

ABSTRACT

We report an evaluation of BN On The Move, a community steps program, linked to BruHealth (295,001 active users), Brunei's national mHealth application.

This a nationwide, government-led, adult physical activity program that uses a mobile application, and various behavior change techniques. Step count data collected was integrated with the national electronic medical records system, BruHIMS (>99% coverage) and descriptive analysis used to measure the uptake, engagement, and daily step counts of participants.

20% of users (n= 59,924) signed up during Phase 1 linked to a 1-billion steps campaign with lower participation levels observed among those aged 60 years and above and those with chronic conditions. The 1-billion steps campaign was completed within 8 days, with an average daily steps of 3,036 per participant. Following achievement of the 1-billion steps target, the average daily step count per user declined.

The program highlights the potential for a scaled-up approach to promoting physical activity, although findings also suggest challenges in sustaining behavior change beyond the initial period.

INTRODUCTION

- Global physical inactivity trends have shown little improvement, with the global age-standardized prevalence of insufficient physical activity at 27.5% (95% CI 25.0–32.2) in 2016. This prevalence has been stable since 2001.
- Novel interventions such as mobile apps to improve physical activity have potential due to scalability, low cost, use in multiple settings, and opportunities for real-time modifications and improvements, however the evidence of effectiveness for such interventions are limited.
- BN On The Move (BNOTM) is a nationwide physical activity program in Brunei (pop. 445,373) that uses a smartphone application, with optional sync to wearables, and various behavior change techniques. It was implemented by the Health Promotion Centre, Ministry of Health in August 2022 with the aim of increasing physical activity through walking among the Brunei adult population.
- Phase 1 from August to September 2022 comprises a 1-billion steps challenge. Subsequently Phase 2, 20-billion step challenge that ran from September to December 2022, and a Phase 3 maintenance phase is planned for 2023.
- Previous national surveys based on self-reported physical activity suggest that only 25% of adults report insufficient physical activity as compared to official government recommendations. Walking is the most popular form of physical activity (51%), with walking and jogging showing the highest future demand (69%).
- The present study aims to provide an interim evaluation of BNOTM Phase 1. Specifically, our objectives are to evaluate the BNOTM initial uptake, engagement, and effectiveness in increasing physical activity.

MATERIAL AND METHODS

- BNOTM is a community steps program, linked to BruHealth (295,001 active users), Brunei's national mHealth application. Initially developed as a contract tracing app for the COVID-19 pandemic, it has since transitioned to become a one-stop national health app and is integrated on the back-end with the existing national electronic medical records system, BruHIMS (coverage >99% of resident population).
- The program uses a step-tracking feature on the app alongside various behavior change initiatives such as: Nudges via push notifications
 - Public campaigns in the form of mass walkathons
 - Gamification via a national ranking system and the ability to form a family and friends circle on the app
 - Incentives in the form of prizes and vouchers for individuals with high step counts
- The step-tracking feature was launched on the app in August 2022 (Fig. 1) alongside a 1-billion step challenge, which was expected to take 30 days to achieve. Adults aged 18 years and above received an invitation to sign up and set a daily step goal for the program.
- Descriptive statistics were used to measure the uptake, engagement, and daily step counts of participants by socio-demographic and clinical characteristics.

