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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

**SOCIO-HYGIENIC ASSESSMENT OF
RISK FACTORS FOR FORMATION OF
ARTERIAL HYPERTENSION AND
APPROACHES TO REDUCE
THEIR ACTIVITY AMONG WOMEN
OF REPRODUCTIVE AGE
IN THE CITY OF BAKU**

Speciality: 3212.01-Public Health and its Organization

Field of science: Medicine

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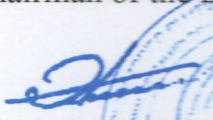
The work was performed at the Department of Public Health and Health Organization, the Azerbaijan Medical University.

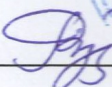
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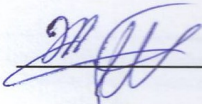
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GENERAL DESCRIPTION OF THE PAPER

Urgency of the topic. Arterial hypertension (AH) is one of the main problems of modern medicine, being the cause of fatal complications and the related disability and mortality in the general female population. Widespread epidemiological prevalence and systemic effects on health, decreased ability to work and quality of life (QL) of women turns AH into one of the key problems. AH in women is the most common chronic disease that reaches 50% of the total female population¹.

The fact that AH occurs in masked forms in many women and they enter into pregnancy without suspecting their disease, which is fraught with serious consequences, is of particular concern. Therefore, the study of the nature of the prevalence of AH among women, the peculiarities of its formation, the search for methods of diagnosing the masked forms, safe means of treatment of AH and rational approaches to its prevention will provide an optimal basis to increase the effectiveness of measures to protect women's reproductive health².

It was shown in a number of large prospective studies conducted in foreign countries and Russia that the success of the fight against AH, in general, and among women, in particular, depends on the correction of socio-behavioural characteristics necessary to limit the activity of exposure of risk factors on the organism. In turn, the activation of risk factors is influenced by the natural and climatic conditions of certain regions, national and ethnic characteristics as well as the educational and cultural level of local women, their

¹ S.Boytssov et al., 2014; V.Gafarov et al., 2016; C.Hawitt et al., 2015; W.Li et al., 2016

² V.Larina et al., 2015; N.Lyamina et al., 2016; J.Anthony et al., 2016; A.Helon et al., 2016

prophylactic behaviour, socio-economic prerequisites, the state of reproductive services for women, etc.¹.

The dominant risk factors for the formation of AH among the adult population, including women, are hypercholesterolemia (HPC_h), hypodynamia (HD), obesity, non-rational nutrition, smoking, and alcohol².

The role of abuse of salt, the reduction of consumption of which increases the effectiveness of treatment of AH, was also shown as a risk factor³. But the role of stress that every person experiences to one degree or another every day is especially emphasized⁴. At the same time, the literature lacks the papers on the combined effect of risk factors on the body, on the mechanism of their comorbidity which limits the possibilities of effective prophylaxis of AH among reproductive women.

In recent years, more and more researchers are inclined to think about the need to begin implementing health protection programmes among women from a young and even adolescent age, in consideration of the progressively growing number of early marriages, pregnancy and birth child⁵. At this age, women are more susceptible to measures to correct prophylactic behavior. As a result, prerequisites for improving their health and limiting the prevalence of AH are created⁶.

Purpose of paper. The study of the socio-hygienic aspects of the formation and effect of AH on the reproductive potential of women, finding approaches to diagnose masked forms, rationaliz-

¹ G.Andreeva et al., 2014; N.Nikitina et al., 2016; L.Glynn et al., 2014; K.Bramham et al., 2014

² V.Ivanchenko et al., 2018; A.Orlov et al., 2016; S.M.Smith, 2013; R.Hermida et al., 2015

³ M.Batyushin, 2015

⁴ S.Crowley, 2014

⁵ S.Israfilbeyli, L.Rahimova, 2015; N.Paskar, A.Nedoshivin, 2015; L.Mosca et al., 2011; G.Mancia et al., 2013

⁶ E.Indukaeva et al., 2015; Y.Greenstein et al., 2016; S.Lewington et al., 2016

ing the treatment and prevention of this disease at the population level.

Tasks of paper.

- Identification of the population characteristics of the prevalence of AH, the medical and social aspects of its influence on the reproductive potential of women, the course and outcome of pregnancy;

- The search for markers and methods that contribute to the diagnosis of masked forms of AH in population studies among women of reproductive age;

- The state of adherence of women of reproductive age to ambulatory treatment and prevention of AH and their attitude to reproductive care;

- Quantitative and qualitative assessment of risk factors for the formation of AH, their comorbidity and correction mechanisms among women of reproductive age;

- Development of organizational approaches to correct prophylactic behaviour and mechanisms to reduce the activity of dominant risk factors and experimental evaluation of their effectiveness in outpatient treatment and population prophylaxis of AH among women of reproductive age.

Scientific novelty.

- The patterns of the spread of AH in local conditions, the spectrum of its effect on reproductive health, the course and outcome of pregnancy among women of reproductive age have been identified;

- Based on a combination of markers (debut symptomatology, inheritance, blood types, cholesterinemia), an algorithm for the diagnosis of the masked forms of AH in population studies has been developed;

- Modification of the acute hypoxia test (AHT), which allows diagnosing maximally the masked forms of AH, is suggested;

- According to the opinion of women, flaws in reproductive health institutions that reduce their timely appealability, treatment and prevention of AH have been found and a set of measures to eliminate these flaws has been suggested;

- There has been established that the personal and behavioural characteristics of women activate risk factors (RF) and the predominant formation of AH occurs with combinations of excess body weight (OVW), food value (FV) and physical activity (PhA);

- There has been shown that training of women in self-monitoring of AH (measuring arterial pressure (BP)) increases their motivation and an adequate attitude to reproductive health;

- There has been shown experimentally that a combination of measures to improve reproductive care, self-monitoring of AH and correction of PhA increases the effectiveness of treatment and the recovery of women in outpatient conditions;

- Affordable and ongoing explanatory work among women on the importance of reproductive health, correction of dominant risk factors helps preventing the formation of new cases of AH at the population level.

