NAVITA DYAL

Ms. Dyal's grandfather died of a heart attack in Guyana. She believes he would be alive today if there had been adequate awareness of cardiovascular diseases. Her father, a pharmacist, exposed her to the untapped potential of pharmacists' screening for noncommunicable diseases. HELP was initiated to evaluate the feasibility of a pharmacy-based intervention.

Le grand-père de Mlle Dyal est décédé des suites d'une crise cardiaque en Guyane. Elle pense qu'il serait encore parmi nous si les maladies cardiovasculaires étaient mieux connues. Son père, qui était pharmacien, lui a fait découvrir le potentiel inexploité qu'ont les pharmaciens dans le dépistage des maladies non transmissibles. Le programme HELP a été lancé afin d'évaluer la faisabilité d'une intervention en pharmacie.

Assessment of a hypertension screening and education intervention in Charlestown, Guyana: Hypertension Evaluation & Learning Program (HELP)

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ABSTRACT

Background: Hypertension is the leading cause of mortality among Guyanese between the ages of 45 and 64 years and is inversely related to wealth and education. This pilot study aims to determine 1) the feasibility of a pharmacy-based clinic, 2) the prevalence of elevated blood pressure and 3) the outcome of follow-up of those with elevated blood pressure.

Methods: Participants were recruited based on a convenience sample. Adults with or without a previous diagnosis of hypertension were included. Screening, education and patient counselling

were provided. Participants with elevated blood pressure readings were contacted 1 month after the initial visit for a follow-up.

Results: Twenty-two subjects between the ages of 27 and 78 years participated: 32% (7 of 22) were found to have elevated blood pressure readings, and 71% (5 of 7) of those with high blood pressure readings visited a physician within 1 month of the screening. Of those prescribed antihypertensive medications, 71% (5 of 7) reported low adherence to their medication.

Conclusion: The methods developed in this study advanced knowledge on the effective management of hypertension in a developing country. One-third of participants were found to have elevated blood pressure. Among those with elevated blood pressure, most followed up with a physician and were diagnosed with hypertension. Pharmacists and pharmacies can play a pivotal role in providing education and improving drug therapy adherence. The need for pharmacy interventions is heightened in areas where access to physicians is scarce. This pilot study illustrates that a pharmacy-based screening and education intervention is indeed feasible. *Can Pharm J (Ott)* 2016;149:46–53.

Background

Guyana is the only English-speaking country in South America. Its 2 largest ethnic groups are the Indo-Guyanese (43.5%), descendants of Indian indentured laborers, and the Afro-Guyanese (30.2%), descendants of African slaves. Mixed-raced individuals comprise 16.7%

of the population; Amerindians, 9.1%; and the remaining 0.5% encompasses Portuguese, Chinese and Caucasian.¹ Approximately one-third of Guyana's 735,000 people live below the poverty line. The majority of Guyanese (37.42%) are between the ages of 25 and 54 years, followed by the 15–24-year age bracket (21.26%). Only 13.25% of the population are older than 54 years.¹

Noncommunicable diseases are the leading cause of mortality in Guyana, accounting for 822 deaths per 100,000 population. Cardiovascular disease is the noncommunicable disease responsible for the greatest number of deaths in Guyana, accounting for 526 deaths per 100,000 population.² Hypertension is a major modifiable risk factor for cardiovascular mortality. It is also a global health concern, affecting approximately 20% of the adult population in most countries. Hypertension is responsible for 20% to 50% of all cardiovascular mortality and morbidity, which contributes to increased health care costs.³ In Guyana, hypertension is the leading cause of mortality among those between 45 and 64 years.⁴

Guyana is divided into 3 counties: Berbice, Demerara and Essequibo. Charlestown is a coastal community within the Demerara county, where 40% of citizens live in absolute poverty, earning less than US \$510 per year, and 18% of people who reside in this area live in critical poverty, equivalent to earning less than US \$364 per year.⁵ Hypertension is inversely related to education, income and occupation; therefore, higher levels of blood pressure are prevalent in lower socioeconomic groups.²

Guyana has a 2-tiered health care system—public and private. Each of Guyana's 3 counties has a publicly funded hospital, where patients receive free medical care and prescription medication. It is difficult and expensive for the residents of Charlestown to access the nearest publicly funded hospital. This is a deterrent for most; thus, residents typically visit the hospital only when there is an acute emergency medical concern. It is also noteworthy that more than 80% of Guyanese with tertiary-level education have emigrated. Brain drain and a concentration of medical resources in 1 hospital per county hamper Guyana's ability to meet the health needs of its population.¹

