

Public-Use Blood Pressure Machines in Pharmacies for Identification of Undetected Hypertension in the Community

Detection and monitoring of hypertension is largely dependent on screening at medical visits, which may explain why one third to one half of patients have poorly controlled blood pressure (BP) and many patients are unaware that they have hypertension.^{1,2} Community pharmacies offer a highly accessible and frequently used platform for patients to self-measure their BP free of charge at automated kiosks.

PharmaSmart PS-2000 (PharmaSmart Canada Corporation, Vancouver, BC) BP kiosks are validated devices³ measuring seated BP at the brachial artery. These kiosks also have Internet connectivity, allowing collection of anonymized results obtained at these kiosks. However, until now there were no data on the range of readings acquired at these kiosks and their potential role in identifying undetected hypertension in the community.

We obtained data from PharmaSmart on readings obtained from 341 locations of a Canadian chain pharmacy between January 2010 and November 2011. Because these results are collected anonymously with no ability to trace results to individual users, we assumed that each result corresponded to a unique individual. We classified readings consistent with North American hypertension guidelines^{4,5} as optimal (<130/80 mm Hg), prehypertensive (130–139/80–89 mm Hg), uncontrolled (140–159/90–109 mm Hg), or very high ($\geq 160/110$ mm Hg). Age, sex, and comorbidity status of users was unknown, so classifications for patients without complicating factors were applied. When systolic and diastolic values from the same reading fell into 2 different categories, the higher category was utilized.

A total of 8,457,552 readings were taken in the observation period, with an average usage across all pharmacies of 964 ± 26.8 measurements monthly. Mean BP was 131/78 mm Hg (standard deviation, 13.7/13.4) with mean pulse of 76 beats per minute (standard deviation 5.6).

Since BP kiosks are freely available for public use, the potential for improper technique must be considered. To estimate the potential impact of improper technique such as lack of rest or consumption of cigarettes or caffeine, coefficients of determination (R^2) were calculated to assess the potential association between heart rate and BP. These showed that any association between

BP result and heart rate were very weak ($R^2=0.17$ for systolic BP, $R^2=0.04$ for diastolic BP).

Because these kiosks are frequently used and approximately two thirds of results obtained are elevated, this may present a unique and important opportunity for the early detection of hypertension (or poorly controlled hypertension) in the community, particularly among individuals who do not regularly present to a physician. To ensure accurate results, patient education on proper measurement is critical. While the PS-2000 has been well-validated, the freely accessible nature of these machines requires health professionals to be vigilant in ensuring users receive training in self-monitoring technique.

This research identifies public-use BP kiosks as a potentially valuable tool in the early detection of undetected or uncontrolled BP. Given the accessibility and frequent use of kiosks by the public, future research on individuals' motivation to measure their BP at these kiosks and how we can utilize the results is warranted.

Acknowledgments: The authors wish to thank Josh Sarkis and Lisa Goodwin at PharmaSmart for providing data access on BP readings obtained at their PS-2000 kiosks.

Disclosures: Ms Houle receives funding for her PhD studies from the Canadian Institutes of Health Research, Hypertension Canada and the Interdisciplinary Chronic Disease Collaboration (funded by Alberta Innovates – Health Solutions). Dr Tsuyuki was previously a consultant for PharmaSmart Inc; however, no funding was received by PharmaSmart for this study, nor did they play any role in data analysis or interpretation.

Sherilyn K.D. Houle, BSP; Ross T. Tsuyuki, BSc
(Pharm), PharmD, MSc
From the Department of Medicine, University of
Alberta, Edmonton, AB, Canada

References

1. Egan BM, Zhao Y, Axon RN. US trends in prevalence, awareness, treatment, and control of hypertension, 1988–2008. *J Am Med Assoc.* 2010;303:2043–2050.
2. Wilkins K, Campbell NR, Joffres MR, et al. Blood pressure in Canadian adults. *Health Rep.* 2010;21:37–46.
3. Alpert BS. Validation of the Pharma-Smart PS-2000 public use blood pressure monitor. *Blood Press Monit.* 2004;9:19–23.
4. Daskalopoulou SS, Khan NA, Quinn RR, et al. The 2012 Canadian Hypertension Education Program recommendations for the management of hypertension: blood pressure measurement, diagnosis, assessment of risk, and therapy. *Can J Cardiol.* 2012;28:270–287.
5. National High Blood Pressure Education Program. 2004. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. <http://www.nhlbi.nih.gov/guidelines/hypertension/jnc7full.pdf>. Accessed June 25, 2012.