The practical value of the thesis. Based on the results obtained, the following is suggested: risk groups among women of reproductive age, which increases the level of AH screening, especially among pregnant women, have been identified; the use of a developed algorithm and a modified AHT allows diagnosing the masked forms of AH as much as possible; mechanisms for reducing (correcting) the activity of dominant factors of the risk of AH formation have been identified; to increase the adherence of women to treatment and prophylaxis, measures to improve reproductive care and train women to self-control AH are suggested; experimentally, as a result of the implementation of a combined set of measures (improvement of reproductive care, organizational and explanatory work, correction of risk factors and prophylactic behaviour, self-monitoring of BP), the probability of increasing the

effectiveness of treatment of AH in ambulatory cases and at the population level has been proved.

The basic provisions of the thesis submitted to the defence.

- The effect of AH on the reproductive health of women, on the course and outcome of their pregnancy;
- Socio-environmental and personality behavioral prerequisites and exogenous RF of AH formation;
- The state of reproductive services for women, their motivation for treatment and prevention of AH;
- Methods for diagnosing the masked forms of AH;
- Evaluation of approaches to prevent AH at the population level.

Approbation of the thesis: Materials of the thesis were presented at the conferences: XX World Congress on Rehabilitation in Medicine and Immunorehabilitation, New York, 2014; Scientific Conference dedicated to the 70th Anniversary of Doctor of Medical Sciences Azam Aghayev, Baku, 2014; 1. International medical congress for student and young doctors, Baku, 2014; I International Scientific Conference *European Applied Sciences: Challenges and Solutions*, Stuttgart, 2015; 5th annual international scientific – practical conference “Medicine pressing questions” Young doctors of Azerbaijan, Baku, 2016; Conference dedicated to the 100th anniversary of Vali Akhundov, prominent public, political and scientific figure, Honoured Scientist, Professor, Full Member of the Azerbaijan National Academy of Sciences, Baku, 2016; Scientific and Practical Conference on the 120th Anniversary of Aziz Aliyev hold in ATU, Baku, 2017; Scientific and Practical Conference Actual Problems of Medicine 2017 dedicated to the 25th anniversary of the restoration of Azerbaijan's state independence, Baku, 2017.

Publications. Based on the materials of the thesis, scientific works, of which 6 articles and 10 theses, have been published; 5 articles and 2 theses have been published abroad.

Structure and scope of paper: The thesis is presented on 219 typed pages, consists of an introduction, *Material and Research Methods* of Chapter, 5 chapters of my own researches, conclusion, findings and practical suggestions. The list of references includes 282 sources of national, Russian-speaking and foreign authors. The paper is illustrated by 26 tables and 19 figures.

Material and research methods.

The work has been carried out as part of the scientific programme of the Department of Public Health and Public Health Organization, AMU. Three polyclinics and antenatal clinics in the Sabayil, Sabunchu and Yasamal Districts, as well as 3 associated schools, have been selected as basic objects. 5 kindergartens and nurseries and nearby shopping facilities, and offices, with managers and staff of which the programme of research has been agreed upon and approved. For convenience of perception, the volume, material, and methods of the studies are grouped into 5 blocks, which consistently correspond to the chapters of my own research.

Block 1. In polyclinics and antenatal clinics, 1,051 and 795 outpatient cards of women at different periods of reproduction, out of pregnancy and pregnant, have been analyzed respectively using blind methods, including 225 and 102 women with AH. Sociological studies have been conducted using the international standardized WHQ questionnaire¹. In total, 3,500 questionnaires have been distributed at basic objects, the response was 1,866 completely filled out questionnaires (53.3±0.7%), of which 231 were women with controlled AH, 334 women with uncontrolled AH and 1,241 women without AH (control). By analyzing the questionnaires and ambulatory cards, we have determined the state of reproductive appealability of women, they have made 3,739 visits in all to polyclinics during the year, of which 829 visits have been the share of controlled AH, 618 visits have been the share of uncontrolled AH and 2,292 visits have been the share of the control group.

¹ M.Hunter et al., 2000

Among 638 pregnant women, 1,587 visits have been made. Adherence to the treatment and prevention of AH has been studied among 901 women and 511 pregnant women according to the D.Morisky method¹. 2 groups of reasons for low adherence of women have been identified - 14 reasons of a social and personal nature and 15 reasons with flaws in reproductive servicing.

Block 2. Based on the qualitative and quantitative assessment of markers, AH heredity (1,071 women's parents), debut symptomatology (1,746 units of symptoms) from the blood group of air cooling (AC) system (679 women and 143 donors), and total cholesterol in the blood (TCh) (866 laboratory tests), an algorithm has been developed to diagnose masked hypertension forms of AH (see. Fig. in the text). A modification of AHT has been tested among 171 men, 187 women and 173 pregnant women for the diagnosis of masked forms of AH.

Block 3. The incidence of selected groups of women has been analyzed in polyclinics; a total of 33 nosoforms have been detected. The level of stress has been determined among 1,143 women and 152 pregnant women under the L.Reeder² scale. The effect of AH on the course and outcome of pregnancy has been studied among 1,866 surveyed women on the basis of data on a previous pregnancy and among 652 women with a current pregnancy. Assessment of their own health and the state of their quality of life has been determined among 901 women according to the questionnaire SF-36³ (the norm is more than 70 points). According to the method of I.Seregina⁴, the opinion of women on accessibility, satisfaction and awareness of reproductive assistance has been determined (the norm of each position is 45 points).

