

ON THE RELATIONSHIP OF NON-LIPID RISK FACTORS IN THE DEVELOPMENT OF PREDIABETES AND TYPE 2 DIABETES MELLITUS

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Abstract. *The data obtained by modern researchers allows us to only approximate the proportion of the population with newly diagnosed prediabetes and type 2 diabetes associated with non-lipid risk factors [1]. New epidemiological and clinical studies once again convincingly state that disorders of carbohydrate metabolism are a global problem of our century.*

Keywords: *prediabetes, diabetes mellitus, blood pressure, non-lipid risk factors, prehypertension.*

Over 40 years, the global number of DM patients alone has increased 4-fold, or the number of DM patients accounts for 9.1% of the world's total population [2,3]. Another important problem is that glycemic disorders and their risk factors, including non-lipid ones, are significantly affected by environmental, geographical, ethnic, and socio-economic factors. Naturally, this state of affairs actualizes the problem of epidemiological study of carbohydrate metabolism disorders in the modern population of the world's regions and their association with risk factors, including non-lipid ones. This scientific direction is also important in the fact that every second population studied in certain regions is not diagnosed with cases of glycemic disorders in conventional clinical approaches. This "epidemiological threat", accompanied by a number of complications, doubles the risk of death from prediabetes and diabetes [4].

These data undoubtedly indicate the need to conduct epidemiological studies in Uzbekistan with the calculation of prediabetes and diabetes mellitus type 2 epidemic indicators for certain regions, in particular for the Andijan regions with different geographical and population specifics.

Objective: to study the degree of association of a non-lipid risk factor, in particular blood pressure levels, with prediabetes and diabetes mellitus type 2 in the conditions of the rural region of Andijan.

Materials and methods of the study: Strictly according to the scenario of the epidemiological study, 2112 people were examined (coverage - 100.0%), women - 83.1% and men - 16.9%. All the respondents were representatives of the indigenous population of the Markhamat district of Andijan region. Involvement of the population in the survey was provided by a written invitation and home visits. Work with the invitation was completed after the survey.

The following methods were used in the population survey: epidemiological, clinical, biochemical, instrumental, and statistical. The population was surveyed using standardized and unified questionnaires to assess the risk of prediabetes and diabetes mellitus type 2.

Risk factors were identified and evaluated according to the criteria of WHO, the Russian Association of Endocrinologists (2017), EASD and ADA (2015, 2018), Clinical Guidelines for the management of patients with type 2 diabetes in the Republic of Uzbekistan (2019).

Blood pressure was measured twice with an interval of 2 minutes on the right arm of the subject in a sitting position, after 5 minutes of rest. The average of their two measurements was

taken into account. Hypertension was diagnosed according to the WHO classification (WHO, 1999). SBP of at least 140 mmHg or DBP of at least 90 mmHg were taken as hypertension, regardless of taking antihypertensive drugs. (Table. 1.)

Table 1.

Classification of blood pressure, determination of degrees of hypertension

Category A / D	SBP mmHg	DBP mmHg
Optimal	<120	<120
Normal	120-129	120-129
Prehypertension	130-139	130-139
AH 1-degree	140-159	140-159
AH 2-degree	160-179	160-179
AH 3-degree	≥180	≥180
Isolated systolic hypertension	≥140	≥140

It should be noted that among the surveyed adult population, optimal blood pressure was observed with a prevalence of 57.2%, normal blood pressure-17.3% and prehypertension-10.9% (Table 2).

Table 2.

Comparative assessment of the prevalence of different blood pressure levels and their association with prediabetes and type 2 diabetes in the rural population of Andijan

Indicators of blood pressure and hypertension	IFG		IGT		IFG+IGT		diabetes mellitus type 2		Persons without CMD	
	n	%	N	%	n	%	n	%	n	%
Optimal BP (<120/80 mm.Rt St)	47	12,3 ± 2,8	69	18,0 ± 3,9	37	of 9.7 ± 2.3 to	11	2,9 ± 0,7	219	57,2 ± 6,4
Normal BP (120-129/ 80-84 mm.Hg)	8	2,1 ± 0,5	16	4,2 ± 1,05	9	2,4 ± 0,6	1	0,26 ± 0,07	66	17,3 ± 3,7
pre-hypertension	2	0,52 ± 0,14	0	0,00	2	0,52 ± 0,14	2	0,52 ± 0,14	42	10,9 ± 2,6
AH 1 - degree (140-159/90-99 mm.Hg)	94	24,5 ± 4,8	30	of 7.8 ± 1,9	20	5,2 ± 1,3	21	5,5 ± 1,4	196	51,2 ± 6,5
AH 2 - degree (160-179/109-109 mm.Hg)	4	1,0 ± 0,3	3	0,8 ± 0,2	5	1,3 ± 0,34	4	1,0 ± 0,3	22	5,7 ± 1,4
hypertension of the 3rd degree (≥ 180/110 mm.Hg)	1	0,3 ± 0,07	0	0,00	3	0,8 ± 0,2	4	1,0 ± 0,3	6	1,6 ± 0,4

Isolated systolic hypertension (≥140/<90 mm.Hg)	87	22,8 ± 4,58	20	5,2 ± 1,3	9	2,4 ± 0,6	9	2,4 ± 0,6	102	26,6 ± 5,1
RR=0,36 DI=0,39-0,95; $\chi^2=45,1$; P<0,05; Df=33										

In the population of individuals without NUE, the prevalence of hypertension was: grade 1 hypertension-51.2%, grade 2 hypertension-5.7% (P<0.001), grade 3 hypertension-1.6% (P<0.001), and isolated systolic hypertension -26.3% (P<0.05).

