

# May Measurement Month 2018: an analysis of blood pressure screening results from United Arab Emirates

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## KEYWORDS

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Hypertension is one of the most important modifiable risk factors for cardiovascular disease and death even in high-income countries. According to the PURE Study, globally only half of hypertensives are aware and less than a fifth controlled. May Measurement Month (MMM) is a global campaign to raise awareness and screen for high blood pressure (BP) *in lieu* of formal screening. United Arab Emirates (UAE) has taken part in MMM since its inception and here data from MMM18 are reported. Trained volunteers from 54 sites screened 31 316 individuals from all the Emirates of UAE using convenience sampling. Blood pressure measurement, the definition of hypertension, and statistical analysis followed the standard MMM protocol. The mean age was  $36.8 \pm 11.4$  years and 18 411 (59%) were male. Participants of Arab descent were 11 829 (38%) and 11 569 (37%) were South Asian. Mean body mass index was  $26.8 \pm 5.29$  kg/m<sup>2</sup>. Of those screened, 7 917 (25%) had never had a BP recorded, while 16 892 (54%) had recorded BP in the previous year. After imputation, 6 243 (20%) had hypertension. Of those participants, only 2 540 (41%) were aware and 2 331 (37%) were on antihypertensive medication, of which 61% were controlled. Of all hypertensives, only 23% were controlled. May Measurement Month in UAE expanded significantly compared to 2017. A quarter had never had BP measured and awareness of hypertension low (41%). This opportunistic screening method found a substantial number of adults with untreated or inadequately treated hypertension.

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## Introduction

Cardiovascular disease (CVD) continues to be the leading cause of death in the United Arab Emirates (UAE).<sup>1</sup> Hypertension remains one of the most important modifiable risk factors for CVD and mortality worldwide, even in high-income countries.<sup>2</sup> Worldwide, more than half of those with hypertension are unaware. In the UAE, the age and sex standardized hypertension prevalence is estimated at 33%, while awareness has been recorded at 49%, treatment 47%, and control only 19%.<sup>3</sup> Screening for CVD risk factors has been a national priority.<sup>4</sup> May Measurement Month (MMM) is the largest worldwide synchronized awareness and screening project *in lieu* of a systematic screening program. The UAE took part in 2017, and the results suggested that opportunistic screening could identify significant numbers with raised BP.<sup>5</sup> We report the results of MMM18 from the UAE.

## Methods

The MMM18 protocol was similar to MMM17 with minor changes. New variables measured were awareness and screening site type. Ethical approval (DSREC-03/2018-6) was from Dubai Health Authority's Dubai Scientific Research Ethical Committee. The UAE Ministry of Health and Prevention (MOHAP), Dubai Health Authority (DHA), private and public Hospitals, Dubai Medical University and Pharmacies took part in MMM18 for the whole of the month of May 2018. There were 54 centres manned by 245 volunteers consisting of laypersons, health workers, nurses, medical students, and physicians. Convenient sites were chosen in order to get the greatest number of adults above 18 years of age, who ideally had not had a blood pressure (BP) measurement in the past year. It varied from homes, workplaces, markets, pharmacy to clinic, and hospital foyers. The volunteer staff were trained on the background and the objectives of MMM, the one-page questionnaire, and the different methods of capturing data via an MMM18 App, on a case report form or on dedicated excel sheet was practised. A standardized method of BP measurement using either an automated or a manual sphygmomanometer was encouraged using BP measurement video from the MMM website and face to face on-site training. Three sitting measurements within a minute of each other, after 5 min of rest was required.

Availability of free BP measurement was advertised at the designated sites using prior announcement, posters, and pull-down banners. Volunteers for screening were self-invited. Heights and weights were also measured where possible, otherwise they were estimated by screenees.

There was no direct source of funding. However, we received help in kind from the UAE Ministry of Health and Prevention (MOHAP), Dubai Health Authority (DHA), public and private hospitals/clinics and from Les Laboratoires Servier. We received Omron BP devices from Omron Healthcare Co. Ltd.

Definition of hypertension diagnosis, awareness, treatment, and control are as published in the MMM18 global paper.<sup>6</sup> Briefly, hypertension was defined as those with a

systolic BP of  $\geq 140$  mmHg or a diastolic BP of  $\geq 90$  mmHg on the basis of the mean of the second and third BP recording. Those taking antihypertensive medications were assumed to have hypertension and to be aware of their condition. Among those on treatment, controlled BP was defined as a systolic BP of  $< 140$  mmHg and a diastolic BP  $< 90$  mmHg. All data were sent directly via the App or cleaned and sent via excel sheets. Data were analysed centrally by the MMM project team and multiple imputations performed based on the global data to impute the mean of readings 2 and 3 where this was missing. The age and sex standardized hypertension rate was calculated using the WHO world standard population.

