22	38.5	56	47.5
	Impropernutrition (micronutrientdeficiency)	15	26.3	14	11.9
	Ageover 40	10	17.5	18	15.3
	I do notknow	9	15.7	21	17.8
3	Do you know how a capillary blood IGT test is performed?				
	Yes	6	10.5	11	9.3
	No	51	89.5	107	90.7
4	What is the normal fasting capillary blood glucose level in mmol / L?				
	3.3-6.1	33	57.9	61	51.7
	6.1-7.0	19	33.3	50	42.4
	7.0-7.8	5	8.8	7	5.9
5	What is the normal level of total cholesterol in mmol / L?				
	<5.0	28	49.1	47	39.8
	5.0-6.0	20	35.1	56	47.5
	6.5	9	15.8	15	12.7
6	What hormones need to be tested to assess iodine deficiency conditions?				
	TSH	17	29.8	2 + 9	24.5
	T4	6	10.5	20	17.0
	TTG, T4, T3	34	59.7	69	58.5
7	Do you use the Quetelet index (BMI-index of body mass kg / m2) in your work to assess the BMI of your patients, if so, which BMI do you consider normal?				
	<18.5	2	3.5	8	68.8
	18.5-24.9	28	49.1	52	44.1
	25.0-29.9	14	24.6	34	28.8
8	Indicate the degree of obesity				
	Obesity I degree (30.0-34.9)	6	10.5	12	10.2
	Obesity II degree (35.0-39.9)	7	12.3	10	8.5
	Obesity III degree (40.0 b more)	5	8.7	7	6.0
9	Are you using the waist / hip index?				
	Yes	3	5.3	7	5.9
	No	54	94.7	111	94.1

As can be seen from table 1, FP / RMC doctors who underwent 10-month retraining courses before learning the skills of early detection of endocrine pathology (FP-32.8%; RMC 67.2%) revealed an underestimation of the risk factors for type 2 diabetes and iodine deficiency states. In addition,

primary care physicians are poorly aware of the normal levels of fasting blood sugar, IGT, total cholesterol, and do not use the Quetelet index and the waist / hip index in their practice.

Table 2. Comparative characteristics of the obtained data from a survey of general practitioners of FP / RMC on early diagnosis of diabetes mellitus and iodine deficiency states after training in early detection and management skills at the outpatient stage

No.	Relevantquestion	General practice doctors FP (n = 57)		General practice doctors RMC (n = 118)	
		Qty.	%	Qty.	%
1	What risk factors contribute to the onset and development of type 2 diabetes?				
	Hereditaryburden	52	91.2	107	90.7
	History of the birth of a child weighing 4 kg or more	50	87.7	110	93.3
	Impropernutrition	47	82.5	89	75.5
	Obesity	55	96.5	106	89.8
	Hypodynamia	33	61.3	85	72.0
	Lowsociallevel	45	79.0	102	86.5
2	Indicate what risk factors contribute to the onset and development of iodine deficiency states?				
	Endemiczone	57	100	107	90.7
	Impropernutrition (micronutrientdeficiency)	47	82.5	104	88.2
	Ageover 40	52	91.2	114	96.6
	I do notknow	-	-	-	-
3	Do you know how a capillary blood IGT test is performed?				
	Yes	50	87.7	102	86.5
	No	7	12.3	16	13.5
4	What is the normal fasting capillary blood glucose level in mmol / L?				
	3.3-6.1	55	96.5	112	95.0
	6.1-7.0	2	3.5	6	5.0
	7.0-7.8	-	-	-	-
5	What is the normal level of total cholesterol in mmol / L?				
	<5.0	49	86.0	105	89.0
	5.0-6.0	8	14.0	13	11.0
	6.5	-	-	-	-
6	What hormones need to be tested to assess iodine deficiency conditions?				
	TSH	47	82.5	96	81.3
	T4	-	-	2	1.7
	TTG, T4, T3	10	17.5	20	17.0
7	Do you use the Quetelet index (BMI-index of body mass kg / m2) in your work to assess the BMI of your patients, if so, which BMI do you consider normal?				
	<18.5	-	-	-	-
	18.5-24.9	54	94.7	112	95.0
	25.0-29.9	3	5.3	6	5.0
8	Indicate the degree of obesity				
	Obesity I degree (30.0-34.9)	55	96.5	112	95.0
	Obesity II degree (35.0-39.9)	56	98.2	112	95.0
	Obesity III degree (40.0 b more)	54	94.7	114	96.6
9	Are you using the waist / hip index?				
	Yes	51	89.5	96	81.3
	No	6	10.5	22	18.7

It should be noted that after the training, the number of doctors who pay attention to the identification and correction of risk factors for type 2 diabetes and iodine deficiency states, possessing the skills of early detection, significantly increased ($p < 0.001$).

