



## **EPIDEMIOLOGY OF ARTERIAL HYPOTENSION (RESULTS OF RESEARCH APPLIED IN MODERN RURAL POPULATION)**

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<b>Article history:</b>	<b>Abstract:</b>
<b>Received:</b> December 11 <sup>th</sup> 2022 <b>Accepted:</b> January 11 <sup>th</sup> 2023 <b>Published:</b> February 20 <sup>th</sup> 2023	The criteria for a significant decrease in arterial pressure is considered to be an element of arterial pressure variability or a certain degree of manifestation. Implementation of various forms of epidemiologic research in order to establish the basis for new approaches to early diagnosis of arterial hypotension, to improve the prognosis, and to achieve high efficiency in prevention has become a necessity and a necessity for farmers in the conditions of Uzbekistan. In the regions of Uzbekistan, there is a great need and necessity to solve the problems of R&T in this approach. The lack of scientific study of this issue, especially among the large population of Uzbekistan engaged in farming, undoubtedly requires science to fill the "gap" in this direction.
<b>Keywords:</b> arterial hypotension (ArGt), PATe - male population with asthenic body type, PATa - female population with asthenic body type, PATup - general population with asthenic body type, GttmpE-hypersthenic male population, GttmpA-hypersthenic female population, GttmuP- general population with hypersthenic body	

According to the World Health Organization, cardiovascular diseases are the most common and the main causes of medical and socio-economic losses in the countries of the world [1, 20]. Among these diseases, arterial hypotension, despite the fact that ArGt is widely encountered in medical practice, is a poorly studied disease, especially at the population level [5, 8]. For example, it became known to us that studies on the epidemiology of this disease in the population of farmers have not been carried out until now. A small number of studies conducted in the population of urban residents and adolescents under the leadership of the Andijan Preventive Science School proved that NCDs take the leading place among non-communicable diseases and occupy the "top ranks" in terms of their contribution to the formation of regional specific risk factors. In the development and implementation of preventive and screening programs for diseases that threaten the modern population with increasing epidemics, it is definitely necessary to take into account R&T [7], or this topic is considered a priority direction and an urgent issue for the science of Uzbekistan. With the prioritization of farming activity as an important direction at the national and state level in Uzbekistan, a large number of separate population strata - the population of farmers - appeared. They differ in their specific demographic, social, economic, gender, ethnic, occupational and medical details.

Taking this into account, the development of all types of medical care and, first of all, preventive strategies and improvement in the population engaged in

farming is considered an almost unexplored current scientific problem. Implementation of various forms of epidemiological research in order to achieve high efficiency in early diagnosis of ARG, improvement of prognosis, foundation of new approaches and prevention has become a privilege and a necessity for farmers in the conditions of Uzbekistan.

In general, there have been almost no studies of ArGt prevalence over the past 60 years using standardized and unified methods. Existing results, mostly obtained from clinical studies and official statistical data, and moreover outdated results, regarding the prevalence of ArGt, are transferred from one cardiology manual to another. Although they cannot fully represent the current epidemiological situation, they can show the prospects of studying modern epidemiology of ArGt regarding the occurrence of ArGt among different regions and populations: ArGt is detected with a frequency of 5-6% among the 20-30-year-old population of Russia (1962); • Between 1.6-2.7 percent and 0.3-3.6 percent of Melbourne adult men and women were reported (1989); -1.5% in North America and 10.0% in Europe have ArGt, more often in women and under the age of 50 (1982).

It should be noted that these are provided in the above-mentioned guide, which is very reliable.

An increase in cardiovascular complications (stroke, myocardial infarction, dementia) due to ArGt (but such conclusions are based only on clinical trials) has been noted in studies [SHEP, 1999]. It is worth noting that the results of one epidemiological study conducted in the population of adolescents and young adults in the



conditions of Uzbekistan differed sharply from international data: the prevalence of ArGt was 18.6 percent [10].<sup>1</sup>

The second epidemiological study, which was carried out in the population of elderly residents of Andijan city, confirmed the prevalence of ArGt in relatively high frequencies [4]. The results of these scientific studies, firstly, confirm that ArGt is much higher than the indicators obtained by other researchers or predict that the epidemiological conditions may have changed in relation to it, and secondly, it is necessary to carry out ArGt in a deeper and wider scope in the population of our region, for example, in the rural population, and based on them, complete screening requires giving a proven epidemiological conclusion in relation to ArGt. For this, it is necessary to continue the screening examinations or the proper implementation of such scientific activities, which in other non-communicable diseases have reduced the annual population death from them from 1.7% to 2.9% [1, 11, 16]. The existing literature and scientific sources again prove that the levels of arterial pressure of diagnostic importance, recommended by different researchers for ArGt, are still very different. For example, according to the information provided by N.S. Molchanov (1998) (the information and educational literature of this great expert on R&T is still used as the "1st manual") 1914-1955. dozens of authors have calculated the systolic arterial pressure from 90 to 120 mm Hg, diastolic arterial pressure - from 40 to 70 mm Hg as the limits of hypotension. calculated up to These results are based on a large number of meta-analyses [12,17]. Lapin V.V. et al. (2008) as a theoretical basis for the limits of arterial hypotension, a threshold value of blood pressure that ensures autoregulation of blood flow equal to 70 mm Hg is proposed (for mean arterial pressure) or 90/60 mm Hg. The diagnosis of SAB/DAB is based on criteria [6].

