

# May Measurement Month 2017: an analysis of blood pressure screening results from the United Arab Emirates—Northern Africa and Middle East

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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 aimed at raising awareness of high BP and to act as a temporary solution to the lack of screening programmes worldwide. United Arab Emirates has a young population, but cardiovascular disease (CVD) is the commonest cause of death (40%). Myocardial infarction and stroke occurs at least a decade earlier than in western countries. Previous screening in our young population showed that 85% of the population had at least one CVD risk factor and about 62% of them were unaware of it. An opportunistic cross-sectional survey of volunteers aged  $\geq 18$  was carried out in May 2017. Blood pressure measurement, the definition of hypertension and statistical analysis followed the standard MMM protocol. Screening was held in 23 sites such as mosques, sports, and men's/ladies' clubs, airports, parks, shopping malls, work places as well as their residences, and in the public areas of hospitals or outpatient clinics. A total of 6193 individuals were screened during MMM17. The mean age was  $39.2 \pm 13.1$  years. After multiple imputation, 1867 (30.2%) had hypertension. Of individuals not receiving anti-hypertensive medication, 813 (15.8%) were hypertensive. Of 1054 individuals receiving anti-hypertensive medication, 427 (40.6%) had uncontrolled BP. MMM17 was a useful screening model as it makes BP measurement easily accessible. Eight hundred and thirteen (16%) possibly new hypertensives were uncovered and 427 (40.6%) of those on treatment for hypertension were found to be uncontrolled. These results suggest that opportunistic screening can identify significant numbers with raised BP.

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## Background

United Arab Emirates (UAE) has a population of 9.27 million (2016). The median age was 30 years and only 1% of the population was above 60 years of age. Cardiovascular disease (CVD) is the commonest cause of death (40%), and 17% of the death from non-communicable diseases (NCD) is premature, that is, between ages 30 and 70 years.<sup>1</sup> Myocardial infarction and stroke occur more than a decade earlier than in the western countries.<sup>2,3</sup> Cardiovascular disease Risk Factors occur even in the young in UAE, and remain undiscovered in a large majority (62%).<sup>4</sup>

Several studies in nationals as well as the expatriate community estimate an age-standardized hypertension prevalence of 33%.<sup>5-7</sup> In the community, the awareness of high blood pressure (BP) was 49%, the treatment 47%, and the control only 19%.<sup>7</sup> Screening for NCD is a national priority in UAE.<sup>8</sup> May Measurement Month (MMM17) initiated by the International Society of Hypertension was a worldwide, month long opportunity to increase awareness and screen for high BP.<sup>9</sup>

## Methods

The ethical approval (DSREC-04/2017-01) was from Dubai Scientific Research Ethical Committee (DSREC) of the Dubai Health Authority. There were several volunteers from laypersons, nurses, medical students, teams from hospitals both governmental and private, as well as several primary health centres. These teams screened the public from mosques, sports and other clubs, airports, parks, shopping malls, work places as well as their residences. There were 23 sites from 5 emirates, and the number of volunteers was 98. Each of the team heads trained the volunteers on the one-page protocol, the standardized method of taking BP and the methods of recording either on the bespoke MMM17 App or standardized Excel sheets. There was no direct funding, however, BP machines, roll down banners, and MMM17 information for subjects were provided by Omron.

There was advertisement of the event, which moved from place to place from 1 to 30 May 2017. We used several tables, chairs, and pull-down banners at the site. Upper arm cuff digital and automated BP machines—mostly Omron M7 Intelli IT—were used. Three BP readings after 1 min in between was encouraged after 5 min of rest. Heights and weights were as reported by the participants and measured at the site in some locations.

Data (through the App or Excel sheets) were sent directly to, and were cleaned and analysed centrally by, the MMM project team. To provide a comparable BP reading for all individuals, multiple imputations were used to estimate the average of the 2nd and 3rd reading where either reading was not documented. Hypertension was defined as systolic BP  $\geq 140$  or diastolic BP  $\geq 90$  or on treatment for hypertension.

## Results

We screened 6193 participants. The mean age was 39.2 (SD 13.1) years and 3935 (63.5%) were male. The highest ethnic

groups were Arabic 2367 (38.2%) and South Asian 2209 (35.7%). The majority 5123 (82.7%) were not on anti-hypertensive treatment. Diabetes was reported in 852 (13.8%), previous myocardial infarction was reported in 83 (1.3%), and previous stroke in 35 (0.6%). Pregnancy was reported by 83 (1.3%) of women. Current smoker status was reported by 1029 (16.6%), alcohol intake at least once a week was reported by 270 (4.4%) and mean body mass index (BMI) was 26.7 (SD 5.0).

Blood pressure was measured in the right arm in 2629 (42.5%) and the left arm in 3514 (56.7%). All three BP readings were recorded in 6110 (98.7%). Blood pressure decreased on average by 4.1/2.3 mmHg between 1st and 3rd reading. The mean of the 2nd and 3rd readings, generated the lowest proportion with high BP. After imputation, the number with hypertension was 1867 (30.2%) out of 6191. About 813 (15.8%) out of 5137 not receiving treatment had hypertension. On the other hand, the number receiving treatment but uncontrolled was 427 (40.6%) out of 1054.

Supplementary material online, *Figure S1* shows the difference in mean BP according to individual characteristics. After adjusting for age and sex, significantly higher systolic and diastolic BP were apparent in people receiving anti-hypertensive treatment. Adjusting for age, sex, and anti-hypertensive medication, there was a significant increase in both systolic and diastolic BP in those with previous stroke and significant decrease in those with previous myocardial infarction. Systolic BP was also significantly higher in people who were diabetic and current smokers, while diastolic BP was significantly higher in those who took alcohol at least once a week compared with those who rarely or never took alcohol. Pregnant women showed decreased systolic as well as diastolic BP compared with those not pregnant.

Supplementary material online, *Figure S2* shows the difference in mean BP according to BMI from linear regression model, adjusted for age, sex, and anti-hypertensive medication. There is a clear and significant increase in both systolic and diastolic BP with increasing BMI.

## Discussion

MMM17 in UAE found that 30.2% of the participants had hypertension. Of all hypertensives, 43.5% were not treated. Among the hypertensives on treatment, 40.6% were uncontrolled. This corroborates with previous data showing low level of awareness and inadequate control of hypertension.<sup>7</sup>

In UAE, more men were screened compared with women, most likely because of the >2:1 demography. Compared with the worldwide MMM17 participants, UAE participants were younger, (mean age 39.2 vs. 44.9) had higher proportion of diabetics (13.8% vs. 8.6%), smokers (16.6% vs. 11.6%), and higher mean BMI (26.71 vs. 24.6 kg/m<sup>2</sup>).<sup>9</sup> This corroborates with previous data showing a young population with high burden of CVD risk factors.<sup>4</sup>

Screening for NCD is a national strategic goal in UAE and it is expected that screening systems will be set-up all across the country. MMM17, however, was a useful opportunity for a mass screening and awareness campaign.

Screening can be resource-intensive and difficult to administer. To achieve high uptake, it needs to be simple, cost-effective, and highly accessible. Blood pressure measurement is simple, it was free, cost-effective, and we took it to the community (mosques, markets, work places, etc.) for anyone to access it. This makes MMM a useful model. Pending the set-up of systematic screening systems in UAE, we hope to continue participating in MMM annually to increase awareness and screening.

## 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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