Screening is usually done using cheap, simple, non-invasive diagnostic procedures that are highly sensitive. Unfortunately, the current system of screening and preventive medical examination of the population of Uzbekistan in the conditions of FP / RMC does not allow satisfying enough personal approach to each patient, taking into account his personal characteristics, existing uncontrollable and controllable risk factors for the disease. This, in turn, worsens the quality of detection of type 2 DM, does not help to reduce the negative health consequences of both urban and rural residents suffering from this pathology. The level of awareness of rural residents on the timely detection of diabetes and medical literacy of adult patients preconditions the correction of a set of measures aimed at increasing them.

According to the above, in order to increase the effectiveness of primary and secondary prevention of type 2 DM in outpatient settings, we have to develop an algorithm for an electronic program for early diagnosis of prediabetes and type 2 DM at the level of primary health care.

The system of electronic early detection and dynamic observation on an outpatient basis does not require large economic costs, communicative, simple in its implementation, saves time and facilitates the practical activities of primary care physicians, and most importantly, it allows maintaining the confidentiality of information and the accumulated database of each patient. In addition, the electronic follow-up program is patient-centered. By using of a mathematical calculation of the points scored, it facilitates the monitoring of the levels of type 2 diabetes, controllable risk factors, basic biochemical parameters of blood (glucose, cholesterol, creatinine, etc.), target organ damage, the selection of the most suitable hypoglycemic drugs or their combination for a particular patient and improves adherence to the fulfillment of medical appointments.

ALGORITHM OF THE ELECTRONIC PROGRAM OF EARLY DIAGNOSIS AND PRE-DIABETES AND TYPE 2 DM AT THE LEVEL OF PRIMARY HEALTHCARE LEVEL (for the adult population)

Date: "____" _____ 20__ year

FULL NAME. patient:

Gender: male ... female ...

1. Patient's age:

Under 45... 0 points

45-54 years old... 1 point

55-64 years old... 2 points

Over 65 years old ... 3 points

2. Features of the profession:

Physical inactivity and intellectual-emotional load - no ...

0 point

Physical inactivity and intellectual-emotional load- yes ...

1 point

3. Hereditary burden of diabetes mellitus (DM)

No ... 0 point

Yes ... 1 point (grandmother-grandfather, aunts-uncles, cousins and brothers)

Yes ... 2 points (dad-mom, siblings and brother)

4. Hereditary burden but CVD (HD, IHD) and obesity or the presence of chronic pancreatitis, CVD and their complications in the patient himself (HD, IHD, MI, MI, CHF)

No ... 0 point. Yes ... 1 point

5. If the gender is female, it is necessary to determine whether the patient has a history of giving birth to a child with a large weight (4 kg or more ...)

No ... 0 point. Yes ... 1 point

6. Obesity according to the WHO classification 1997 Determination of body mass index (BMI)

No ... 0 point (BMI from 18.5-24.9)

Yes ... 1 point (before obesity - BMI 25.0-29.9)

Yes ... 2 points (grade I obesity - BMI 30.0-34.9)

Yes ... 3 points (obesity II degree - BMI 35.0-39.9)

Yes ... 4 points (grade III obesity - BMI 40 or more)

7. Abdominal obesity (abdominal circumference in cm. At the level of the navel)

• Among women:

No ... 0 point (up to 80 cm.)

Yes ... 1 point (80-88 cm)

Yes ... 2 point (more than 88 cm)

• In men:

No ... 0 point (up to 94 cm.)