Block 4. A systematic analysis of socio-behavioral prerequisites for the formation of AH has made it possible to identify 23

¹ D.Morisky¹ et al. 1986

² L.Reeder et al., 1968

³ J.Ware et al., 1994

⁴ I.Seregina, 2009

components of the coincidence of AH to the social environment. Mass of body (kg/m^2) according to the Kettle index of all 1,866 surveyed women, and food energy (kcal/day) according to the WHO method¹ among 901 women have been defined. The state of physical activity of women has been studied in particular detail, the GPAQ Questionnaire² has been used, and responses have been received from 1,375 women: 243 with controlled AH, 285 with uncontrolled AH, 947 of control group.

Block 5. Measures have been taken to improve the quality of reproductive care on the basis of taking into account the views of 901 women in basic polyclinics and antenatal clinics. Observations have been carried out for 11-15 months. To increase commitment, 136 women have been trained in self-control of AH. We have evaluated the role of PhA correction in increasing the effectiveness of treatment of AH on an outpatient basis and preventing the formation of new cases of AH at the population level. The effectiveness of the work has been determined after 11-15 months among 218 women who increased PhA, and 96 women who did not increase PhA.

When processing the results, we have used the Student criterion (t), the arithmetic weighted average ($M \pm m$), Van der Waerden (X) criterion, the correspondence criterion (χ^2), and the correlation coefficient (r)³.

The results of our own researches.

Based on a questioning, AH has been detected in $33.5 \pm 1.1\%$ of women of reproductive age. The incidence rate has a pronounced correlative age-specific nature ($r = +0.88 \pm 0.09$), increasing from $23.8 \pm 2.5\%$ among women under the age of 20 to $38.8 \pm 4.0\%$ among women aged 40 and over ($t = 3.16$; $P < 0.01$). In $15.6 \pm 0.8\%$ of cases, AH has been monitored by doctors at the

¹ E.Akimova et al., 2009

² WHO, 2010

³ S.Glants, 1999

clinic, women took AHA and carried out routine visits to doctors (controlled AH). In 17.9 ± 0.9 cases ($t=1.92$; $P>0.05$), AH has proceeded in mild and latent forms with periodically occurring and quick-passing symptomatology and therefore women very rarely made visits to the clinic (uncontrolled AH). The duration of the course of controlled AH has been on average 4.12 ± 1.17 years, reaching seven years or more in $13.1 \pm 2.0\%$ of women.

During examination and questioning in antenatal clinics, AH has been detected in $40.5 \pm 1.9\%$ of women, which is higher relative to women with AH detected in clinics - $33.5 \pm 1.1\%$ ($t=2.73$; $P<0.01$), since during pregnancy women more often seek reproductive assistance. However, only $9.4 \pm 1.2\%$ of women addressed before pregnancy; $36.5 \pm 1.9\%$ of women addressed, respectively, in the first trimester of pregnancy ($t=12.04$; $P<0.001$); $45.8 \pm 1.9\%$ of women addressed in the second trimester ($t=3.46$; $P<0.001$) and $11.4 \pm 1.3\%$ of women addressed in the third trimester ($t=14.96$; $P<0.001$). Obviously, in spite of having a pregnancy, women late appeal for reproductive assistance.

Medical and reproductive appealability of women itself is rather low. The entire group of questioned women has made an average of 2.00 ± 1.4 visits. At the same time, the average rates of appealability increase in series as women age increase from 1.30 ± 0.29 to 2.84 ± 0.33 visits during the year ($t=3.50$; $P<0.001$).

The reproductive appealability of pregnant women is also far from the desired level. So, before the onset, an average of 1.22 ± 0.19 visits have been made; 1.84 ± 0.17 visits ($t=2.48$; $P<0.05$) have been made in the first trimester of pregnancy. 3.23 ± 0.16 visits ($t=6.04$; $P<0.001$) have been made in the second trimester. 2.95 ± 0.18 visits ($t=1.17$; $P>0.05$) have been made in the third trimester; their decrease is due to the fact that in the later stages of pregnancy, many women prefer to stay at home and prepare for the upcoming birth.

According to Morisky's methodology, adherence is recognized among patients who scored 4 points (normal). The women examined by us have scored a total of 2.34 ± 0.13 points on average, which is an

objective indicator of their low commitment to the implementation of therapeutic and preventive measures. This indicator is slightly higher among women with controlled AH - 2.84 ± 0.19 points, which is associated with a prolonged chronic course of AH and the associated frequent visits to doctors.

Among pregnant women, the situation with adherence is similar, the total index of which is 2.72 ± 0.14 points.

As a result of questioning, interviews with doctors and constant contacts with women, we have identified main reasons. By nature, they have been divided into 2 blocks. The first block has consisted of social and personal reasons. By means of quantitative calculations, it has been established that 2.37 ± 0.43 reasons on average are the share of one woman (pregnant) with controlled AH; 6.23 ± 0.39 ($t=6.66$; $P<0.001$) are the share of one woman with uncontrolled AH, respectively; 7.04 ± 0.31 of the reasons of social and personal nature are the share of one woman of the control group.

The second block of reasons has been associated with certain flaws in the functioning of polyclinics and antenatal clinics. According to calculations, an average of 5.85 ± 0.48 reasons are the share of one woman with controlled AH; 3.35 ± 0.36 reasons ($t=4.10$; $P<0.001$) are the share of one woman with uncontrolled AH; 1.25 ± 0.25 reasons ($t=2.50$; $P<0.01$) are the share of one woman in the control group.

All identified causes are quite easily removable, they do not require additional human, material and technical resources.

