



European Society
of Cardiology

May Measurement Month 2017 in Russia: hypertension treatment and control—Europe

Oxana Rotar^{1*}, Alexandra Konradi^{1,2}, Anastasia Tanicheva³,
Sergey Nakonechnikov⁴, Natalia Blinova⁵, Thomas Beaney⁶, Xin Xia⁶,
Neil R. Poulter⁶, Irina Chazova⁵, and Evgenyi Shlyakhto¹

¹Almazov National Medical Research Centre, Saint Petersburg, Russia;

²University of Information Technologies, Mechanics and Optics, Saint Petersburg, Russia;

³Russian Society of Cardiology, Moscow, Russian Federation;

⁴Pirogov Russian National Research Medical University, Moscow, Russian Federation;

⁵The National Medical Research Center of Cardiology, Moscow, Russian Federation; and

⁶Imperial Clinical Trials Unit, Imperial College London, Stadium House, 68 Wood Lane, London W12 7RH, UK

Elevated blood pressure (BP) is a growing burden worldwide, leading to over 10 million deaths each year. May Measurement Month (MMM) is a global initiative by the International Society of Hypertension aimed at raising awareness of high BP and to act as a temporary solution to the lack of screening programs worldwide. The most recent publication compared data from three surveys performed in Russian population aged 25–64 showed that the prevalence of hypertension increased by approximately 20% from 2003 to 2013. This study presents screening data collected in 2017 through the MMM17 initiative in Russia. An opportunistic cross-sectional survey of volunteers aged ≥ 18 was carried out in May 2017 in 19 Russian cities. Blood pressure measurement, the definition of hypertension, and statistical analysis followed the standard MMM protocol. The recruitment of MMM17 participants in Russia occurred in shopping malls, colleges and universities, supermarkets, business centres, parks, and squares. Russian young cardiologists as an official section of Russian Society of Cardiology was actively involved. A total of 5660 individuals were screened. After multiple imputation, 2709 (47.9%) had hypertension. Of individuals not receiving antihypertensive medication, 753 (20.3%) were hypertensive. Of individuals receiving antihypertensive medication, 1094 (55.9%) had uncontrolled BP. Comparing with the worldwide results of MMM17 screening, Russian participants had a higher proportion of hypertension, comparable antihypertensive prescription rate, and worse hypertension control. Thus, the MMM17 project appears to be an important step in evaluating hypertension burden in Russia and emphasizes the further need to improve hypertension awareness, treatment, and control.

Background

According to the systematic analysis for the Global Burden of Disease Study, Russia stands out for having the smallest net gain over the 68-year period of the study (1950–2017) at only 5.7 years (4.8–6.7) for men and 7.7 years (7.0–8.6) for women.¹ In Russia, higher mortality rate starts at the age of 10 years and continues throughout adulthood. A Russian Statistical Report documented in 2017

cardiovascular mortality as 584.7 per 100 000 inhabitants and cardiovascular morbidity in 2016–236.2 per 1000.²

Russia occupies the seventh place in age-standardized prevalence (%) of elevated blood pressure (BP) in population older than 18 years based on data from World Health Organization Global Health Observatory 2014. Similar to other European countries gender difference in hypertension prevalence is observed (34% in males and 24% in females).³ As announced by Russian Ministry of Health, 1418.9 subjects with new onset of hypertension were registered in 2017 with morbidity level—966.3 per 100 000.²

*Corresponding author. Tel: +78127023756, Fax: +78127023733, Email: rotar@almazovcentre.ru

The most recent publication hitherto compared data from three surveys performed in Russian populations aged 25–64 (in 1992–94, 2003–2004, and 2012–14) with a total number of screened subjects of 64 819 (Supplementary material online, *Figure S1*). From 2003 to 2013, the prevalence of arterial hypertension increased by approximately 20%.⁴ Russia was involved in the May Measurement Month (MMM) study organized by the International Society of Hypertension (ISH) as a regular active member of society, and with Russian Antihypertensive League as an official partner.

Methods

The recruitment of MMM17 participants in Russia occurred in shopping malls, colleges and universities, supermarkets, business centres, parks, and squares. The following 19 cities participated in screening: Saint Petersburg (322 participants), Moscow (987), Belgorod (28), Bryansk (405), Ivanovo (583), Kemerovo (676), Kirov (1220), Kostroma (122), Krasnodar (123), Krasnoyarsk (154), Rostov (260), Samara (67), Saratov (59), Stavropol (269), Surgut (137), Tver (289), Udmurtia (50), Ulyanovsk (50), and Yaroslavl (610). Volunteer staff totalled about 10–50 persons in each city. One site had one or two doctors. Professors Alexandra Konradi and Irina Chazova were Russian study coordinators.

The protocol, essential training material, videos, detailed instructions, and marketing information were sent to regional coordinators in each centre by e-mail. Regional coordinators contacted directly MMM17 country coordinators if they had any issues. Russian young cardiologists as an official section of the Russian Society of Cardiology were actively involved. Planning and training were already performed at the end of April 2017 during young cardiologists' conference in Krasnoyarsk. Ethics permission for the study was not required.

Most BP measurements were performed by automated A&D devices, which were provided by the A&D Company. All other expenses were financed by the Russian Society of Cardiology and Russian Society of Hypertension budgets.

Screening was 1 day in each site during the month of May 2017. Both automated BP devices and manual sphygmomanometers were used. Three seated measurements were taken on the left arm (70.2% of cases) with 1 min intervals between readings. Weight and height were recorded according to self-reported data. Data were entered into a study-specific mobile application, as well as on paper forms and later transferred to spreadsheets (Excel). Statistical data were analysed centrally by the MMM project team; full details were provided in the global paper.⁵

Results

A total of 5660 Russian participants were screened with mean age 49.7 (standard deviation (SD) 16.2) years. Predominantly they were females—4166 (73.6%) and had white ethnicity 5469 (96.5%). Diabetes was registered in 385 (6.8%) participants, previous myocardial infarction in 254 (4.5%), and previous stroke in 164 (2.9%). Current

smokers were 920 (16.3%) and the majority reported drinking alcohol never or rarely (97.3%).