Yes ... 1 point (94-102 cm)

Yes ... 2 point (more than 102 cm)

8. Smoking

No ... 0 pt. Yes ... 1 point

9. Alcohol abuse

No ... 0 score

"On holidays" ... 1 point

Chronic alcohol dependence ... 2 points

10. Blood pressure (BP)

Norm ... 0 point

AH 1 degree ... 1 point

AH grade 2 ... 2 points

AH grade 3 ... 3 points

11. Diet

Rational nutrition ... 0 point

Overeating ... 1 point

Abuse of easily digestible carbohydrates ... 2 point

Abuse of easily digestible carbohydrates and foods from animal fats ... 3 points

12. Fasting blood glucose (blood vein) (WHO 1999)

Norm (4.0-6.1 mmol / L) ... 0 point

Increased (from 6.1 to 7.0 mmol / L) ... 1 point

Increased (from 7 mmol / L to 11.0 mmol / L) ... 2 points

13. Blood glucose 2 hours after meals (WHO, 1999)

Norm ... 0 point (up to 7.8 mmol / l)

Impaired glucose tolerance (IGT) ... 1 point (from 7.8-11.1 mmol / L)

Diabetes mellitus ... 3 points (11.1 mmol / L and above)

14. Lipid spectrum (European recommendations III revision 2003)

• Total cholesterol norm (<5.0 mmol / L) ... 0 point

• Total cholesterol increased (> 5.0 mmol / L) ... 1 point

• LDL cholesterol norm (<3.0 mmol / l) ... 0 point

• LDL cholesterol (> 3.0 mmol / L) ... 1 point

• HDL cholesterol (> 1.0 mmol / L in men;> 1.2 mmol / L in women) ... 0 point

• HDL cholesterol is lowered (<1.0 mmol / L in men; <1.2 mmol / L in women) ... 1 point

• TG norm (<1.77 mmol / L) ... 0 point

• TG increased (> 1.77 mmol / L) ... 1 point

15. Secondary symptoms of diabetes mellitus

Polydipsia (thirst): No ... 0 point Yes ... 1 point

Polyphagia (increased appetite): No ... 0 point Yes ... 1 point

Polyuria (diabetes): No ... 0 point Yes ... 1 point

16. Glycated hemoglobin (WHO, 2011)

Upto 4.0 - 5.6% 0 point

From 5.7 - 6.4% 1 point

1.5% or more 2 points

Calculation of the received points

Criteria	GreenZone (upto 6 points)	Yellowzone (from 7 to 16 points)	Redzone (17 points or more)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
Total:			
Calculation / diagnostics	Wellbeing Zone, which means "No Diabetes". It is enough for this patient to undergo a routine examination by a general practitioner once a year.	Warning zone, which means "Stage of prediabetes" or a high risk of "Diabetes mellitus" or "Latent stage of diabetes". This patient needs to undergo an in-depth medical examination by a general practitioner with laboratory and instrumental studies on the target organs of diabetes (nervous system, fundus, heart, kidneys and all arterial vessels)	A zone of alarm and danger that means "Stage of overt diabetes" and a high risk of formidable complications of this disease. The patient needs an in-depth medical examination by a general practitioner with laboratory and instrumental studies on the target organs of diabetes (nervous system, fundus, heart, kidneys and all arterial vessels) and consultation of a narrow specialist-endocrinologist.

3. Interpretation of the Results Obtained

1. If the patient's scores correspond to the "Green Zone" (6 points), this is the well-being zone, which means "No Diabetes". It is enough for this patient to undergo a routine examination by a general practitioner once a year.
2. If the patient's scores correspond to the "Yellow zone" (from 6 to 17 points), this is a warning zone, which

means "Stage of prediabetes" or a high risk of "Diabetes mellitus" or "Latent stage of diabetes". This patient needs to undergo an in-depth medical examination by a general practitioner with laboratory and instrumental studies on the target organs of diabetes (nervous system, fundus, heart, kidneys and all arterial vessels).

3. If the patient's scores correspond to the "Red Zone" (17 or more points), this is an alert/danger zone,

which means "Stage of overt diabetes" and a high risk of severe complications of this disease. This patient needs an in-depth medical examination by a general practitioner with laboratory and instrumental studies on the target organs of diabetes (nervous system, fundus, heart, kidneys and all arterial vessels) and consultation of a narrow specialist - an endocrinologist.

4. Conclusions

Training of general practitioners in the skills of early detection of type 2 diabetes and iodine-deficiency states contributes to the prevention of formidable complications, timely control of diseases and is one of the effective methods in the complex treatment of endocrine patients.