Interventions are necessary to increase awareness that elevated blood pressure is a serious condition, despite its asymptomatic nature. Prevention of hypertension is linked to the elimination of relevant modifiable risk factors and the promotion of a healthy lifestyle.⁶ The Hypertension Evaluation & Learning Program (HELP) aims to provide a pharmacy-based intervention in a developing-world environment. The objectives of this study were to determine 1) the feasibility of a pharmacy-based clinic, 2) the prevalence of elevated blood pressure and 3)

KNOWLEDGE INTO PRACTICE

- This intervention provides the blueprint for enhancing the awareness, and screening for the prevalence, of hypertension in a developing country.
- Pharmacies are easily accessible and abundant in this population, thereby providing an excellent setting for enhancing hypertension education and screening.
- Pharmacists are able to provide personalized patient counselling regarding blood pressure medications, with the goal of improving drug therapy adherence.
- Using volunteer peer health educators to assist with this intervention contributes to reduced program costs.

the outcome of follow-up of those with elevated blood pressure.

Methods

Design and sample

This was a descriptive pilot study that used convenience population sampling. Posters were placed in community centres, and volunteers went door to door to notify the community of this program.

Subjects

We included all subjects older than 18 years, regardless of hypertension diagnosis. We excluded subjects who did not speak English.

Intervention

The HELP team in Guyana comprised a local pharmacist, social worker and 3 trained volunteer peer health educators. This intervention was held at the Young Men's Christian Association (YMCA) in Charlestown. When participants entered the premises, they were greeted by 1 of the 3 trained volunteers. These volunteers assisted participants with completing their consent forms and patient history questionnaires.

The pharmacist provided individualized patient counselling that aimed to increase hypertension awareness and communicate the importance of monitoring blood pressure levels and adherence to drug therapy. Advice on how to control and possibly eliminate modifiable risk factors of hypertension, in addition to recommendations on how to adapt and adhere to a healthy lifestyle if already diagnosed with hypertension, were discussed. The social worker was a trusted member of this community. Inhabitants of this small town

MISE EN PRATIQUE DES CONNAISSANCES

- Cette intervention fournit un modèle afin de renforcer la sensibilisation et de dépister la prévalence de l'hypertension dans un pays en voie de développement.
- Les pharmacies sont nombreuses et aisément accessibles dans cette population, c'est pourquoi elles constituent un excellent cadre pour améliorer l'éducation sur l'hypertension et le dépistage.
- Les pharmaciens sont en mesure d'offrir des conseils personnalisés à leurs patients concernant les médicaments pour la tension, dans le but d'améliorer l'observance thérapeutique.
- Le recours à des éducateurs volontaires en matière de santé dans le cadre de cette intervention permet également de réduire le coût du programme.

often sought out the social worker to discuss any issues they were dealing with in their lives. Having the social worker on our team was invaluable, as he was able to encourage individuals to attend the clinic. Establishing trust between participants and clinic facilitators is vital to positively alter health behaviours. Both the pharmacist and social worker volunteered their time for this pilot project.

Three blood pressure readings were taken. The first reading was ignored, and an average of the last 2 readings was used for this study.⁶ High blood pressure was defined, in accordance with the Canadian Hypertension Education Program, as a systolic reading of 140 mmHg or greater and/or a diastolic level greater than 90 mmHg. Participants who were found to have elevated readings at this clinic were instructed to follow up with a physician within 1 month. Patients with diabetes who had a systolic reading of 130 mmHg or greater and/or a diastolic reading of 80 mmHg or greater were similarly advised.⁶ One month later, the HELP team contacted individuals who were identified with elevated blood pressure readings to participate in a follow-up questionnaire, which was administered over the phone. The purpose was to understand the steps participants took, if any, to monitor and control their blood pressure levels.

Measurement

The Omron M7 Oscillometric Blood Pressure Monitor, validated by the British Hypertension Society Protocol in 2008, was employed.⁷ At the initial screening and awareness clinic, the 8-item Morisky Adherence Scale was administered to those who had previously been prescribed

antihypertensive medication.⁸ Two questions addressing patient forgetfulness about taking medications within a specific time interval were removed from the Morisky Adherence Scale during the follow-up questionnaire, because it was deemed difficult to assess a change in response to these 2 questions within 1 month.⁹ Thus, the scoring system was rescaled, and a 6-point scale was used for the follow-up questionnaire. Individuals who had a score of 6 were determined to have a high adherence; 4 to less than 6, medium adherence; and less than 4 indicated low adherence. Lastly, clinic facilitators were asked to determine the challenges of planning and executing this clinic and how they can be better addressed in the future.

