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May Measurement Month 2017: an analysis of blood pressure screening results in Nepal—South Asia

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Hypertension is the leading risk factor of mortality in Nepal accounting for ~33 000 deaths in 2016. However, more than 50% of the hypertensive patients are unaware of their status. We participated in the May Measurement Month 2017 (MMM17) project initiated worldwide by the International Society of Hypertension to raise the awareness on the importance of blood pressure (BP) screening. In this paper, we discuss the screening results of MMM17 in Nepal. An opportunistic cross-sectional survey of volunteers aged ≥18 years was carried out in May 2017 following the standard MMM protocol. Data were collected from 18 screening sites in 7 districts covering 5 provinces. Screenings were conducted either in health facilities, public places, or participants' homes. Trained volunteers with health science background and female community health volunteers were mobilized to take part in the screening. A total of 5972 individuals were screened and of 5968 participants, for whom a mean of the 2nd and 3rd readings was available, 1456 (24.4%) participants had hypertension; 908 (16.8%) of those not receiving treatment were hypertensive; and 248 (45.2%) of those being treated had uncontrolled BP. MMM17 is the first nationwide BP screening campaign undertaken in Nepal. Given the suboptimal treatment and control rates identified in the study, there is a strong imperative to scale up hypertension prevention, screening, and management programmes. These results suggest that opportunistic screening can identify significant numbers with hypertension. Mobilization of existing volunteer networks and support of community stakeholders, would be necessary to improve the overall impact and sustainability of future screening programmes.

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Introduction

Raised blood pressure (BP) is a major health problem in the Nepalese population, with various surveys reporting high prevalence rates.[1–4] However, the control rate of hypertension is low because of low awareness and treatment rates. Raising awareness about the adverse consequences of elevated BP is a key step for preventing complications of hypertension.[5,6] Blood pressure screening is a relatively low-cost effective health promotion strategy that can be implemented in a large scale and is sustainable in the long term.[6] It can raise awareness and identify undiagnosed cases of hypertension particularly in low- and middle-income countries like Nepal where people have limited access to healthcare.

May Measurement Month 2017 (MMM17) was initiated as a global campaign by the International Society of Hypertension (ISH) to raise awareness of hypertension, which targeted adults (aged $\geq$18 years) who have not had their BPs measured for at least a year.[7] In Nepal, the campaign lasted for 2 months in May and June of 2017. In this paper, we present the results from this campaign and deliberate some lessons for future campaigns.

Methods

This paper used the data from MMM17 conducted in Nepal.[7] Sitting BP was measured three times according to standardized specified methods. Both digital (OMRON) and manual sphygmomanometers were used for BP measurements. Data were collected using a paper-based questionnaire. The ethical clearance was obtained from the Nepal Health Research Council (Approval: 102/2018). A total of 18 sites in 7 districts were covered from 5 provinces (except Province 2 and Province 6). Volunteers with a bachelor's degree in health sciences/medicine conducted the BP screening. We also mobilized trained female community health volunteers (FCHVs) for screening BP who collected nearly half of the data for MMM17. Screening was conducted either in health facilities or at participants' homes (for FCHVs).

People with systolic BP (SBP) 140 mmHg or higher and/or diastolic BP (DBP) 90 mmHg or higher were classified as hypertensive, along with people on anti-hypertensive treatment.[8] The description and methods of measurement for other study variables has been presented elsewhere.[7] Data cleaning was done locally with further cleaning done after submission to ISH. Data for this study were analysed centrally by the MMM project team.[7]

Results

Data from 5972 participants were collected during MMM17 (see Supplementary material online, *Table S1*). More women than men (63% vs. 37%) were screened. Mean age of the participants was 39.3 ± 16 years and mean body mass index (BMI) was 23.2 ± 4.3 kg/m^2. About 548 (40.8%) reported taking anti-hypertensive medication. Around 75% of participants had BP measurements taken on the left arm. Of 5972 screened, 203 (3.4%) reported having type 2 diabetes, 62 (1%) reported a history of myocardial infarction, and 38 (0.6%) reported a history of stroke. Of 5193 participants with three BP readings, the 3rd reading was lower compared with the first reading on average by 2.6/1.5 mmHg. The mean of 2nd and 3rd readings (118.6/78.4 mmHg) was lower for both SBP and DBP compared with mean of the 1st and 2nd readings (120/79.2 mmHg) (see Supplementary material online, *Table S2*). The age and sex-standardized mean BP for the screened population was 120.8/79.5 mmHg. For those who were not taking anti-hypertensive medication standardized mean BP was 119.8/79.1 mmHg and for those taking anti-hypertensive medication it was 131.3/85 mmHg (see Supplementary material online, *Table 3*).

Of the 5968 participants for whom mean of the 2nd and 3rd readings was available or known to be on anti-hypertensive treatment, 1456 (24.4%) participants were hypertensive; 908 were hypertensive and not receiving treatment, which was 16.8% of the total not receiving treatment. About 248 (45.2%) of the 548 receiving treatment had uncontrolled BP (see Supplementary material online, *Table S4*). These proportions were similar before and after imputation analysis.

After adjustment for age and sex, people receiving anti-hypertensive medication had significantly higher SBPs and DBPs. Smoking and alcohol intake were associated with significant increases in both SBPs and DBPs. In contrast, DBP readings were significantly lower in pregnant women and higher in the left arm than readings from the comparator groups (i.e. non-pregnant and readings on the right arm, respectively; see Supplementary material online, *Table S5* and *Figure S1*). After adjustment for age, sex, and anti-hypertensive medication, there was a significant increase in both mean SBP and DBP across successive BMI categories (see Supplementary material online, *Table S6* and *Figure S2*).

Discussion

This campaign found that nearly a quarter of participants were hypertensive; 16.8% of those not receiving treatment were hypertensive and nearly half those being treated had uncontrolled BP. Even in well-adjusted models, anti-hypertensive medication (vs. those not receiving treatment), currently smoking (vs. non-smoker), alcohol intake (one or more per week vs. never/rarely) were associated with significantly higher DBP and SBP.

Although MMM17 was an opportunistic screening, the findings are compatible with previous prevalence studies conducted in Nepal. An earlier study of 2815 participants (1844 were women), aged between 25 and 65 years from Western Nepal showed that nearly 28% of community residents were hypertensive.[4] A larger nationwide study of 13 598 participants who were drawn randomly from all seven provinces found a slightly lower prevalence of hypertension (18%, 95% CI: 16.7–19.2) among aged 15–69 years.[3] Excluding aged 15–29 years, the prevalence stood around 26.7% which is comparable with the current screening estimates.[4] The treatment rate in the current study was twice that observed in the nationwide study ($449/2438 = 18.4\%$) while the control rate ($233/449 = 51.8\%$) was comparable.[3]

Screening campaigns like MMM help identify undetected and inadequately treated cases of hypertension. However, such programmes alone are not adequate for the long-term management of hypertension. Therefore, we recommend strengthening primary and community care services through the gradual integration of BP screening in existing delivery platforms, for example, HIV, tuberculosis, or reproductive health services. Although some figures obtained from our analysis are comparable with previous national and regional studies, we do not claim our study findings to be representative to a larger population due to the nature of convenience sampling. The critical lessons learnt from this campaign are primarily that hypertension screening can be conducted locally making use of existing volunteer networks, reducing overall financial cost of the programme; and secondarily that a BP screening programme needs the support of community stakeholders, to maximize population level coverage, as well as to maintain sustainability. These lessons will be crucial for us in continuing this campaign in the future.

Supplementary material

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

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