The success of the fight and prevention of AH largely depends on the timely detection of masked mild and especially masked forms of AH, observed in most women, and their effective treatment. However, no methods for their diagnosis and identification at the population level have yet been suggested. Therefore, using the peculiarities of AH in women, we have conducted researches on the development of an algorithm for identifying its masked forms. A comparison of the frequency of detection of AH among parents and children (women) has found that in $45.4 \pm 1.3\%$ of cases, AH is presumably trans-

mitted in inherited way through the “mother-daughter” line. The debut symptomatology of AH with mild and even masked forms is observed in every woman, but their rarely manifested and rapidly passing nature almost always remains without due attention. Although each of these women has noted an average of 5.23 ± 0.22 of these debut symptoms of AH. At the same time, it has been found that AH is more often detected among women with blood group A(II). In particular, among women with uncontrolled AH and blood group A(II), the disease is detected $20.6 \pm 2.9\%$ more often than with other blood groups. Hypercholesterolemia (HPCh) is one of the leading factors in the formation of AH; the level of total cholesterol in the blood is determined in the laboratories of clinics and antenatal clinics in many women, but doctors rarely use its excess values to identify masked forms of AH. At the same time, our observations show that in $75.0 \pm 2.6\%$ of women with uncontrolled AH (mild and latent forms), cholesterol levels exceed the norm (>5.0 mmol/L). Based on the quantitative calculations of the listed diagnostic markers of AH, a scheme of an algorithm for identifying mild and masked forms of AH among women in population studies has been developed. For the first time, the algorithm allows identifying these forms of AH when women turn to medical institutions, during their prophylactic inspections and medical examinations. However, the detection of such cases of AH requires objective confirmation. Unfortunately, measuring of BP often does not solve this goal. Therefore, we have tested and adapted AHT to the local conditions. AHT is based on the fact that asphyxia leads to an increase in sympathetic vasomotor activity. An increase in BP can occur also due to an increase in the general peripheral vascular resistance. Therefore, in patients with a masked course of AH, the sensitivity of receptors involved in the autonomic regulation of the cardiovascular system is increased, the sensitivity of chemoreceptors to carbon dioxide is reduced, and neurohumoral regulation disorders that respond to hypoxia are often observed; as a result, the cascade of changes quickly starts, leading to an increase in BP. In those examined with a masked form of AH, the test was posi-

tive in 97.9% of cases after breath-holding for 30 seconds¹. When testing, the effectiveness of AHT has amounted to an average of $40.6\pm 3.6\%$, and smoking reduces its effectiveness. Among pregnant women, the effectiveness of AHT in the first trimester of pregnancy is $55.6\pm 6.3\%$; in the second trimester is $26.8\pm 6.0\%$ ($\chi^2=10.07$; $P<0.01$); in the third trimester is $4.5\pm 2.6\%$ ($\chi^2=12.17$; $P<0.01$). Thus, the addition of the algorithm results by setting the AHT will allow identifying fully the softly flowing and masked forms of AH at the population level.

AH exerts an independent aggravating effect on the body, but having a systemic character, it creates favourable conditions for the development of various diseases. A total of 33 groups of diseases have been detected, the level of which among women with controlled AH reaches $64.6\pm 1.9\%$; among women with uncontrolled AH reaches, respectively, $58.7\pm 2.7\%$ ($t=3.35$; $P<0.001$). Among women in the control group, it reaches $46.3\pm 1.4\%$ ($t=4.05$; $P<0.001$). According to the calculations made, 5.55 ± 0.36 ; 3.04 ± 0.32 and 1.35 ± 0.22 cases of morbidity ($t=4.33$; $P<0.001$) are the share of each of the women in these groups. Very often, AH is interdependent with psychoemotional stress, especially with its strong level, its combined effect on organism in the first group of women is $34.9\pm 2.9\%$ of cases, in the second group - $27.2\pm 2.6\%$ of cases ($t=1.98$; $P>0.05$) and only $17.4\pm 1.6\%$ in the third group of women ($t=4.35$; $P<0.001$), i.e. AH contributes to the development of stress. The combination of AH and a high level of stress is especially high in the third trimester of pregnancy, respectively $65.1\pm 6.1\%$, $42.6\pm 6.0\%$ ($\chi^2=6.61$; $P<0.02$) and $34.7\pm 5.6\%$ of cases ($\chi^2=0.93$; $P>0.05$).

