European Heart Journal Supplements (2022) **24** (Supplement F), F38–F40
The Heart of the Matter
https://doi.org/10.1093/eurheartjsupp/suac044

ESC
European Society
of Cardiology

May Measurement Month 2017–2019: results from Switzerland

Aikaterini Damianaki[1], Wei Wang[2], Thomas Beaney[2,3], Thilo Burkard[4], Isabella Sudano[5], Michel Burnier[1], and Gregoire Wuerzner [1]*

[1]Service of Nephrology and hypertension, Lausanne University Hospital and University of Lausanne, Rue de Bugnon 17, 1005 Lausanne, Switzerland; [2]Imperial Clinical Trials Unit, Imperial College London, Stadium House, 68 Wood Lane, London, W12 7RH, UK; [3]Department of Primary Care and Public Health, Imperial College London, St Dunstan's Road, London, W6 8RP, UK; [4]Medical Outpatient Department and Hypertension Clinic, University Hospital Basel, Basel, Switzerland; and [5]Department of Cardiology, University Heart Center Zürich, Zürich, Switzerland

KEYWORDS
Hypertension;
Blood pressure;
Screening;
Prevalence;
Switzerland;
MMM

May Measurement Month (MMM) is an international screening campaign for arterial hypertension initiated by the International Society of Hypertension and endorsed by the World Hypertension League. Its aim is to raise the awareness of elevated blood pressure (BP) in the population worldwide. The goal of the present analyses is to assess the results obtained during three years of this campaign in Switzerland. Swiss data from MMM17 to MMM19 campaigns were used. BP and a questionnaire for basic demographic and clinical information were recorded for each participant. BP measurements and definition of arterial hypertension followed the standard MMM protocol. To assess BP control, European Society of Hypertension 2018 thresholds of <140/90 mmHg were used. Overall, 3635 participants had their BP measured, including 2423 women (66.7%) and 1212 (33.3%) men. More than half of the data came from pharmacies during MMM18 and MMM 19 campaigns. The difference in BP between pharmacies and other screenings sites was small. Overall, prevalence and awareness rates were 32.7% and 72.3%, respectively. Of those on medication, 60.9% were controlled, and of all hypertensive patients, 39.4% had controlled BP. In Switzerland, the prevalence of hypertension based on a 3-year awareness campaign was similar to previous epidemiological data within the country. One third of the population screened had hypertension, two thirds were aware of it, and less than half had controlled BP.

Introduction

Arterial hypertension (AH) is the leading cause of global cardiovascular mortality, and its high prevalence is still increasing worldwide.[1] According to the Swiss Healthy survey conducted in 2012, hypertension prevalence was 27% and in unselected Swiss population-based studies in adults, prevalence ranged between 26% and 36.6%.[2–5] Data from the Swiss Federal Office of Statistics showed that in 2018 ischemic heart disease accounted for 54.9% of death in men and 25.3% in women and cerebrovascular diseases for 20.4% and 17.4%, respectively, per 100 000 persons, supporting that early detection and efficient treatment of AH are of high importance to prevent these events.

Today, primary care is the main place where AH is diagnosed either through systematic routine screening or by opportunistic measurement. However, a significant number of hypertensive patients do not attend regular primary care consultations. Pharmacies, as being the most accessible and frequently visited places compared

*Corresponding author. Tel: 0041 21 314 02 23, Email: gregoire.wuerzner@chuv.ch

Table 1 Total participants and prevalence of hypertension, awareness, treatment, and controlled blood pressure

	Number of participants	Number with hypertension	Proportion of all participants with hypertension (%)	Proportion of hypertensives aware (%)	Proportion of hypertensives on medication (%)	Proportion of those on medication with controlled BP (%)	Proportion of all hypertensives controlled (%)
Total	3635	1187	32.7	72.2	64.6	60.9	39.4
Female	2423	598	24.7	72.8	63.0	64.4	40.6
Male	1212	589	48.6	74.8	66.3	57.6	38.2

with other health-care facilities, have shown to provide reliable data on blood pressure (BP)[6] and may have a significant impact on high BP diagnosis and adherence to treatment.[7] We took the opportunity to include Swiss pharmacies during the May Measurement Month (MMM) campaigns as well as sites in hospitals and public areas. We present the results from these cross-sectional measurements and surveys in the present manuscript.