Pankov D.D., Borodulina G.A, Rumyantsev A.G. (2005) studied the pathogenesis and prognostic significance of arterial hypotonia in adolescents. For example, it has been proven that the following play a leading role as the mechanisms of negative effects of ArGt on survival: 1) violation of blood circulation in the brain, 2) violation of autoregulation of cerebral blood flow, 3) failure of neurohumoral regulation of blood pressure, 4) vascular (hypotonic) encephalopathy origin [3]. Vilkov V.G. et al. (2021), as noted above, according to 40 years of monitoring, survival in the Russian population is worse - in men and women, respectively, at the levels of average AB <70 and 68

mm Hg. This observation was also confirmed in the US population, with a 20-year follow-up showing a similar worsening of survival in men and women with mean AB <76 and 72 mmHg [2]. Of course, the findings in the two populations cannot be a coincidence, according to the authors, or so they suggest. J.Yu. Chefranova (2008) in his review article raised, in our opinion, a logically relevant issue in relation to ArGt. According to the main conclusion of the author, the main reason for the lack of international criteria for ArGt is that the arterial hypotension criteria written in the literature are mostly based on the results of clinical examinations. Without prospective observations, researchers have focused mainly on clinical manifestations (caused by insufficient blood supply to the organs) [11]. Similar results and epidemiological conclusions related to the diagnosis of ArGt Williams B. et al (2018) Shalnova S.A. etc. (2004) and Sharamova E.E. etc. (2007) [13, 14, 15,19]. These clinical results and the presented literature review confirm that today's diagnostic and, especially, preventive issues of arterial hypotension have not been fully resolved. Controversial and unclear questions about its exact limits or normo-and hypotonia indicators, which have a negative effect on survival, have remained. It follows from the general opinions that, in order to "fill the gaps" noted, it is necessary to increase the attention to epidemiological research as a priority scientific direction: the medical and economic efficiency of such approaches to the R&T problem has been confirmed in the scientific research carried out in Uzbekistan. [9, 10].

**THE PURPOSE OF THE STUDY** was to study and evaluate the epidemiology of arterial hypotension in the modern rural population..

Research material and methods The object of the research is the aboriginal population living and working (mainly engaged in agricultural work) in the rural conditions of the Pakhtaabad region, which fully represents the rural-farming population of the Ferghana Valley. The subject of the study was to determine the epidemiological details and preventive specifics of ARG among the population involved in farming activities in the village. 2182 farming population participated in the study. All population-subjects signed informed consent before entering the study. Their age ranged from 18 to 70 years and older. The main exclusion (exclusion) criteria were: those who moved to another city or district, went on a business trip for more than one year (the duration of the investigation), those who were registered or living elsewhere in the investigation area, did not agree to participate in the investigation, after the first invitation

<sup>1</sup> Management of cardiology. Edited by G.I. Storjokova and A.A. Gorbachenkova. -Tom 1. - Moscow.-2008.



to the investigation was sent those who died or ceased to live in the prescribed place. The object and territory of the study fully meet the requirements of epidemiological investigation: no migration, the selected population of farmers, representative of the entire territory, the place of investigation is well connected by transport, the number of inspectors is sufficient for the analysis, no other epidemiological investigation has been conducted in the object and territory. The study protocol was approved by the local ethics committee. The total number of farmers-population registered at the place of work is 2182 and they were involved in the full investigation, they are described as follows: 1)  $\geq 18-70$  years old-2182 (men-1069 and women-1113), including 18-30 years old-435 (men-236 and women-199), 31-49-year-olds-1143 (606 men and 537 women), 50-69-year-olds-549 (men-194 and women-335) and  $\geq 70$ -year-olds-55 (men-33 and women-22); 2) people with higher education - 304 (214 men and 90 women); 3) secondary education - 1896 (men - 1035 and women - 861); 4) unmarried - 149 (men - 121 and women - 28); 5) married people - 2000 (men - 1116 and women - 884); 6) divorcees - 46 (25 men and 21 women); 7) widows - 26 (men - 7 and women - 19). These descriptions of the population meet the requirements of epidemiological studies [WHO, 2011; 20]. Currently, there are no specific criteria for arterial hypotension. In our study, the classification of N.S. Molchanov (1962) was used for the diagnosis of