Hypertension was registered in every second person examined, and prehypertension was registered in every tenth person.

Optimal blood pressure was associated with various disorders of carbohydrate metabolism with the following prevalence levels: prediabetes-9.7% and type 2 diabetes – 2.9% detectability.

With normal blood pressure, these indicators were recorded with the following prevalence levels: IFG-2.1%, IGT-4.2%, IFG+IGT-2.4%, diabetes mellitus type 2 -0.26%.

The prevalence of IFG in the blood pressure range 140-159 / 90-99 mm Hg.st (grade 1 hypertension) was 24.5%, IGT-7.8% (P<0.001), IFG+IGT– 5.2% (P<0.001) and diabetes melitus type 2 – 5.5% (P<0.001). In grade 2 hypertension, IFG was detected with a prevalence rate of - 1.0%, IGT-0.5%, IFG+IGT-1.3%, and diabetes melitus type 2 -1.0% (P>0.05).

The combination of grade 3 hypertension with IFG was observed with a prevalence rate of 0.3%, with IGT-0.00%, with IFG+IGT-0.8% and diabetes melitus type 2 -1.0% (P>0.05).

In prehypertension, IFG was observed with a frequency of 0.52%, IGT-0.00%, IFG+IGT and diabetes mellitus type 2 -0.52% and 0.52% each.

Glycemic disorders in the examined population with isolated systolic hypertension were detected at the following prevalence levels (Figure1-4): 22.8% (IFG), 5.2% (IGT), 2.4% IFG+IGT, and 2.4% (diabetes mellitus type 2). There was an association of increased prevalence of IFG, IGT, IFG+IGT and type 2 diabetes among individuals with arterial hypertension (RR=0.36; - 0.95; $\chi^2=45.1$; P<0.05) (Fig.1)

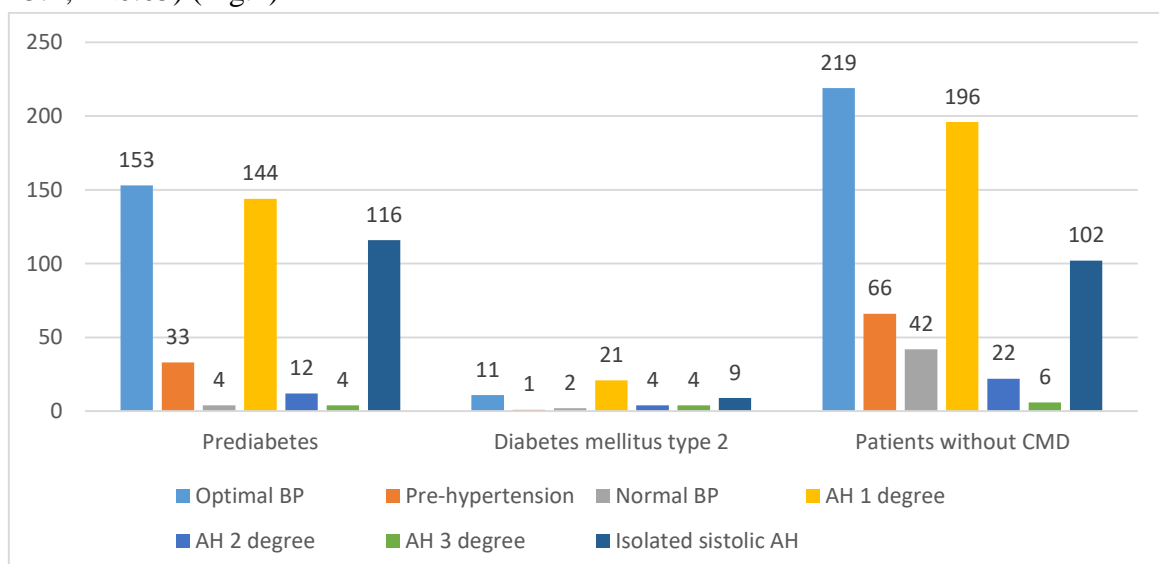


Figure 1. The development of various types of carbohydrate metabolism disorders depending on blood pressure levels and blood pressure indicators in individuals without CMD (in %)

Table 2. and Figure 1. demonstrate that among the rural population of Andijan, the prevalence of carbohydrate metabolism disorders depends on the blood pressure index. Thus, all the data presented indicate that prediabetes and diabetes, depending on the epidemiological

characteristics of the Andijan population, require a complex multi-factorial impact on the main regional, priority population links in the development of these glycemetic disorders associated with lipid (biochemical) and non-lipid risk factors.

Population problems of prediabetes and type 2 diabetes are at the forefront of modern preventive medicine. Since there are still many questions about epidemiology, it is necessary to continue this type and content of research.

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