¹ N.Lyamina et al., 2009

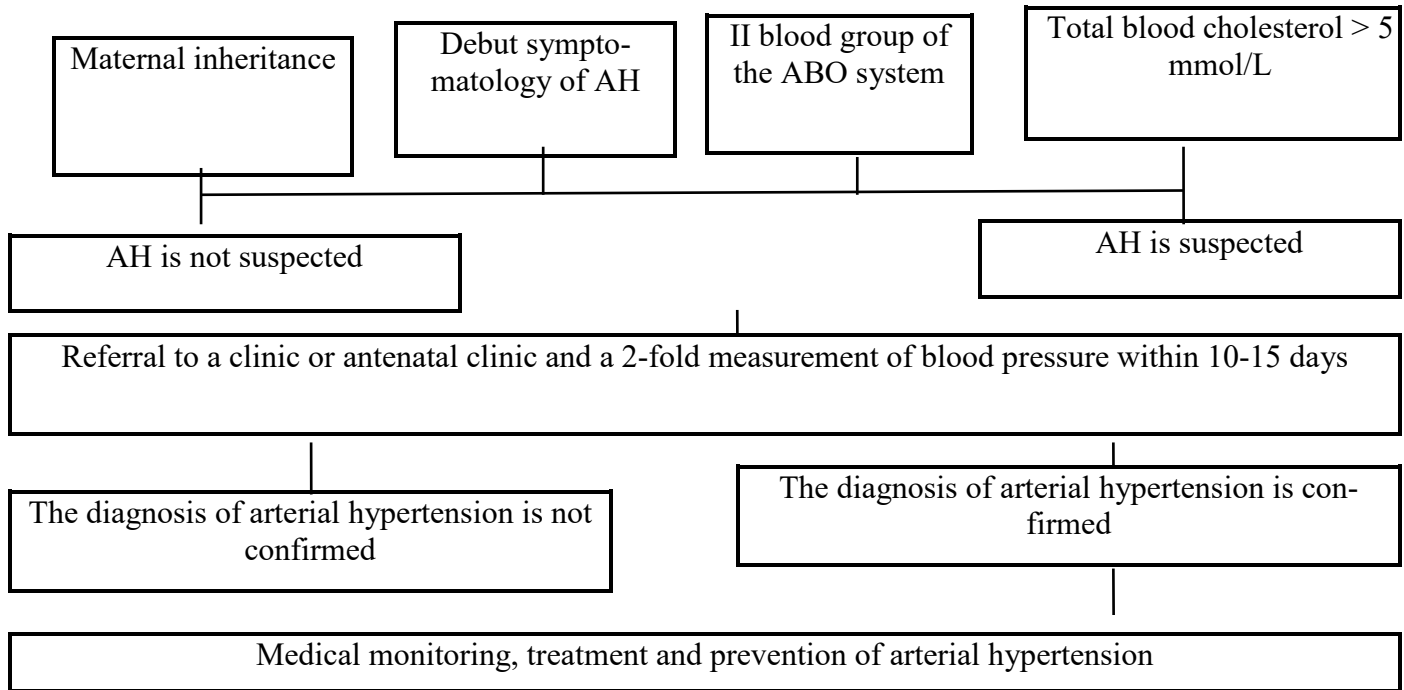


Fig. Algorithm for detecting mild and masked forms of AH among women of reproductive age at the population level

AH has a serious negative effect on the course and outcome of pregnancy. For example, against the background of controlled AH, the frequency of such reproductive disorders such as abortion, caesarean section, burdened pregnancy, premature and difficult birth, pathology of newborns and others has amounted to $57.7\pm 2.9\%$. Against the background of uncontrolled AH, their frequency is lower, $35.6\pm 2.6\%$ ($t=5.68$; $P<0.001$), it is even lower in the control group of women, $23.1\pm 1.2\%$ ($t=4.37$; $P<0.001$). An average of 1.69 ± 0.17 ; 0.86 ± 0.16 ($t=3.61$; $P<0.001$) and 0.36 ± 0.21 ($t=2.63$; $P<0.01$) is the share of each woman in these groups, respectively. In addition to a fixed reproductive disorder, pregnant women experience a whole range of complications, which are generally referred to as toxicosis. Depending on the severity of the manifestations, we have grouped toxicoses as weak, medium and strong. So, a strong level of toxicosis against the background of controlled hypertension in the third trimester of pregnancy is observed in $66.7\pm 6.0\%$ of pregnant women; against the background of uncontrolled hypertension - in $51.5\pm 6.1\%$ of pregnant women ($\chi^2=3.88$; $P<0.05$); in the controlled group - in $48.6\pm 5.9\%$ of pregnant women ($\chi^2=0.83$; $P>0.05$), i.e. AH contributes to the formation of reproductive disorders, complicates the course and outcome of pregnancy, and therefore represents an important socio-demographic significance.

We have studied the indicators of the quality of life of women and the quality of the reproductive care provided to them. We note that only $20.8\pm 3.0\%$ of women with controlled AH, $32.5\pm 3.0\%$ of women with controlled AH ($t=2.76$; $P<0.01$) and $38.8\pm 2.3\%$ of women in the control group ($t=0.87$; $P>0.05$) have rated their own health as satisfactory. The self-esteem of health as good has been even lower, from 9.8 ± 2.2 to $12.2\pm 1.5\%$ of women ($t=0.90$; $P>0.05$). As a result of this, the indicators of women's quality of life have turned out to be lower than the standard (>70 points satisfactory), making for women with controlled AH an average of 49.2 ± 1.7 points; for women with uncontrolled AH - 55.0 ± 1.2 points ($t=2.64$; $P<0.01$); for women of the control group - 65.8 ± 1.2 points ($t=5.87$;

$P < 0.001$). According to the opinion of women regarding the quality of reproductive assistance, it has been found that its accessibility has been estimated at an average of 27.8 ± 0.8 points (norm - 45 points), satisfaction - at 36.6 ± 1.0 points, awareness - 29.5 ± 0.9 points. When implementing organizational measures to increase the accessibility and satisfaction of reproductive assistance and informative provision, $61.3 \pm 1.6\%$ of women have showed a motivation to control reproductive health, incl. AH.

Many significant chronic non-infectious diseases, including AH, are socially determined diseases. Among the local population of women, we have identified 23 such components that create the necessary starting conditions for activating the main risk factors for AH. These components include educational qualifications; social status; professional orientation; type of character; nature of night and day sleep; duration of use of computer and TV; family status; living conditions; living space for 1 woman; family size; material welfare; relationships in the family; attitude to service (work); mutual relations in the team; upbringing and studying children; family services; attitude to health protection; trust in doctors; inclination to taking medication and self-medication; medical awareness and sources of information. The quantitative values of the detailed components are 2.21-8.85 times more positive among women in the control group than among women with controlled AH.

Defects in the social environment, personal and behavioural characteristics of women lead to the activation of such dominant risk factors for the formation of hypertension as OVW (obesity), FV and PhA. In our observations $51.8 \pm 1.2\%$ of women has exceeded the norm ($>25.0 \text{ kg/m}^2$) body weight, the rate of which has averaged $27.1 \pm 0.12 \text{ kg/m}^2$. For example, the body weight of women with controlled AH averages $29.1 \pm 0.23 \text{ kg/m}^2$; with uncontrolled AH - $27.8 \pm 0.19 \text{ kg/m}^2$ ($t=4.33$; $P < 0.001$); in the control group - $26.6 \pm 0.14 \text{ kg/m}^2$ ($t=5.00$; $P < 0.001$). Between AH and OVW, there is a correlative dependence in the age-related coincidence ($r=+0.89 \pm 0.09$). In particular, in the age range of 20-40 years, the OVW value in the first

group of women gradually increases from 26.6 ± 0.43 to 31.2 ± 0.45 kg/m^2 ($t=7.42$; $P<0.001$); in the second group of women - from 26.6 ± 0.37 to 33.5 ± 0.39 kg/m^2 ($t=12.78$; $P<0.001$); in the third group of women - from 25.7 ± 0.28 to 27.8 ± 0.30 kg/m^2 ($t=5.12$; $P<0.001$).