Results

Patient characteristics

Participant characteristics are shown in Table 1. Twenty-two subjects, aged 27 to 78 years, participated in the screening program; 59% (13 of 22) were female and 41% were male. Sixty-four percent (14 of 22) were Indo-Guyanese, while 32% were Afro-Guyanese. The majority of participants (67%) had received only a primary school level of education or less. Most participants were considered to have normal weight; however, 33% (7 of 21) of participants were overweight and 14% were obese. Thirty-two percent (7 of 22) of participants had diabetes. There seems to be a strong history of hypertension in this population, as 57% (12 of 21) of patients reported a family history; 42% (5 of 12) of these participants also had diabetes. Eighteen percent (4 of 22) of subjects had high cholesterol, with 75% (3 of 4) of these subjects also having diabetes. One participant reported having had a heart attack in the past, while another reported a previous stroke.

The majority of subjects appeared to engage in a healthy lifestyle. Most participants (55% [12 of 22]) reported never having smoked, 23% (5 of 22) had smoked in the past but did not anymore, 18% (4 of 22) smoked occasionally and only 1 of 22 regularly smoked. The majority of participants, 85% (17 of 20), did not consume more than 2 alcoholic beverages per day. Overall, the participants had a good diet: 95% (20 of 21) ate fruits and vegetables, 81% ate fish, 67% ate lean meat and poultry, 29% consumed dairy products, 19% ate salty foods and only 10% ate fast food in a typical week. The majority of participants, 76%, reported exercising for 30 to 60 minutes per day. Last, 52% (11 of 21)

TABLE 1 Patient characteristics

	Results (n = 22)
Gender, n (%)	
Female	13 (59)
Male	9 (41)
Average age, mean, SD	53, 12.56
Ethnic origin, n (%)	
Indo-Guyanese	14 (64)
Afro-Guyanese	7 (32)
Other	1 (4)
Body mass index (BMI), n (%)	n = 21
Normal weight	9 (43)
Overweight	7 (33)
Obese	3 (14)
Underweight	2 (10)
Average BMI, mean, SD	25.77, 6.38
Level of education achieved, n (%)	n = 21
Primary school	14 (67)
High school	6 (28)
College/university	1 (5)
Regular family physician, n (%)	n = 16
No	10 (63)
Yes	6 (38)

of participants reported feeling frustrated, anxious or stressed a few times a week, and 29% reported experiencing these feelings often.

Blood pressure and high blood pressure management

The average systolic blood pressure reading at the clinic was 127.9 mmHg (SD 40.21), and the average diastolic blood pressure reading was 79.99 mmHg (SD 23.64). A total of 45% (10 of 22) of participants had been previously advised by their physician that they had hypertension. Only 40% (4 of 10) of these individuals were found to have good control of their hypertension (Table 2).

Thirty-two percent of subjects (7 of 22) were found to have elevated blood pressure readings at the clinic. Specifically, 86% (6 of 7) of those with elevated blood pressure had a high systolic reading and 71% (5 of 7) a high diastolic reading. Of those with above-target blood pressure levels, 86% (6 of 7) were previously diagnosed with hypertension. Fifty-seven percent (4 of 7) of individuals with elevated blood pressure readings were also

diabetic. It is noteworthy that 75% (3 of 4) of these diabetic patients with elevated blood pressure readings had also previously been advised by their physician that they had high blood pressure.

Medication adherence

Forty-one percent (9 of 22) of participants had previously been prescribed antihypertensive medication. Of these 9 patients, 67% were found to have low drug therapy adherence and 33% medium adherence by the Morisky adherence questionnaire.

Medication adherence among participants with elevated blood pressure

It was noted that 32% (7 of 22) participants had an elevated blood pressure reading at the clinic. Eighty-six percent (6 of 7) of these participants had previously been prescribed antihypertensive medication and had low drug therapy adherence by the Morisky adherence scale. Only 43% (3 of 7) of these individuals found to have an elevated blood pressure reading at the clinic reported having a family physician (Table 3).