arterial hypotension, and generally accepted diagnostic criteria were used. In particular, specific clinical symptoms for ArGt were taken into account. Arterial pressure (AB) was diagnosed as arterial hypotension when it was observed at levels below 100/60 mm Hg in men and below 95/60 mm Hg in women (following the rules for measuring AB). In addition, when daytime SAB<101 and night <86 mm above sea level, and DAB - daytime <61 and night <48 mm above sea level. when it is equal, it was considered to be diagnosed as ArGt. Statistical processing of the data was carried out with the help of computer programs-2021, which create the possibilities of parametric and non-parametric analysis. Nonparametric tests of Manna-Whitt were used to assess intergroup differences. The statistical significance of the results was assessed by RR, CI-low and CI-up and  $\chi^2$  parameters. Pearson's linear correlation analysis and Spearman's linear-serial method were used to assess the degree of correlation between epidemiological indicators, as well as stepwise multivariate regression analysis. It was accepted that the level of difference was equal to  $R < 0.05$ .

Obtained results and their discussion Epidemiological characteristics of arterial hypotension in the population engaged in farming activities were studied and evaluated. Gender and age-related characteristics of such data obtained for the first time are summarized in Table 1 and recommended numerically.

**1-Table**

**Characteristics of gender and age-related changes in the epidemiology of ARG in the population engaged in farming activities**

T/r	Age groups	Male population			R	Female population			Total farming population		
		N	ArGt			N	ArGt		N	ArGt	
			n	%			n	%		n	%
1.	$\geq 18-30$	236	14	5,9	<0,01	199	25	12,6	435	39	9,0
2.	31-49	606	85	14,0	ИЭ	537	78	14,5	1143	163	14,3
3.	50-69	194	33	17,0	<0,001	355	13	3,7	549	46	8,4
4.	$\geq 70$	33	2	6,1	<0,05	22	1	4,5	55	3	5,5
5.	$\geq 18-70$	1069	134	12,5	0,12	1113	117	10,5	2182	251	11,5
RR=1,23, CI-low=0,95, CI-up=1,61; $\chi^2=3,13$ ; P=0,077											

**Note:** •N-the number of the examined general population, n-the population with arterial hypotension determined from among the general population is in absolute number, %-ArGt in percentage; other tables and figures show similar interpretations; the IE-variance level is not statistically reliable.

It follows from the table statement that the male gender has significant importance in the development of ArGtni (RR=1.23). At the same time, the confidence interval (SI-low, CI-up),  $\chi^2$  and Pearson's R test showed that this result does not have significant statistical significance [CI-low=0.95; CI-up: 1.61;

$\chi^2=3.13$ ? P=0.08]. In the general population of farmers aged  $\geq 18-70$  years, the prevalence of ArGt is 11.5% and is characterized by over-detection in men (12.5%) compared to women (10.5%) with a difference of 2.0% (R=0.12 ). As age changes, the frequency of detection of the disease increases up to



5.0 percent or 1.6 times ( $R < 0.05$ ). In particular, in the general population - 9.0 percent in  $\geq 18$ -30-year-olds (from -5.9 percent in men and -12.6 percent in women;  $R < 0.01$ ), -14.3 percent in the 31-49 age group (in men - 14.0 percent and -14.5 percent in women;  $R > 0.05$ ), 8.4 percent in 50-69-year-olds (-17.0 percent in men and -3.7 percent in women;  $R < 0.001$ ) and  $\geq 70$  -5.5 percent in older people (from -6.1 percent in men and -4.5 percent in women,  $R < 0.05$ ). A specific "epidemiological structure (construction)" of arterial hypotension is determined even in groups of farmers-population differing in their social and family status and labor activity (shown in Table 2).

The statistical processing of the received data revealed the unique "ArGt construction" in the population of farmers depending on social and family