The mass distribution of OVW is promoted by flaws in food behaviour and low PhA in women. The questioning has revealed women's 10 food preferences; their quantitative values among women with controlled AH are 1.36-1.92 times worse than among women in the control group. In addition, if 34.4 ± 2.2 and $33.5 \pm 2.2\%$ of women respectively consume first courses ($t=0.29$; $P>0.05$), then the first of them than the second prefer the second courses - 39.9 ± 3.6 and $27.5 \pm 2.1\%$ ($t=2.97$; $P<0.01$) and vice versa, the second ones than the first prefer both dishes - 39.1 ± 2.3 and $25.7 \pm 3.2\%$ ($t=3.40$; $P<0.001$); i.e. women with AH are more committed to irrational high-calorie diets, which leads to an increased content in the body, an increase in body weight and poses a serious risk for the formation of AH.

In addition, the issue of the role of sodium chloride (NaCl) in the development of AH has been intensively debated in recent years. The intake of NaCl in the body occurs with food and salting food. But especially a lot of NaCl comes from the use of various pickles and marinades, which is especially characteristic of the local female population. For example, in our observations pickles and marinades were consumed 2 times a day by $37.2 \pm 3.6\%$ of women with controlled AH and only $20.8 \pm 1.9\%$ of women in the control group ($t=4.03$; $P<0.001$), whereas they were consumed 3-5 times a month by $8.7 \pm 2.1\%$ of the first and $21.2 \pm 1.9\%$ of the second women ($t=4.42$; $P<0.001$). In addition, the frequency of weak salting of food in these groups of women has been 19.1 ± 2.9 and $28.5 \pm 2.1\%$ ($t=2.63$; $P<0.01$); normal salting has been 44.8 ± 3.7 and $50.4 \pm 2.3\%$ ($t=1.28$; $P>0.05$); strong salting - 36.1 ± 3.6 and $21.0 \pm 1.9\%$ ($t=3.71$; $P<0.001$). Increased use of NaCl (norm is <6 g/day) leads to the formation of AH.

In Western countries, the FV norm for an adult is 1,800-2,100 scales/day. Our calculations show that the FV among women with

controlled AH averages 2530.7 ± 22.6 kcal/day; among women with uncontrolled hypertension - 447.0 ± 18.3 kcal/day ($t=2.88$; $P<0.01$); among women in the control group - 2192.1 ± 15.4 kcal/day ($t=10.67$; $P<0.001$). As can be seen, increased FV is a serious risk factor for the formation of AH among women. Therefore, if we take as norm the data on the control group of women who are reproductive representatives of the local population of women, then the normal FV should not exceed 2250 kcal/day.

The greatest damage to health is caused by the low PhA of the population, which is the cause of many diseases, leading to disability and mortality. Until now, the exact norms of PhA have not been specified; in different countries they vary from 30 minutes to 50 minutes or more, and it can be achieved by moderate walking too. The calculations show that the duration of moderate walking of women with controlled AH is on average just 28.4 ± 1.7 min/day; with uncontrolled AH - 33.7 ± 1.5 min/day ($t=2.33$; $P<0.05$); control group - 55.6 ± 1.3 min ($t=11.06$; $P<0.001$). As we can see, to cover the body in physical loads and prevent weight gain, including the formation of AH too, 45 min/day or more should be counted for the norm of PhA of the local population of women; it can be achieved by moderate walking, which is available for every woman.

RFs (OVW, FV and PhA) are affected women both individually and in different ratios with each other. However, their quantitative values differ in different groups of women. For example, among women with controlled AH, the frequency of independent exposure of OVW, FV and PhA to the body is not high and varies from 4.4 ± 1.5 to $7.7 \pm 2.0\%$ ($t=2.53$; $P>0.05$). The effect of a combination of two risk factors on the body significantly increases ($t=2.16$; $P<0.05$), the indicators of which vary from $14.8 \pm 2.6\%$ to $16.9 \pm 2.8\%$ ($t=0.55$; $P>0.05$). But the combined (simultaneous) effects of immediately three risk factors on the body increase especially noticeably: $35.5 \pm 3.5\%$ ($t=4.15$; $P<0.001$). In general, $83.1 \pm 2.8\%$ of women with controlled AH are simultaneously affected by two and especially three risk factors.

The distribution of frequencies of risk factors among women in the control group has a completely opposite character. In particular, the frequency of combinations of two risk factors is very low, ranging from 4.7 ± 1.0 to $8.4\pm 1.3\%$ ($t=2.26$; $P<0.01$), and combinations of three risk factors among women of this group have not been identified at all. While the frequency of independent exposure of OVW to the body is $22.5\pm 1.9\%$; the frequency of FV is $24.8\pm 2.0\%$, respectively ($t=0.83$; $P>0.05$); and the frequency of PhA is $33.9\pm 2.2\%$ ($t=3.06$; $P<0.01$). A total independent effect of OVW, FV and PhA on the body is observed in 389 of 466 women in the control group ($83.5\pm 1.7\%$).