TABLE 2 Blood pressure reading variables

	Results (n = 22)
Previously told by physician that they have high blood pressure, n (%)	
Yes	10 (45)
No	8 (36)
Not sure	4 (18)
Previously prescribed antihypertensive medication, n (%)	
No	13 (59)
Yes	9 (41)
Blood pressure readings, mean, SD	
Systolic	127.9 mmHg, 40.21
Diastolic	79.9 mmHg, 23.64
Participants with high blood pressure readings at clinic, n (%)	
	7 (32)
Breakdown of high blood pressure readings at clinic, n (%)	
Systolic	6 (27)
Diastolic	5 (23)
Participants with a high blood pressure reading who were previously prescribed antihypertensive medication, n (%)	
	5 (71)*
Adherence to drug therapy, n (%)	
Low	6 (67)†
Medium	3 (33)†
High	0†

*n = 7.

†n = 9.

Patients with elevated blood pressure at the clinic
Eighty-six percent (6 of 7) of participants with elevated blood pressure at the clinic had received primary level schooling or less, and 14% (1 of 7) had earned a high school education. This finding is consistent with the literature, which states that hypertension is inversely related to education.² The self-reported understanding of hypertension after the clinic, in patients found to have a low adherence to their medications, was high: 86% (6 of 7) reported having a good to very good understanding of hypertension, while 1 patient reported still being unclear. An analysis of the qualitative results from participant questionnaires indicated 2 common themes. One was the lack of awareness pertaining to the severity of hypertension and the other the importance of adhering to their drug therapy and following up with a health care professional.

At the initial screening clinic, 1 patient reported that the most important thing he learned was “to check my blood pressure regularly and to follow up with my doctor for medications, which I have stopped taking since last year.”

Follow-up of patients with elevated BP

We were able to contact 86% (6 of 7) of patients with elevated blood pressure readings for follow-up. Eighty-three percent (5 of 6) had visited a physician within 1 month of the evaluation clinic. All 5 of these participants were diagnosed with hypertension and prescribed medication. The 1 person who did not follow up with a physician reported having domestic problems that prevented her from seeing a physician. Based on the rescaled 6-point Morisky Adherence Scale used at the follow-up clinic, it appeared as though there was an improvement in drug therapy adherence. However, we believe these results may be skewed toward improved adherence by the removal of the 2 questions pertaining to forgetfulness. All of the participants whom we were able to contact reported that this clinic was helpful but that they would like to see a physician present at future clinics. Participants found it difficult to visit a physician at the publicly funded hospital since this hospital is located quite a distance away, and long wait times are another deterrent. We later found out that the

TABLE 3 Patients with elevated blood pressure

	Average SBP	Average DBP	Previously prescribed medication	Drug therapy adherence	Regular family physician	Good/very good understanding of hypertension
Patient 1	150.5	108.5	Not provided by participant	N/A	Not provided by participant	Still unclear
Patient 2	175	119.5	Yes	Low	Yes	Yes
Patient 3	264	156	Yes	Low	No	Yes
Patient 4	145	80	No	N/A	Yes	Yes
Patient 5	150	80	Yes	Low	No	Yes
Patient 6	157	96.5	Yes	Low	No	Yes
Patient 7 (diabetic)	132	86	Yes	Low	Yes	Yes

SBP, systolic blood pressure; DBP, diastolic blood pressure; N/A, not available.

seventh patient with an elevated blood pressure reading, with whom we were unable to speak, was admitted to the hospital due to a hypertensive crisis. Unfortunately, he subsequently died from cerebrovascular hemorrhage.

Clinic processes

All 5 facilitators thought the clinic was well advertised. One facilitator suggested that radio ads be used to aid in advertising future clinics. All facilitators thought the framework of the clinic would be easy to implement in other local communities. They also suggested having a physician present to prescribe and dispense medication free of charge. All facilitators felt that the clinic was successful in improving patient care since 5 out of 6 patients (83%) followed up with a physician.

Discussion

HELP was designed as a pilot study to address the major public health problem of hypertension in Guyana. Indeed, approximately one-third of participants were found to have above-target blood pressure readings. While 6 of 7 of those with elevated blood pressure readings were previously diagnosed with hypertension, medication adherence was generally poor. Most individuals with high blood pressure followed up with a physician within 1 month of this intervention. Eighty-six percent (6 of 7) of participants who were found to have above-target blood pressure readings reported having a good/very good understanding of hypertension after this intervention. HELP demonstrated that a blood pressure screening and education clinic is feasible. This is particularly useful, as the

majority of participants reported that they did not have a family physician. In light of the poor access to adequate health care resources within the Charlestown community, if this project is scaled up, HELP could serve others in a similar impoverished community.