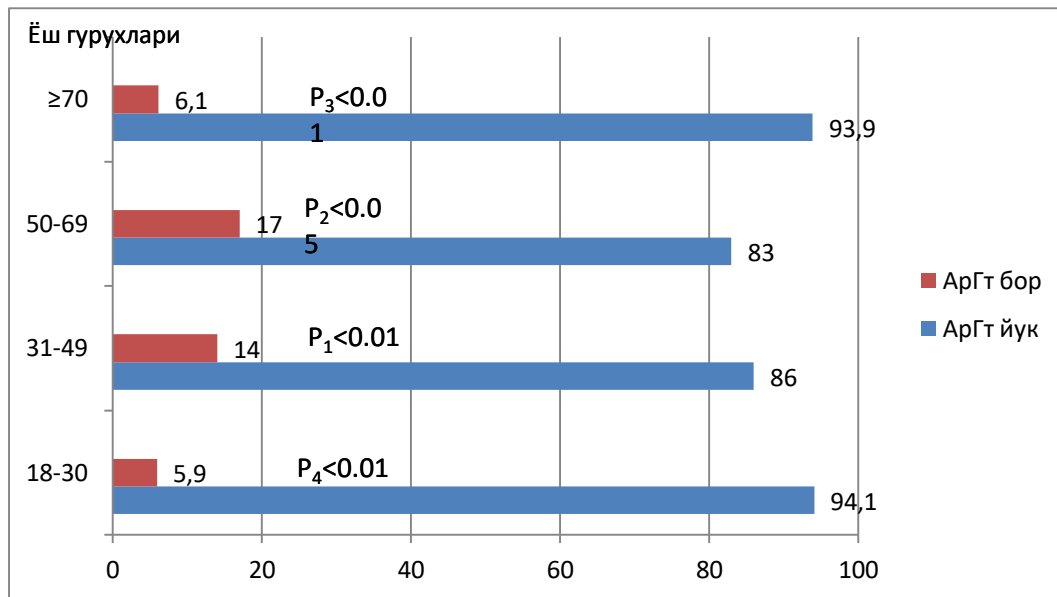
conditions and labor activity. For example, ArGt has the highest frequency prevalence in "Highly educated farmer population" (14.1 percent, -16.4 percent in men and -8.9 percent in women;  $R < 0.01$ ), "Secondary educated population" (12.6 percent, from 11.7 percent in men and -13.7 percent in women;  $R > 0.05$ ) and in the "married farmer-population" (13.4 percent; from 13.1 percent in men and -13.8 percent in women,  $R > 0.05$ ) shows. The frequency of detection of this disease with a significant difference is low in the farming population, in the "Unmarried" population (4.7 percent; in men -5.0 percent and in women -3.6 percent,  $R < 0.05$ ), "Divorced population" (10.9 percent; -16.0 percent in men and -4.8 percent in women,  $R < 0.01$ ) and represented in "Widow population" (7.7 percent; -0.0 percent in men and -10 in women .5 percent,  $R < 0.05$ ).

**2 -Table**

**Epidemiological characteristics of ArGt in the population of farmers differing in social, family and labor factors**

№	Description of social, family and professional factors	Male population			R	Female population			Total farming population		
		N	ArGt			N	ArGt		N	ArGt	
			n	%			n	%		n	%
1.	2	3	4	5	6	7	8	9	10	11	12
	"Highly educated population"	214	35	16,4	<0,01	90	8	8,9	304	43	14,1
	"Secondary educated population"	1035	121	11,7	∩∅	861	118	13,7	1896	239	12,6
	"Unmarried population"	121	6	5,0	<0,05	28	1	3,6	149	7	4,7
	"Married population"	116	146	13,1	∩∅	884	122	13,8	2000	268	13,4
	"The estranged population"	25	4	16,0	<0,01	21	1	4,8	46	5	10,9
	"Widow population"	7	0	0,0	<0,05	19	2	10,5	26	2	7,7

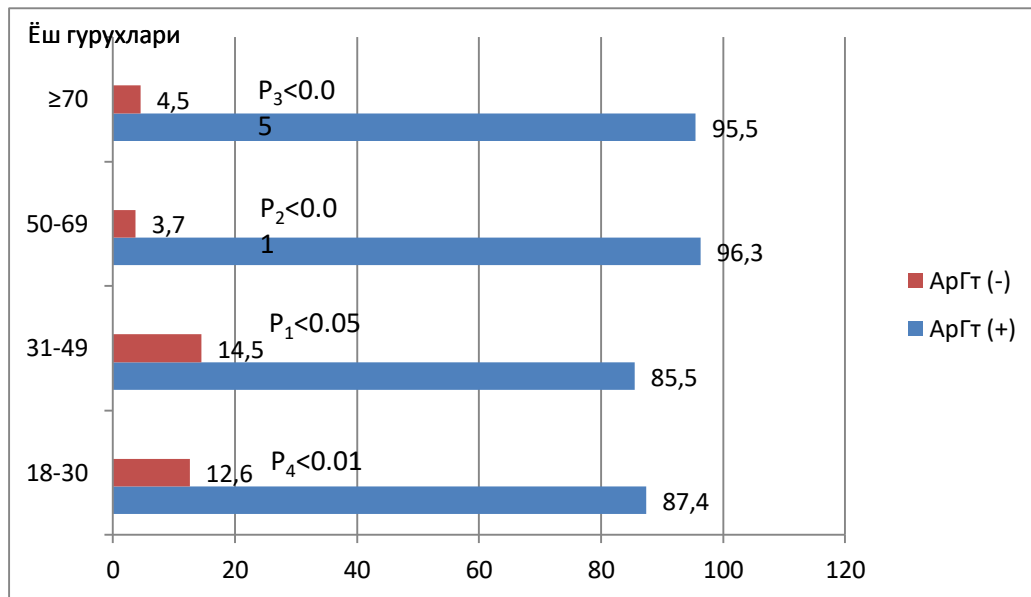
It is worth noting that the age factor has a strong influence on the formation of ArGt in farmer men (shown in Fig. 1).