Antihypertensive medications were taken by 1956 (34.6%) participants. After imputation, 2709 participants from 5660 had hypertension (47.9%). A total of 753 patients of the 3704 not on treatment were found to have hypertension (20.3%). A total of 1094 patients of 1955 with an available imputed BP on antihypertensive drugs were uncontrolled (55.9%).

After adjustment for age and sex, systolic blood pressure (SBP) and diastolic blood pressure (DBP) were significantly higher in subjects taking antihypertensive treatment (Supplementary material online, *Figure S2*). The SBP and DBP were significantly higher in measurements taken on the left arm compared with the right. A significant and linear increase for both SBP and DBP was associated with increasing strata of body weight (Supplementary material online, *Figure S3*).

Discussion

According to Visualizing Health Metrics infographic, based on estimates from the Global Burden of Disease Study 2016, the number of global deaths due to high SBP is increasing, with China, India, Russia, United States, and Indonesia having the highest numbers of deaths.⁶

Comparing with worldwide results of MMM17 screening, Russian participants had a higher proportion of hypertension (47.9% vs. 34.9%) which might be partly explained by higher mean age (49.7 vs. 44.9 years). Russian men have a disproportionate burden of disease relative to women. In 2016, 59.2% (55.3–62.6) of mortality in men aged 15–49 years and 46.8% (44.5–49.5) of mortality in women were attributed to behavioural risk factors, including alcohol consumption and smoking.⁷ Again, the Russian part of MMM17 documented that an increase in BP was associated with alcohol consumption stronger than with smoking. Previous Russian studies showed obesity to be a powerful predictor of hypertension. Adjusted by age, educational level, smoking, alcohol consumption, and increased heart rate, hypertension probability was higher in obese subjects independently of gender according to 20-years dynamics analysis.⁴

Antihypertensive medication prescription rate in hypertensives was comparable with worldwide data (20.3% vs. 17.3% without any medication). Hypertension control was worse in Russia compared with global MMM17 results—55.9% vs. 46.3% remained uncontrolled. In 2013 compared to 1993, the effectiveness of treatment increased in Russia by more than four times, seven times for men and three times for women, but it still remains poor. The three major factors associated with insufficient effectiveness of therapy in Russian population are low level of education, obesity, and high heart rate.⁸

Thus, the MMM17 project appears to be an important step in evaluating the hypertension burden in Russia and emphasizes further need to improve hypertension awareness, treatment, and control. The data obtained will be included in the development of future strategy of cardiovascular disease management and in healthcare projects.

Supplementary material

Supplementary material is available at *European Heart Journal - Supplements* online.

Acknowledgements

We are grateful to all investigators and volunteers. Special gratitude to regional coordinators: Mevsha O.V. (Belgorod), Nedbaikin A.M. (Bryansk), Belova O.A. (Ivanovo), Sokolova N.S. (Ivanovo), Kochergina A.M. (Kemerovo), Isakov A. (Kirov), Zhelezova P.V. (Kostroma), Fendrikova A.V. (Krasnodar), Chernova A.A. (Krasnoyarsk), Shepel R.N. (Moscow), Chuev M. (Rostov), Rubanenko O.A. (Samara), Boiarinova M.A., Alieva A.S., Tregubov A.V. (Saint Petersburg), Posnenkova O.M. (Saratov), Evsevieva M.A. (Stavropol), Cojocari C.G. (Surgut), Nizova E.A. (Tver), Shabardina S.V. (Udmurtia), Makeeva E.R. (Ulyanovsk), Gamayanova S.V. (Yaroslavl).

Conflict of interest: none declared.

References

1. GBD 2017 Mortality Collaborators. Global, Regional, and national age-sex-specific mortality and life expectancy, 1950-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet* 2018; **392**:1684-1735.
2. http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/en/main/ (22 December 2018).
3. ESC Scientific Document Group. European Society of Cardiology: Cardiovascular Disease Statistics 2017. *Eur Heart J* 2018; **39**:508-579.
4. Shalnova SA, Deev AD, Balanova Yu A, Kapustina AV, Imaeva AE, Muromtseva GA, Kiseleva NV, Boytsov SA. Twenty years trends of obesity and arterial hypertension and their association in Russia Cardiovascular Therapy and Prevention. 2017; **16**:4-10.
5. Beane T, Schutte AE, Tomaszewski M, Ariti C, Burrell LM, Castillo RR, Charchar FJ, Damasceno A, Kruger R, Lackland DT, Nilsson PM, Prabhakaran D, Ramirez AJ, Schlaich MP, Wang J, Weber MA, Poulter NR; MMM Investigators. May Measurement Month 2017: an analysis of blood pressure screening results worldwide. *Lancet Glob Health* 2018; **6**:736-743.
6. Marczak L, Williams J, Loeffler M; for the Institute for Health Metrics and Evaluation Global deaths attributable to high systolic blood pressure, 1990-2016. *JAMA* 2018; **319**:2163.
7. GBD 2016 Russia Collaborators. The burden of disease in Russia from 1980 to 2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2018; **392**:1138-1146.
8. Shalnova SA, Deev AD, Balanova YA, Kapustina AV, Konstantinov VV, Muromtseva TA, Boytsov SA. Trends of arterial hypertension in Russia: is there a progress in prescription of antihypertensive therapies? (results of studies in 1993-2013). *Russ Heart J* 2015; **14**: 389-396.