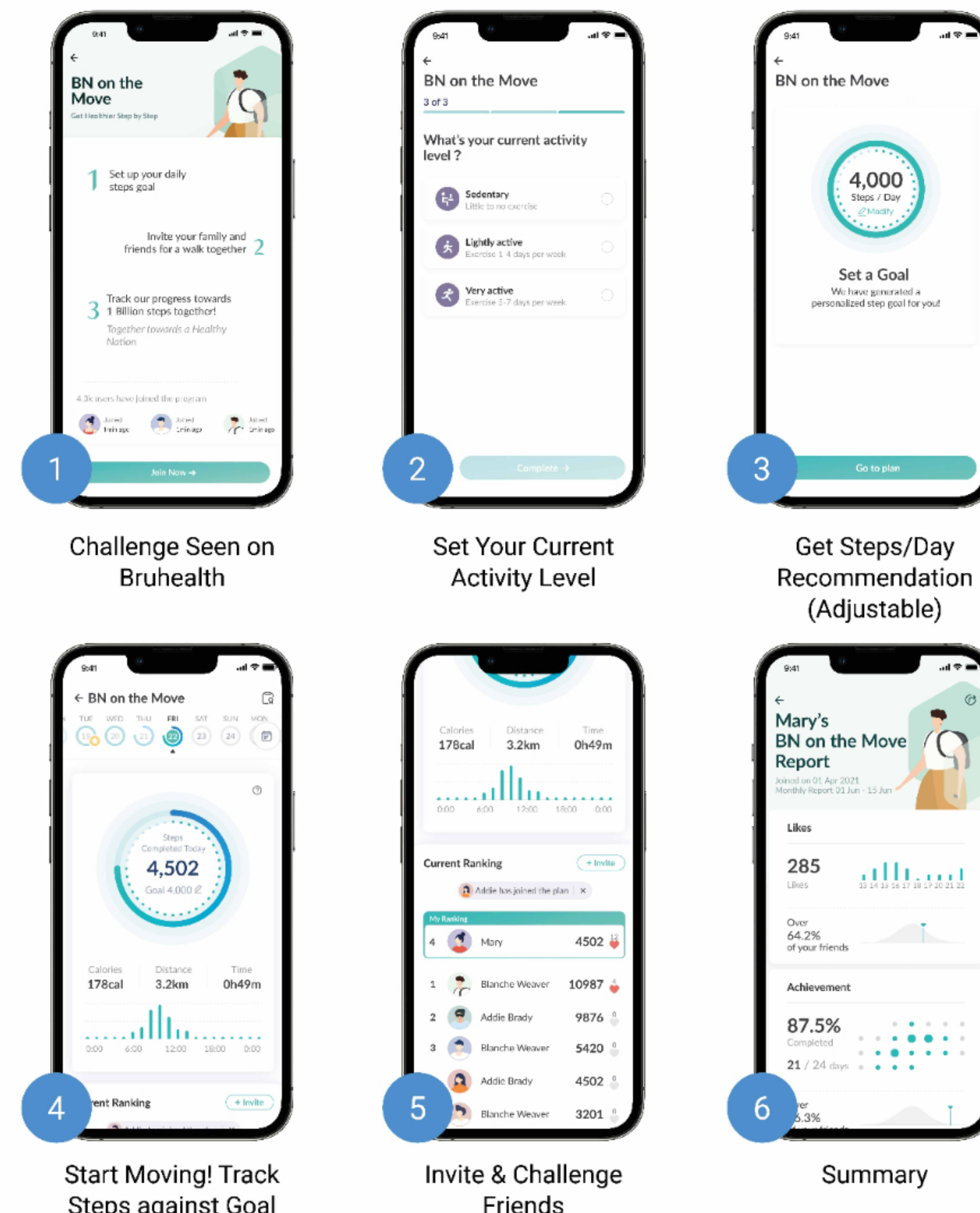


Fig. 1: BN On The Move user journey on the BruHealth

RESULTS

- 59,924 users signed up to participate during Phase 1. An additional 235,077 users were active on the BruHealth app but did not sign-up. Fig. 2 outlines the variation between socio-demographic characteristics of participants vs. non-participants