**Figure 1. Expression of age as a risk factor for ArGt in a population of male farmers.**

The interpretation of the picture shows that, firstly, age as a non-modifiable risk factor in the origin of ArGt in male farmers significantly shows the pathogenic contribution. Secondly, the role of age in causing the disease begins to increase in the age range of 31-49 years, and it increases the frequency of detection of ArGt relatively by 32 times. It is confirmed that 50-69-year-olds are considered the "strongest risk area" for ArGt: in these ages, the prevalence of ArGt is more than 3 times higher than in the male population under 30 years old, and 1.2 times higher than in men under

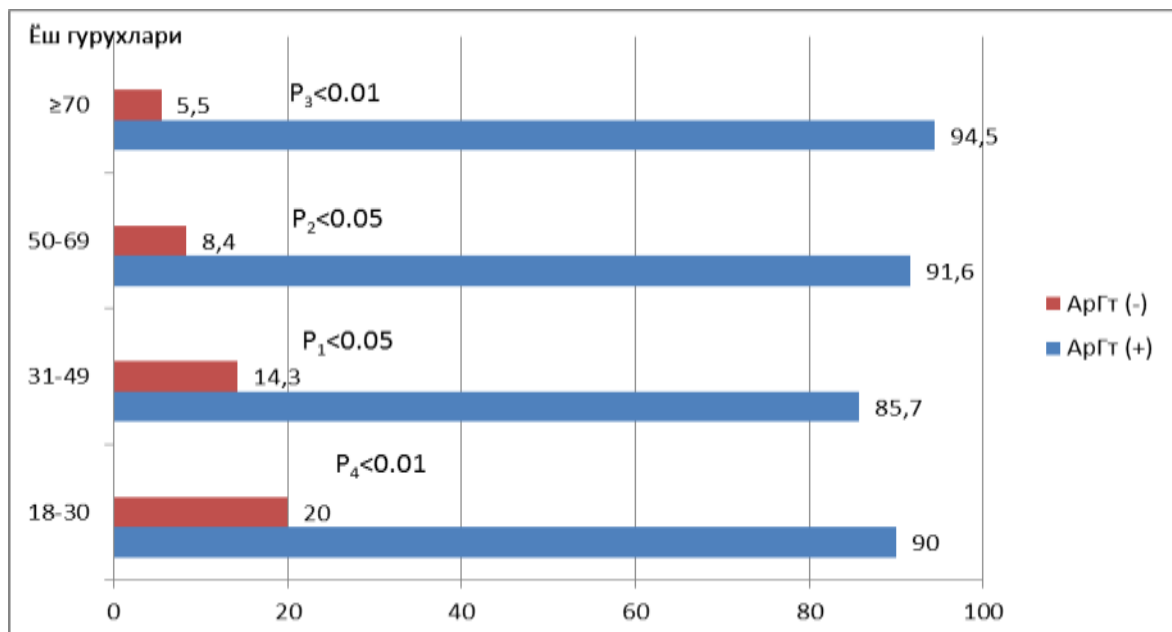
50 years old ( $R < 0.05$  ;  $R_2 < 0.01$ ). After the age of 70, its role in ArGt formation decreases by 2.8 times, or ArGt is sharply reduced in male farmers of this age range ( $R_3 < 0.01$ ). It is proven by 4.6 times less prevalence in male farmers under 30 years of age compared to those aged  $\geq 50$  years ( $R_4 < 0.01$ ). This age is confirmed as the "weakest risk area" for the development of ArGt. A similar trend, but with a significant difference, is expressed as a risk factor for ArGt in the population of female farmers (Figure 2)..