Methods

Ethics approval for this project was obtained by the local ethics committee (2017-00531) for five years. Data were collected from 2017–2019 Switzerland's MMM participation and carried out throughout the month of May of each year. In 2018, regional pharmacies participated in the MMM campaign, and in 2019, the screening was extended to national pharmacies. The Lausanne University Hospital, served as the Swiss coordinating center during MMM17 to MMM19. All data were entered directly on the application during the subject's visit, analysed centrally by the MMM project team, and multiple imputation was performed to impute the mean of readings two and three where this was missing, based on available data as described previously.[8,9] Swiss data were extracted by statisticians of the MMM program and sent to the coordinating investigator. Participants—volunteer adults (≥18 years)—were provided with a complete information leaflet about the study and AH facts. Written informed consent was obtained. Health professionals of the screening sites performed standardized BP measurements by an automated electronic device on the upper arm—preferably left—in triplicate (one min intervals) according to international guidelines.[10] BP and heart rate (HR) were directly uploaded on the server using the online app provided by the lead organization from MMM17 to MMM19. AH was defined if one of the following criteria was met: use of antihypertensive medications, average systolic BP (SBP) (mean of the last two of three readings) ≥140 mmHg, and/or average diastolic BP (DBP) (mean of the last two of three readings) ≥90 mmHg.[10] Controlled AH for those on medication was defined as SBP of <140 mmHg and DBP of <90 mmHg.[10] Awareness and screening site type were collected only in 2018 and 2019. Additional study covariates were collected via sociodemographic and medical questionnaires, which were anonymously collected and uploaded on the app.[9] Statistical analysis methods are presented in Supplementary material online.

Results

A total of 3635 participants were included during the MMM17 to MMM19 campaigns (mean age 48.1 ± 18.8 years). Women were represented in a higher proportion than men (66.7% vs. 33.3%). Ethnicity was almost exclusively white (88.9%). Of all participants, 21.1% were on antihypertensive medication and 24.5% (of the participants screened during MMM18 and MMM19) had never had their BP measured. Details of baseline and sociodemographics characteristics are presented in the Supplementary material (see Supplementary material online, *Table S1*). More than half of the data came from pharmacies serving as screening sites (MMM18 and MMM19 campaigns). The difference between mean BP between pharmacies and other screening sites is presented in Supplementary material online, *Table S2*, with a significantly lower (2.2 mmHg, $P < 0.001$) average diastolic in people screened in hospitals but no other significant BP differences between pharmacies and other screening sites. The prevalence, awareness, and control rates for all participants and by sex are presented below (*Table 1*). A total of 32.7% of all participants had hypertension, of whom 72.2% were aware and 64.6% were on medication. Of those on medication, 60.9% were controlled. Women had higher control rates than men (64.4% vs. 57.6%). Of all hypertensives, 39.4% were controlled.

Discussion

The main findings of this study are that prevalence of AH in this opportunistic sample from Switzerland is 32.7% with an awareness rate of 72.2%. One fourth of all participants had their BP measured for the first time, and only 39.4% of all hypertensive patients had controlled BP, which leaves extensive room for improvement. Women presented higher control rates.

The prevalence of AH was similar to that found in the Bus Santé study of Geneva (34.4%), in the CoLaus study (36.7%), and in the Swiss Survey on Salt study (25.6%).[3-5]

Of note, more than half of the data came from pharmacies, which indicates that screening campaigns in pharmacies are feasible. However, participants in pharmacies are predominately women.

Our study presents some limitations. Selection bias cannot be ruled out as screening centers were not randomly assigned and included different sites such as hospitals, pharmacies, and companies. In addition, the questionnaire included some changes in the questions included after MMM17, such as on awareness. Nevertheless, on a totally voluntary basis, the campaigns enabled the measurement of BP in participants, who never had their BP measured.