The results of studies on OVW, FV and PhA allow coming to a very important following conclusion. Firstly, under the influence of one of these risk factors, starting conditions are created for the formation of AH, in particular, uncontrolled AH, which is realized in the disease when one more and especially three risk factors are added; i.e. by limitation of the impact of the activity of two of 3 factors on the body of women, with the corresponding correction of the lifestyle of women, including their personal and behavioural characteristics, it is possible to achieve not only the effectiveness of treatment of AH, but also to prevent its formation among women of reproductive age.

Improving the system of medical care for the population in general and reproductive care for women, in particular, is recognized as the most important condition for successful solving of problems associated with chronic diseases significant in social and economic relations, including AH too. According to the study of women's opinions, we have presented a list of measures to the managers of basic polyclinics and antenatal clinics, the implementation of which included improving the quality of reproductive care (see practical suggestions). After 11-15 months, an assessment of the implementation of the suggested and organizational measures that do not require additional personnel, material and technical resources has been made. According to women, these measures have contributed to im-

proving the quality of medical care. In particular, its accessibility has increased by averaged values from 28.1 ± 1.1 to 33.2 ± 1.3 points ($t=3.07$; $P<0.01$); satisfaction - from 36.4 ± 1.5 to 41.7 ± 1.6 points ($t=2.42$; $P<0.05$); awareness - from 29.6 ± 1.6 to 39.4 ± 1.7 points ($t=4.33$; $P<0.001$).

Correction of the commitment of the population (women) to timely medical appealability, treatment and prevention of this disease is admitted as another important condition for a positive solution to the problem of AH. We have considered training women to use tonometers and constant self-monitoring of BP to be one of the measures to strengthen commitment. After accessible explanatory work, $67.9 \pm 3.3\%$ of women have carried out self-monitoring of BP for 11-15 months, and their commitment increased to 3.6 ± 0.3 points (norm is 4 points).

Along with this, women's commitment to correcting such dominant risk factors as OVW, FV and PhA, especially low PhA, which contributes to the formation of AH even with an independent effect on the body, has been also evaluated. The work has been carried out during 11-15 months. At the start of work, the PhA duration of women averaged 30.2 ± 1.7 min/day, among women who fully complied with the recommendations at the end of the PhA work, activity has increased to 49.6 ± 1.9 min/day ($t=7.61$; $P<0.001$), i.e. exceeded the norm established by us (more than 45.0 min/day), which had a beneficial effect on the controlled parameters of AH. In particular, the clinical course of AH has improved in $49.1 \pm 3.4\%$ of women versus $18.2 \pm 2.2\%$ of their indices at the start ($t=5.16$; $P<0.001$). At the same time, recovery has occurred in $26.1 \pm 3.0\%$, and the frequency of reproductive disorders has decreased from 74.2 ± 2.5 to $48.6 \pm 3.4\%$ ($t=6.07$; $P<0.001$). Women have also increased positive assessment of their own health, from 16.6 ± 2.1 to $68.3 \pm 3.2\%$ ($t=13.53$; $P<0.001$).

As can be seen, correction of low PhA plays an important role in achieving the therapeutic effect of AH, as evidenced by indicators of BP. So, at the start of work, the systologica BP (SBP) index among women averaged 149.3 ± 4.7 mm Hg, diastological BP (DBP)

- 106.3 ± 3.6 mm Hg. At the end of the work, the SBP indicator in the Group 1 of women has decreased and averaged 126.6 ± 3.6 mm Hg ($t=3.83$; $P<0.001$), DBP - 85.3 ± 3.1 mm Hg ($t=4.42$; $P<0.001$). Increase in PhA has also contributed to the correction of OVW, which during the observed period has decreased from 31.6 ± 1.4 to 25.6 ± 1.6 kg/m² ($t=2.82$; $P<0.01$).

Thus, the sedentary lifestyle, characteristic of a significant part of women, not only exerts an aggravating effect on health, but is a leading risk factor for the formation of AH among them. Against the background of low PhA, the effectiveness of treatment of AH decreases. The modern rhythm of life restricts the possibilities of women in a special PhA, but it is compensated by moderate walking lasting 45 minutes or more per day. With such PhA in a relatively short period (11-15 months), the effectiveness of treatment of AH and recovery of $26.1 \pm 3.0\%$ of women increase and the target level of BP is achieved. In addition, OVW is reduced and development of new cases of AH is prevented. Accessible on an ongoing basis explanatory work finds understanding among women about the need to normalize PhA.

CONCLUSIONS

1. Prevalence of AH among the urban population of women is $33.5\pm 1.1\%$ and has age-related coincidence, reaching $38.8\pm 4.0\%$ among women aged 40 years and older. In $17.9\pm 8.9\%$, AH proceeded in soft and latent forms and was not controlled by doctors. The incidence rate of pregnant women is $39.5\pm 1.9\%$; in the third trimester of pregnancy, the AH level reaches $49.3\pm 5.9\%$, which indicates the role of late gestation in the formation of AH.

2. The reproductive appealability of women is low, on average 2.00 ± 1.4 visits per 1 woman, 2.49 ± 0.14 visits per 1 pregnant woman. Adherence to treatment and control of AH in women is on average 2.34 ± 0.13 points (norm is 4 points), for pregnant women - 2.72 ± 0.14 points. Decrease in the commitment of women (pregnant) is facilitated by the causes of a social and personal nature and flaws in the work of clinics and antenatal clinics.

3. To identify mild and masked forms of AH, the following markers have been tested. In $45.4\pm 1.3\%$ of cases, hereditary transfer of AH is possible. On the line "mother-daughter" in the onset of the disease an average of 5.23 ± 0.22 of rare and rapidly passing symptoms of AH is observed. In $20.6\pm 2.9\%$ of cases, AH is confined to the A(II) blood group, and in $75.0\pm 2.6\%$ of cases TCh in the blood of women exceeds the norm. Based on a combination of markers (heredity, debut symptomatology, blood groups, cholesterolemia), an algorithm for the diagnosis of masked forms of AH at the population level has been offered (see the figure in the text). To confirm their diagnosis, AHT can be used, the effectiveness of which among women is $40.6\pm 3.6\%$, among pregnant women in the first trimester of pregnancy - $55.6\pm 6.3\%$.