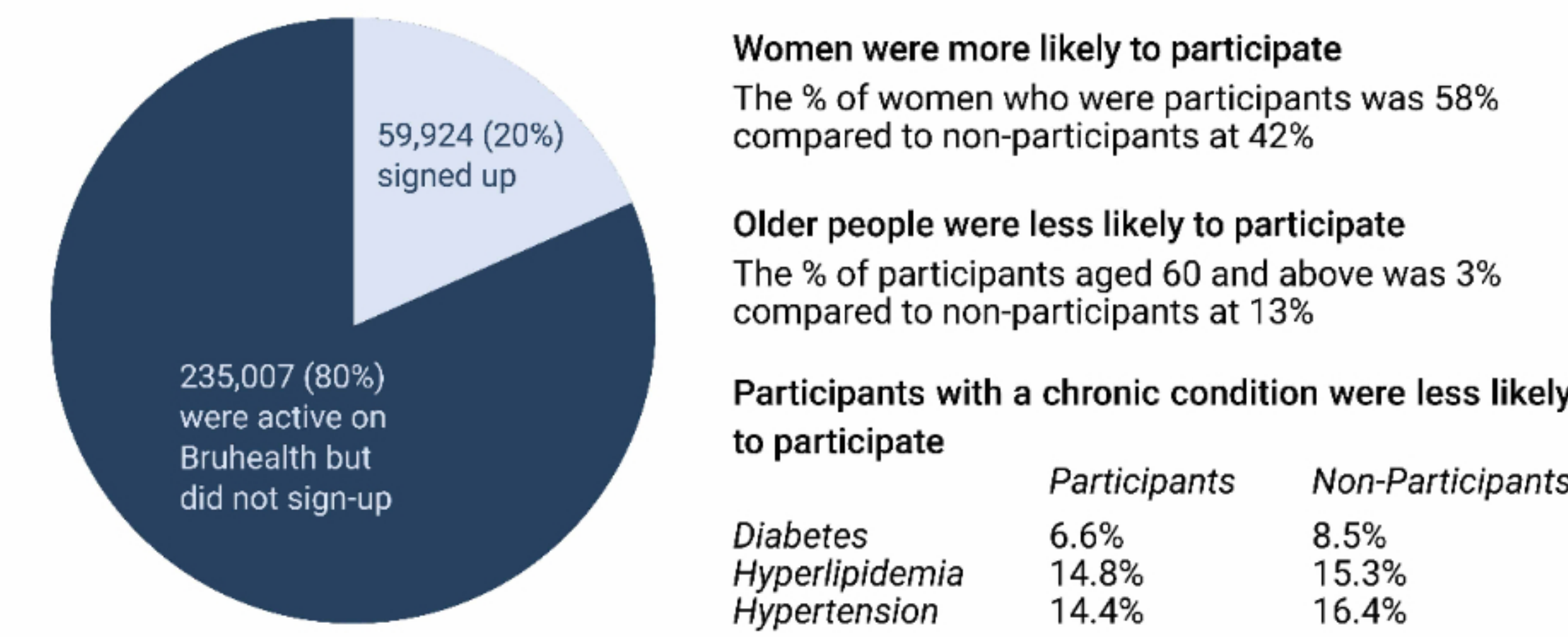


Fig. 2: Socio-demographic and clinical characteristics of participants vs. non-participants

- The 1-billion steps campaign was completed within 8 days, with an average daily step count of 3,036 steps per participant during the campaign period, compared to an average of 2,132 daily steps in the 8 days immediately following the campaign period and further decline thereafter (Fig. 3). This analysis included individuals with a daily step count between 501 up to 50,000 (n=47,916 participants)
- 75.1% of participants had an average daily step count of between 501 up to 5,000, 22.3% of participants had an average daily step count of between 5,001 to 9,999, and 2.6% of participants had an average daily step count 10,000+. One-way ANOVA suggests no significant difference in distribution by age group (Table 1)