In conclusion, the MMM campaigns enabled the screening of about one thousand persons per year, most of whom were screened in pharmacies. With women participating more frequently in screening campaigns in pharmacies, the role of pharmacies is further highlighted.

Supplementary material

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

Acknowledgements

The authors wish to thank all local volunteer investigators, nurses, students, and participants. The authors also wish to thank the Société Vaudoise de Pharmacies and M. Gérald Ménétré (GaleniCare Management SA) for support in Swiss pharmacies. No funding was used for this study.

Funding

None declared.

Conflicts of interest: The authors declared no conflicts of interest for this study.

Data availability

Data are not publicly available but are available with permission from the MMM Management Board, on request through the MMM website: maymeasure.org.

References

1. Collaboration NCDRF. Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. *Lancet* 2021;**398**:957–980.
2. Storni M, Kaeser M, Lieberherr R. *Swiss Health Survey 2012 Overview*. Neuchâtel: Federal Statistical Office (CH).
3. Danon-Hersch N, Marques-Vidal P, Bovet P, Chiolero A, Paccaud F, Pécoud A, Hayoz D, Mooser V, Waeber G, Vollenweider P. Prevalence, awareness, treatment and control of high blood pressure in a Swiss city general population: the CoLaus study. *Eur J cardiovasc Prev Rehabil* 2009;**16**:66–72.
4. Glatz N, Chappuis A, Conen D, Erne P, Pechere-Bertschi A, Guessous I, Forni V, Gabutti L, Muggli F, Gallino A, Hayoz D, Binet I, Suter P, Paccaud F, Bochud M, Burnier M. Associations of sodium, potassium and protein intake with blood pressure and hypertension in Switzerland. *Swiss Med Wkly* 2017;**147**:w14411.
5. Guessous I, Bochud M, Theler J-M, Gaspoz J-M, Pechère-Bertschi A. 1999–2009 Trends in prevalence, unawareness, treatment and control of hypertension in Geneva, Switzerland. *PLoS One* 2012;**7**:e39877.
6. Albasri A, O'Sullivan JW, Roberts NW, Prinjha S, McManus RJ, Sheppard JP. A comparison of blood pressure in community pharmacies with ambulatory, home and general practitioner office readings: systematic review and meta-analysis. *J Hypertens* 2017;**35**:1919–1928.
7. Reeves L, Robinson K, McClelland T, Adedoyin CA, Broeseker A, Adunlin G. Pharmacist interventions in the management of blood pressure control and adherence to antihypertensive medications: a systematic review of randomized controlled trials. *J Pharm Pract* 2020;**34**:480–492.
8. Beaney T, Burrell LM, Castillo RR, Charchar FJ, Cro S, Damasceno A, Kruger R, Nilsson PM, Prabhakaran D, Ramirez AJ, Schlaich MP, Schutte AE, Tomaszewski M, Touyz R, Wang JG, Weber MA, Poulter NR; MMM Investigators. May measurement month 2018: a pragmatic global screening campaign to raise awareness of blood pressure by the International Society of Hypertension. *Eur Heart J* 2019;**40**:2006–2017.
9. Beaney 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**:e736–e743.
10. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, Clement DL, Coca A, de Simone G, Dominiczak A, Kahan T, Mahfoud F, Redon J, Ruilope L, Zanchetti A, Kerins M, Kjeldsen SE, Kreutz R, Laurent S, Lip GYH, McManus R, Narkiewicz K, Ruschitzka F, Schmieder RE, Shlyakhto E, Tsioufis C, Aboyans V, Desormais I; Authors/Task Force Members. 2018 ESC/ESH guidelines for the management of arterial hypertension: the task force for the management of arterial hypertension of the European Society of Cardiology and the European Society of Hypertension: the task force for the management of arterial hypertension of the European Society of Cardiology and the European Society of Hypertension. *J Hypertens* 2018;**36**:1953–2041.