**Figure 2. Representation of age as a risk factor for ArGt in a population of female farmers.**

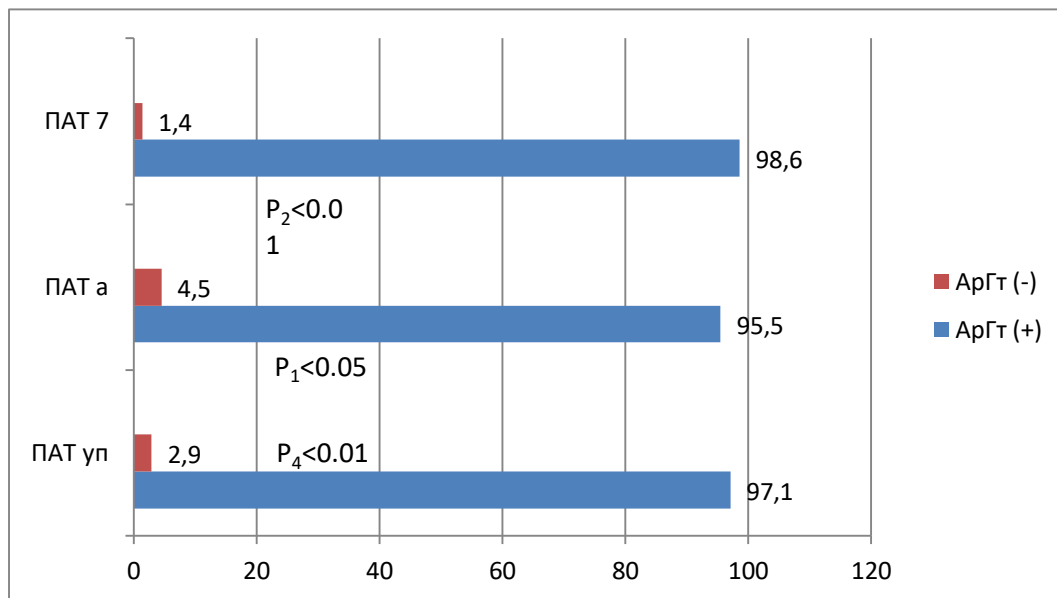
From the analytical results, it is evident that the age range up to 30 years and the age range up to 49 years are considered as "strong risk area" for ArGt among female farmers. Because at these ages, when compared to those over 50, the frequency of ArGt distribution reaches 4 and 5 times ( $R_2 < 0.01$ ;  $R_4 < 0.01$ ). In comparison to the female population under 70 years of age, firstly, the frequency of detection of ArGt is insignificantly different in people

over 70 years old; secondly, in both age groups, hypotonic conditions are noted with a very low detection frequency ( $R_{1.3} < 0.01$ ). In contrast to the male population, these age groups are confirmed to be the area with the lowest risk of developing ARG in women. The age range between 49 and 69 years has almost the same, strong risk of ArGt. Figure 3 shows the specific aspects of the role of age as a risk factor for R&T in the general population of farmers..



**Figure 3. Representation of age as a risk factor for R&T in the general population of farmers.**

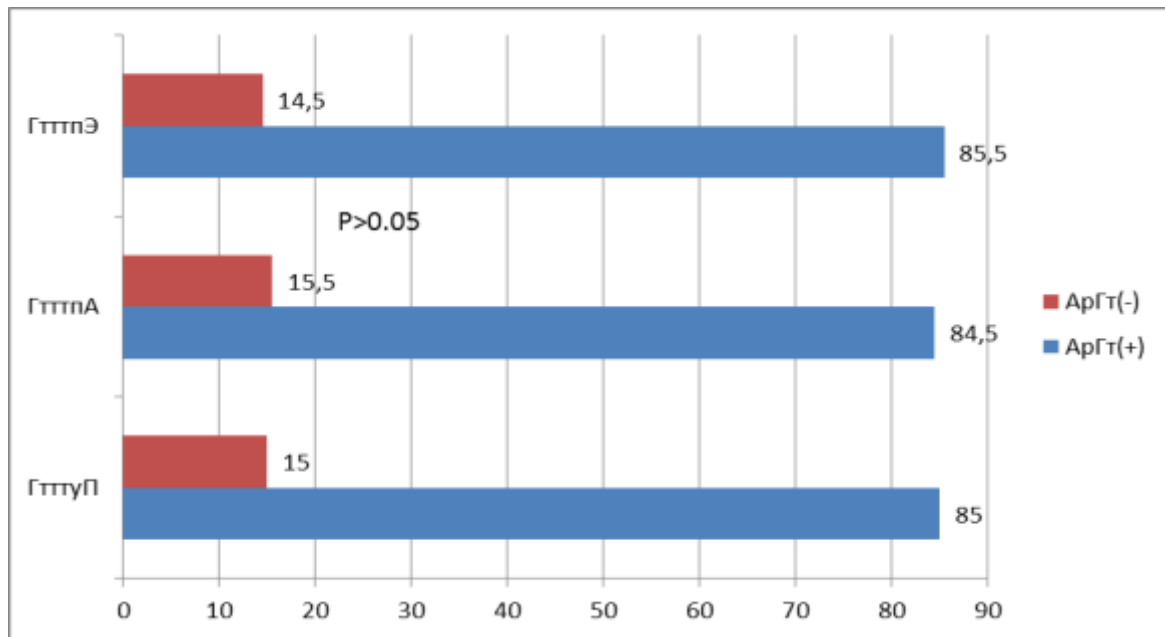
It can be concluded that (according to the data of Figure 3) the age range of 31-49 years is considered to be a factor that sharply increases the risk of developing ArGt in the farming population. In this age group, the development of ArGt increases by 1.4 times ( $R_1 < 0.05$ ) compared to people under 30 years old, 1.7 times compared to people under 70 years old ( $R_2 < 0.05$ ) and almost 3 times compared to people over 70 years old ( $R_3 < 0, 01$ ). Therefore, age intervals of 31-49 and  $\geq 18-30$  are confirmed as "strong unfavorable area" that increases the risk of ArGt for the farming population. With increasing age, from  $\leq 30$  to  $\geq 70$  years, the risk of developing ArG is almost halved ( $R_4 < 0.01$ ). In most scientific sources, it is shown that ArGt is recorded in high frequencies in the elderly population, not in the adolescent population [4, 18]. The fact that such a contradictory scientific result is obtained in the population of farmers, i.e., the decrease of R&T with age, can be explained by the increase of comorbidity pathology and taking the role of priority. As the index of comorbidity increases, the "real ArGt" seems to "remain in its shadow" and remains undetected. The scientific analysis of the research data also shows that ArGt has specific epidemiological characteristics in population groups with asthenic, normosthenic and hypersthenic body types and in the contingent population of very thin (Kettle index  $\leq 15\text{kg/m}^2$ ) (Fig. 4, Fig. 5, Fig. 6 and 7 shown in the pictures).