## Results

We screened 31 316 subjects from all seven Emirates in the UAE. The mean age was  $36.8 \pm 11.4$  years, 63% being below 40 years of age, and 18 411 (59%) male. Participants of Arab descent were 11 829 (38%) and 11 569 (37%) were South Asian. The screening sites were located in hospital or clinic areas in 21 678 (69%), public areas (indoors and outdoors) in 4795 (15%), and 2 918 (9%) in workplaces.

Only 3 046 (10%) had participated in MMM17, 7 917 (25%) had never had BP recorded in the past, while 16 892 (54%) had recorded a BP in the previous year. Antihypertensive treatment was being taken by 2 331 (7%), 2561 (8%) reported diabetes, 252 (1%) had previous myocardial infarction and 177 (1%) previous history of stroke. A current pregnancy was reported by 720 (6%) of the women, and 7 328 (23%) were fasting as the campaign was conducted partially during the month of Ramadhan.

Current smokers were 3 128 (10%) and alcohol use was reported in 2 535 (8%). Mean body mass index (BMI) was 26.8 (SD 5.2) kg/m<sup>2</sup> with 14 719 (47%) overweight or obese participants.

Three BP measurements were taken in 18 104 (58%). The number with raised BP from these was 5 333 (30%) using the first reading, 4 469 (25%) using the second reading and 4 071 (23%) using the third reading. On the other hand, the number with raised BP was 4 736 (26%) using the mean of 1st and 2nd reading, 4134 (23%) using 2nd and 3rd reading, and 4312 (24%) using all three readings.

After imputation and using the mean of 2nd and 3rd reading, 6 243 (20%) were found to have hypertension, of which 2 540 (41%) were aware of their high BP, 2 329 (37%) were on antihypertensive medication and only 23% were controlled. Of those on antihypertensive treatment, the control rate was 61% (Supplementary material online, Table S1). The number of newly detected hypertensives was 3912. The age and sex standardized rate of hypertension was 25%.

Based on linear regression models and after adjusting for age and sex (with an interaction) and antihypertensive treatment, both systolic and diastolic BP were higher in smokers vs. non-smokers and dose-dependent alcohol consumption vs. non-consumers, while it was significantly lower in those fasting vs. non-fasting and amongst women who were pregnant vs. non-pregnant (Supplementary material online, F1). Participants who were overweight or

obese were strongly associated with higher systolic and diastolic measurements than participants who were of a healthy weight. Conversely, underweight vs. healthy weight participants were strongly associated with lower systolic and diastolic BPs ([Supplementary material online, F2](#)). There was a strong linear relationship between systolic and diastolic BP and increasing BMI.

Compared to clinic or hospital-based measurements, both BPs were significantly higher in indoor and outdoor public areas as well as in the workplace ([Supplementary material online, F3](#)). Similarly, both BPs were significantly higher on Friday and Saturday compared to Mondays ([Supplementary material online, F4](#)).

## Discussion

Compared to 6 193 screened in MMM17, we were able to screen five times more (31 316) during MMM18. This was possible because of the involvement of larger numbers of the relevant stakeholders. Action from such institutions as well as awareness within the public is one of the key goals of MMM.

For a quarter of those screened, this was their first ever opportunity. This large gap in our screening system needs addressing.

The association of high BP with smoking, alcohol, and BMI was similar to that found in the global analysis, as was the lower BP with pregnancy.<sup>6</sup> We also found higher BP during our weekend (Friday and Saturday).<sup>7</sup>

Limitations are mentioned in the global paper.<sup>7</sup> In brief, this pertains to making an assumption of diagnosis using three BP measurements in one sitting, using different BP machines in different surroundings and the fact that this was a self-selected and opportunistic convenience sampling.

## Conclusion

MMM18 showed that a large number of untreated and inadequately treated hypertension could be found by this opportunistic, volunteer-based screening. For 1 in 4, this was their first BP measurement, and among the hypertensives, only 4 in 10 were aware of their high BP. The increased number of self-invited participants and the greater involvement from the different stakeholders compared to the previous year shows that MMM is perceived to be useful. We plan to continue with MMM until this need is adequately addressed.

## Supplementary material

[Supplementary material](#) is available at *European Heart Journal Supplements* online.

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**Conflict of interest:** none declared.

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