General practitioners are not sufficiently skilled in the early detection of risk factors for endocrine pathology; poorly proficient in screening methods for type 2 diabetes and iodine deficiency diseases. The proposed algorithm of the electronic program for early diagnosis of prediabetes and type 2 diabetes mellitus to the existing system of diabetological care for the urban and rural population of Uzbekistan will improve the quality of early detection of the disease. In addition, using this technology for early diagnosis, it is possible to personalize the tactics of managing and treating patients with type 2 diabetes in the conditions of FP / RMC, preventing formidable complications of this disease, improving the quality and life expectancy of the population.

REFERENCES

- [1] Balabolkin M.I. Solved and unresolved issues of endemic goiter and iodine deficiency states // Problems of endocrinology. -2005. -№4. -p.31 -37.
- [2] Gaskov A.Yu., Savchenko M.F., Yushkov N.N. Features of the development of iodine deficiency states in children living in conditions of environmental pollution with fluoride compounds // Hygiene and sanitation. - 2005. - No. 6. - p. 53-55.
- [3] Egoshina L.V. Endocrinological service // Coll. scientific works, - Yoshkar-Ola, 1994. -p. 21-23.
- [4] Fields. PP, Hendrich C.E. The role of thyroid hormones in prenatal and neonatal neurological development - current perspectives // Endocrine Reviews. -1993. -V.14 - No. 1. -p. 94-103.
- [5] Harris K.B., Pass K.A. Increase in congenital hypothyroidism in New York state and in the United States // Mol. Genet. Metab. -2007. -№91. -p. 268-77.
- [6] Alberti George Consensus IDF no Prevention of type 2 diabetes // Diabetes. Lifestyle. - 2008. - N1. - p. 79-82.
- [7] Demidova T. Yu. Difficulties and prospects of obesity treatment // Diabetes. Lifestyle. - 2008. - N1. - p. 76-78.
- [8] Shestakova M.V. About the tasks of the world and Russian // Dianovosti. 2007. -№2.-p.3.
- [9] Ford E., Williamson D 'Liu S. Weight change and diabetes incidence findings from a national cohort of US adults // Am. J. Epidemiol. - 1997 Vol. 146.-p. 214-222.
- [10] Meta-analysis subclinical thyroid dysfunction and the risk of coronary heart disease and mortality // N. Ochs. To Auer. B.C. Bauer et al // Ann Intern. Med - 2008. - Vol. 148. - p. 832-845.
- [11] The Colorado thyroid disease prevalence study // G.J. Canaris. N.R. Maniowitz, G. Mayor, E.G. Ridgway // Arch. Intern. Med. -2000. -Vol.160. -p.526-534.
- [12] Mukhamedov T.M. Clinical examination of patients with diabetes mellitus in the Republic of Uzbekistan II News. doctor's general practice. - 2001 - No. 2. - p. 31-33.
- [13] Mukhammedov T.M., Abdujabborova D.Kh. The frequency of endocrine pathology among the population of Uzbekistan for the last decade // Problems of biology and medicine -2005. -No. 3. - p.6-9.
- [14] Aranovich V.V., Svinarov M.Yu. Results of long-term follow-up observation of children living in an iodine-deficient region // Mater. IV All-Russian congress of endocrinologists. - SPb. 2001. -p.576.
- [15] Autoimmune diseases of the thyroid gland / I.I. Delov. W.A. Groshina, S.S. Antonova et al. // Problems of endocrinology. -2002. -№2. - p.6-13.
- [16] Gerasimov G.A., Sviredenko N.Y. Iodine deficiency diseases. Diagnostics, methods of prevention and treatment // Therapeutics archive -1999 - No. 10. -p. 17-19.
- [17] Monitoring of iodine supply in pubertal schoolchildren in Mirninsky ulus of the Sakha Republic (Yakutia) / V.G. Selyatitskaya, N.A. Palchnikova, S.V. Odintsov et al. // Problems of endocrinology. - M., 2003. - No. 3. - p. 24-26.
- [18] Results of epidemiological studies of iodine deficiency diseases in the Russian Federation (IDD) in the framework of the "Tyromobile" project. Problems of biology and medicine. - 2005. - No. 3. - p. 19-20.