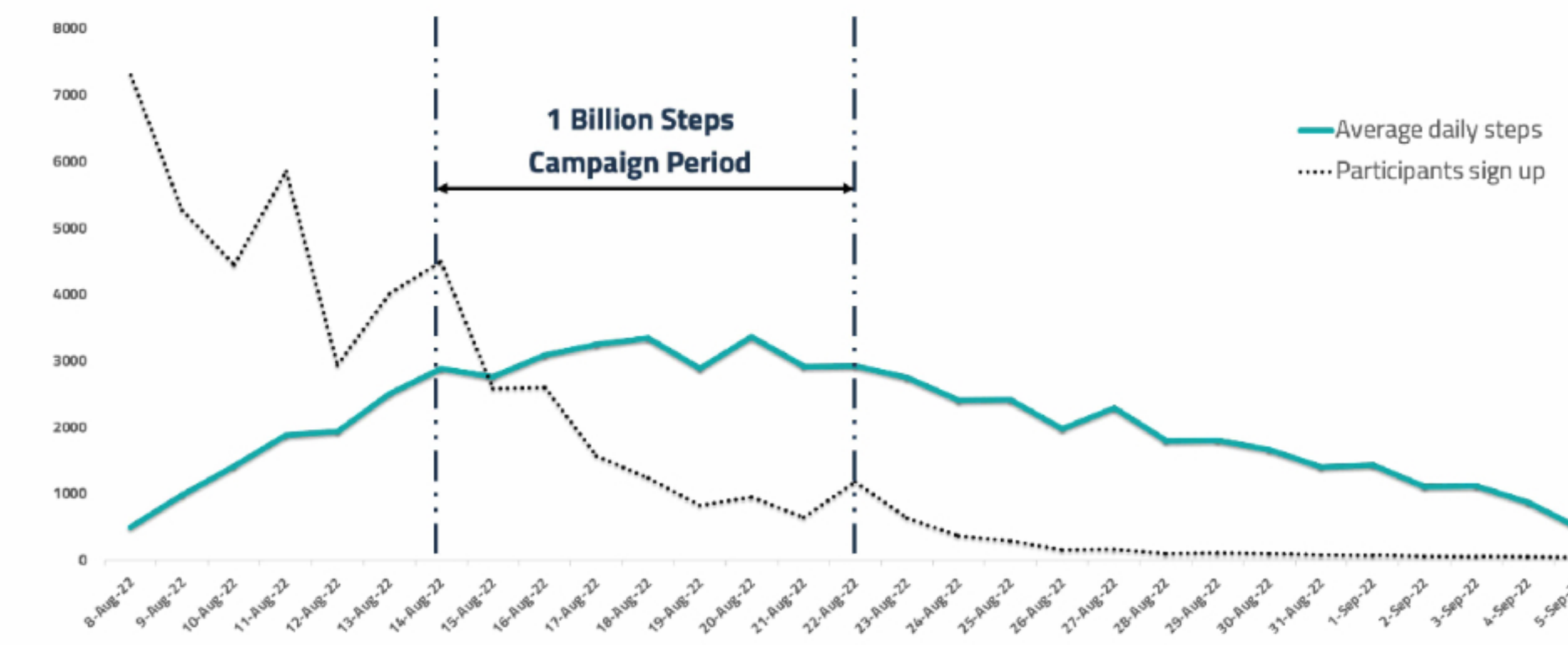


Fig. 3: Participant average daily step count

AVERAGE DAILY STEP COUNT			
	501 to 5,000	5,001 to 9,999	10,000+
Age 18 - 39	24,129 (76.0%)	6,891 (21.7%)	717 (2.26%)
Age 40 - 59	10,986 (73.2%)	3,537 (23.6%)	482 (3.21%)
Age 60+	874 (74.4%)	246 (21.0%)	54 (4.6%)

Table 1: Distribution of mean daily step count by age group

DISCUSSION

- Early findings showed clear promise in leveraging on investments made for COVID-19 (in this case, the development of the BruHealth app) to drive forward broader public health initiatives, particularly in lifestyle modification.
- There were high levels of engagement with 20% of active users signing up (13.4% of the total resident population of Brunei) within the one-month challenge period. It is clear though that more work to engage individuals aged 60 years and above, and those with chronic conditions need to be done to yield greater engagement in these two groups.
- Our findings suggests a lower average daily step count for the Brunei adult population (even including the campaign period where the average step count was higher) compared to other countries, despite previous national surveys suggesting that only 25% of the adult population self-report insufficient physical activity.
- Validation of the step tracking functions of the BruHealth app with wearables and understanding the other types of physical activity conducted by the population will be important going forward. Nonetheless, these early findings suggest that the optimistic self-reported data on physical activity levels in Brunei from earlier studies should be viewed with caution.
- Results suggest a peak in engagement during the 1-billion campaign period with a subsequent decline suggesting that while interest can be generated over a short time period, the challenge will be in maintaining this initial interest and early engagement to bring about sustained behavior change. A well-defined behavior change strategy is important to ensure sustained commitment by participants.
- A key strength of this initiative is the ability to link behavioral with clinical data from the national EMR system. This will enable a more complete health outcomes-based evaluation of the program in the coming years and highlights the benefits of an integrated health data architecture for policy and outcomes research.



Fig. 4: BN On The Move was launched on 14 Aug 2022 at the weekly car-free Sunday initiative in the capital city, Bandar Seri Begawan. Image courtesy of MOH Brunei

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