PAT<sub>3</sub> – male population with asthenic body type, PAT<sub>a</sub> – female population with asthenic body type, PAT<sub>yn</sub> – general population with asthenic body type.

**Figure 4. Representation of the relationship between asthenic body type and ArGt.**

In the population of farmers belonging to the hypersthenic body type (Gttmp), it was determined that the characteristics of the epidemiologic description of ArGt can be described as follows and that it has preventive potential (Fig. 5).

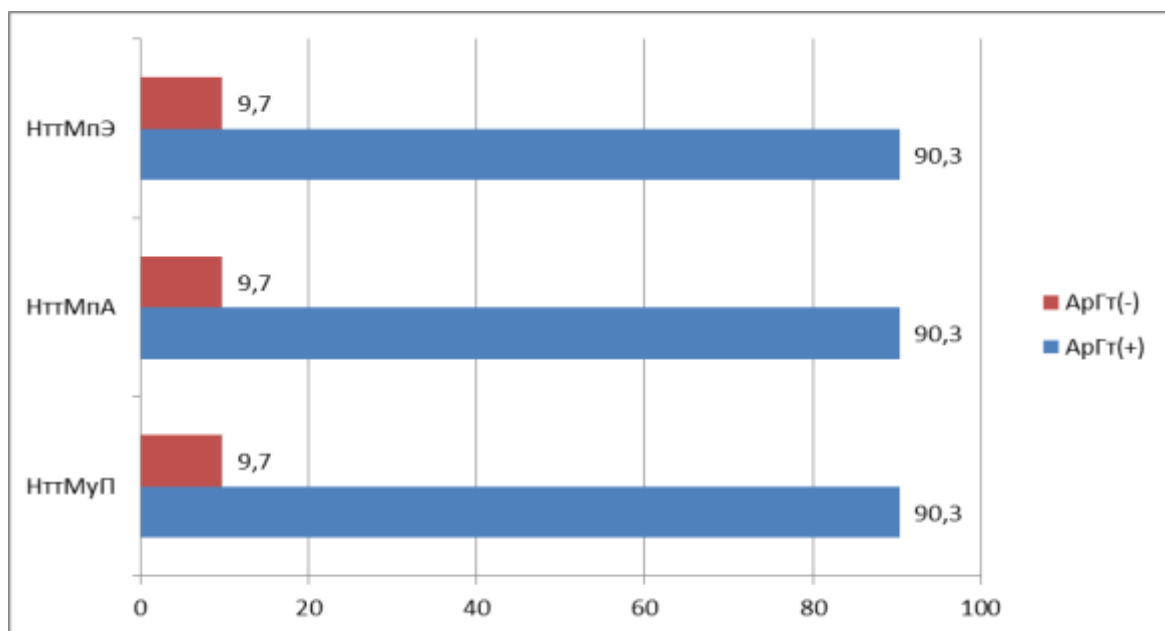


GttmpE-hypersthenic male population  
 GttmpA- A population of hypersthenic women  
 GttmuP-hypertensive general population

**Figure 5. Epidemiological description of ArGt in the population of hypersthenic farmers.**

In particular, according to the analysis, in men and women with hypersthenic body, ArGt-14.5 and 15.5 percent, that is, with a difference of 1.0 percent, is detected to a greater extent in women ( $R > 0.05$ ). In general GttmuP, it is observed with a prevalence of 15.0 percent.