4. The systemic nature of the effect of AH on the body creates the prerequisites for the development of various morbidity. For 1 woman with controlled AH, an average of 5.55 ± 0.36 cases of incidence occur, with uncontrolled AH - 3.04 ± 0.32 cases, in the control group - 1.35 ± 0.22 cases. The combination of AH and a high level of

stress in these groups is $34.9\pm 2.9\%$, $27.2\pm 2.6\%$ and $17.4\pm 1.6\%$ cases, reaching $65.1\pm 6.1\%$, $42.6\pm 6.0\%$ and $34.7\pm 5.6\%$ cases in the third trimester of pregnancy. Combination of AH and DM is $26.5\pm 2.6\%$, $16.8\pm 2.0\%$ and $4.9\pm 0.6\%$; the frequency of reproductive disorders is 1.69 ± 0.17 , 0.86 ± 0.16 , 0.36 ± 0.11 cases, respectively, calculated on 1 woman. A strong level of toxicosis among pregnant women in the third trimester of pregnancy is $66.7\pm 6.0\%$, $51.5\pm 6.1\%$ and $48.6\pm 5.9\%$ of cases.

5. The indicator of the quality of life of women with controlled AH is just 49.2 ± 1.7 points (the norm is more than 70 points), with uncontrolled AH - 55.0 ± 1.2 points, in the control group - 65.8 ± 1.2 points, while a satisfactory assessment of women's own health with AH does not exceed $32.5\pm 3.0\%$, good health - $9.8\pm 2.2\%$. According to women, the availability of reproductive care is 27.8 ± 0.8 points (norm is 45 points); satisfactoriness - $36.6\pm 1.0\%$ points; awareness - 29.5 ± 0.9 points. With the improvement of these indicators, the motivation of women to control their health, including AH, grows up to $61.3\pm 1.6\%$.

6. Among the local population of women, 23 components reflecting their social environment, personal and behavioural characteristics and attitude to health have been distinguished. Quantitative calculations of the values of the components show that they are 2.21-8.85 times more positive among women in the control group than among women with controlled AH.

7. The body weight of women with controlled AH is on average 29.1 ± 0.23 kg/m², in the control group is 26.6 ± 0.14 kg/m², FV is 2530.7 ± 22.6 , 2192.2 ± 15.4 kcal/day respectively, PhA is 28.4 ± 1.7 and 55.6 ± 1.3 min/day. Formation of AH occurs with simultaneous exposure of 2 and especially 3 of these risk factors to the body of women. Standards for OVW, FB and PhA that take into account the peculiarities of the local population of women have been suggested.

8. Elimination of defects in reproductive care identified according to the opinion of women increases its accessibility to 33.2 ± 1.3 points; satisfaction to 41.7 ± 1.6 points; awareness to 39.4 ± 1.7 points.

Upon training of women in the self-monitoring of BP, their adherence to treatment and prevention of AH increases, reaching an average of 3.6 ± 0.3 points. With PhA normalization, the effectiveness of outpatient treatment of AH reaches $49.1 \pm 3.4\%$, contributes to the recovery of $26.1 \pm 3.0\%$ of women, corrects OVW and prevents formation of new cases of AH by 7.43 times.

PRACTICAL RECOMMENDATIONS

1. To identify mild leaking forms of AH during population studies, an algorithm has been developed (see the figure in the text), where hereditary transmission of AH along the mother-daughter line is evaluated as markers, the debut symptomatology of AH and abnormal TCh values, as well as coincidence to the A (II) blood group, are revealed at once.

2. To confirm the diagnosis of masked forms of AH, AHT is used, which is set in the following sequence: 1) initial measurement of BP (after 20 minutes of rest, in a calm environment, in a sitting position); 2) oral and nasal breath holding (by nose clip) for 30s; 3) repeated measurement of BP after resuming breathing - strictly at the 31st second after AHT. The results of AHT are evaluated according to the following criteria: the test is positive with an increase in BP to 140/90 mm Hg and higher after breath holding (for 31s); the test is negative if the BP level was less than 140/90 mm Hg after breath holding.

3. To increase the motivation of women to control health, incl. AH, it is necessary to implement internal organizational measures in institutions for the reproductive service of women to improve the accessibility, satisfaction, and informational provision of reproductive assistance to women. Increasing women's commitment to timely reproductive appealability, treatment and prevention of AH contributes to their training in self-monitoring of BP.

4. To prevent the preconditions for formation of AH, we suggest standards for dominant risk factors that take into account the na-

tional and ethnic characteristics of the rigid population of women:
OVW - $<27.0 \text{ kg/m}^2$, FV - $<2250 \text{ kcal/day}$, PhA - $>45 \text{ min/day}$.

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LIST OF ABBREVIATIONS:

AC	- air cooler
AH	- arterial hypertension
AHA	- antihypertensive agents
BP	- blood pressure
AO	- abdominal obesity
BA	- bronchial asthma
HD	- hypodynamia
HPCh	- hypercholesterolemia
DBP	- diastolic BP
CHD	- coronary heart disease
MI	- myocardial infarction
OVW	- overweight
IR	- insulin resistance
QL	- quality of life
LPhA	- lack of physical activity
TCh	- total blood cholesterol
AHT	- acute hypoxia test
SBP	- systolic BP
DM	- diabetes mellitus
CH	- heart failure
CVD	- cardiovascular diseases
CVC	- cardiovascular complications
PhA	- physical activity
RF	- risk factors
ChKD	- chronic kidney disease
COPD	- chronic obstructive pulmonary disease
CVD	- cerebrovascular disease
FV	- food value

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