The results of the analysis of the association of normasthenic body type with ArGt in the population of farmers are shown in Figure 6



TG-inspection group  
 NttMpE - A population of normosthenic males  
 NttMpA- A population of normosthenic women  
 NttMuP - normasthenic general population

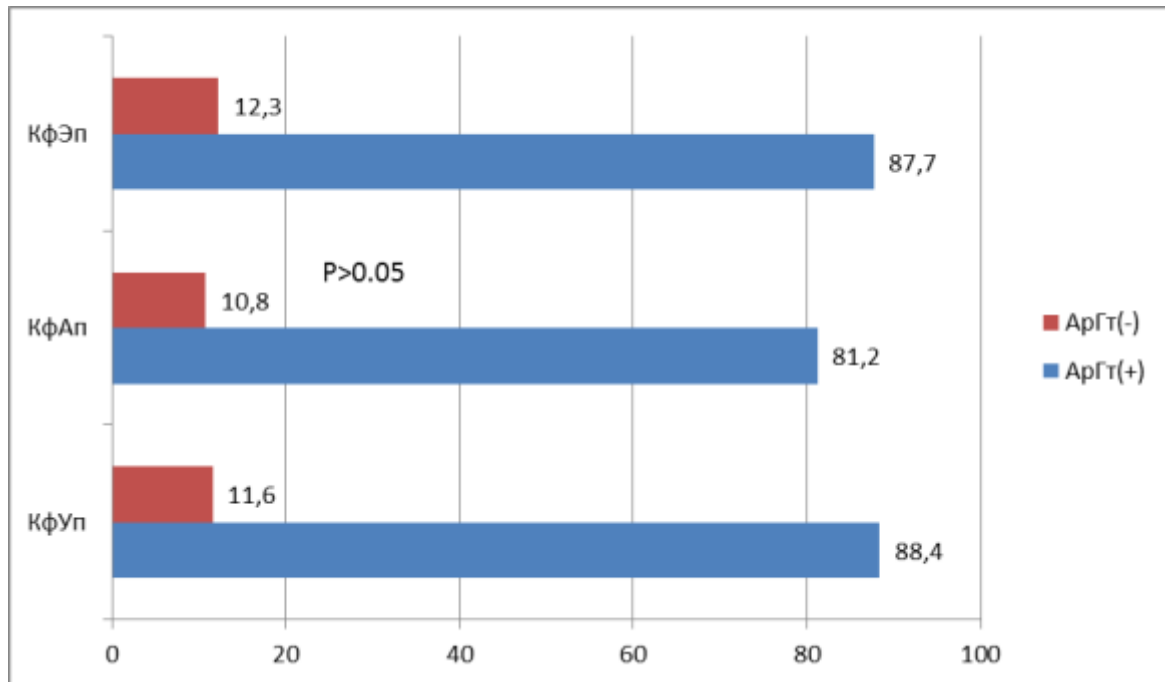
**Figure 6. Representation of normosthenic body type in relation to ArGt in the population of farmers.**





The frequency of detection of ArGt is observed with a prevalence of 9.7 percent in the general population of farmers of the normosthenic body type, and gender differences are not detected. In the population of farmer men (NttMpE) and women (NttMpA), the same prevalence (9.7 and 9.7 percent) is recorded.

In a thin (cachectic) population, engaged in farming activities, ArGt is also confirmed in men and women in the general population with higher frequencies (Fig. 7).



КфЭп-cachectic (lean) male population  
A population of KфАп-cachectic women  
The total population of KфУп-cachetic farmers

**Figure 7. Representation of leanness related to R&T in the population of farmers.**

Another task of the study was to study and evaluate leanness as a possible risk factor for ArGt in a population engaged in farming activities, as can be seen from Figure 7. Analyzes in this regard proved that the prevalence of ArGt in lean people is 11.6 percent.

Its contribution to the origin of ArGtn in men is 1.2 times higher than in women, and its prevalence is 12.3 and 10.8 percent, respectively, with a difference of about 2.0 percent ( $R>0.05$ ).

In conclusion: 1) the risk of developing ArGt in the population of farmers with a hypersthenic body type is 1.7 times higher than that of normosthenics (-1.5 times in men and -1.8 times in women); 2) Asthenic body type has a 5 times lower risk of ArGt origin compared to hypersthenics; 3) cachexia also increases the risk of ArGt in this population up to 1.3 times compared to normosthenics; 4) hypersthenic and thin population is included in the high risk group and primary, secondary and tertiary prevention is

organized or improved in farmers. According to our results, the risk of developing ArGt or the risk of complications of the disease is reduced from 11.0% to 15.0% among the population engaged in farming, and the effect of treatment increases dramatically in every fourth patient, and the potential risk of drugs reaches at least 25.0%. decreases.

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