To our knowledge, this is the first pilot study of its kind in Guyana. However, there have been similar small-scaled interventions aimed at exploring pharmacists' involvement in the management of noncommunicable diseases in other developing countries. Eighteen such studies were analyzed, all of which used face-to-face patient counselling as a successful method of educating clinic participants.¹⁰ Two studies, piloted in Nigeria, demonstrated that pharmacy-based interventions with the goal of providing education on and assisting with the management of hypertension are feasible. However, just as in this study, both interventions were restricted to single sites and the pharmacy staff volunteered their time, which may become an anomaly if wider pharmacy service implementation is realized.^{10,11} Thus, financial consideration is required before suggesting the replication of this intervention. Pharmacy staff at other locations may require fiscal reimbursement. Only 1 study was identified that undertook a formal assessment of the costs of delivering a similar intervention.¹² As such, there is a lack of evidence to enable policy makers to make evidence-based decisions regarding the relative cost-effectiveness of enhanced pharmacy services. In our model, all clinic facilitators volunteered their time; the only potential cost was the blood pressure monitor. However, the sphygmomanometer used in our

study was donated by the nonprofit organization Giving Life In The Rural (GLITR).

This study has several limitations that should be noted. Although we aimed to adopt a scientific approach to sampling and recruitment, there may have been some selection bias. Since many residents of Charlestown had already developed a rapport with the social worker prior to our intervention, he was very influential in motivating locals to attend the clinic. In retrospect, those who sought the guidance of the social worker were presumably individuals who were relatively proactive about their health. This may account for the fact that 10 of 22 participants had previously been diagnosed with hypertension. Therefore, without true population-based random sampling, we cannot generalize our findings at a population level. While the sample size was relatively small, it is noteworthy that the population of Charlestown is less than 1000. Unfortunately, it has been reported that it is difficult to accurately measure a change in participants' forgetfulness to take their medication within only 1 month of the intervention.⁹ We were unable to assess participants' blood pressure postintervention as follow-up was done via telephone. We initially felt that rescaling the Morisky Adherence Scale during the follow-up clinic would address this issue. In retrospect, if participants responded positively to forgetfulness at baseline, a 6-point scale might skew the results. Thus, this cohort would need to be followed for a longer period of time, using the original 8-point Morisky Adherence Scale, to determine if there was a true improvement in drug therapy adherence. It is noteworthy that contrary to the direct relationship between income and diet and exercise in Canada, the opposite holds true in this community. We learned that it is the norm to walk a few miles each day to accomplish daily activities. In addition, inhabitants of this community frequently catch their own fish, as it is expensive to purchase meat. Many participants also grow their own fruits and vegetables. These factors contribute to the reportedly good diet and exercise levels of participants, despite their low income.

Although most participants had a family history of high blood pressure, no one recognized the importance of ongoing follow-up with a physician, monitoring blood pressure levels and adherence to drug therapy. One participant unfortunately died due to cerebrovascular hemorrhage. He had reported that he was aware of his elevated blood pressure but did not take his medication because he "didn't feel sick."

This highlights the need for education and awareness of hypertension and its asymptomatic nature. One-to-one patient counselling was very important; one facilitator reported that it was very successful in gauging how well the patient understood the message, especially since the majority of participants had only an elementary school level of education or less.

The findings of this study are promising, as participants valued the service and most of those who had elevated blood pressure had visited a physician within 1 month of the clinic. In addition, those who were previously diagnosed with hypertension were not adhering to their drug therapy primarily because they did not understand the importance of treating an asymptomatic condition. Thus, the education component of this intervention was valuable, even for those who had been previously diagnosed. This pilot study should encourage more pharmacy-based interventions. The death of one of our participants might have been prevented if he had received adequate education earlier. There is an abundance of pharmacies throughout the Demerara county, which makes them the ideal environment in which to provide education, awareness and screening for hypertension.

Conclusion

Currently, little information exists pertaining to the general health of the Guyanese population. This deficiency is acute when considering hypertension. Based on the statistical data published by the Guyana Ministry of Health, hypertension is the leading cause of mortality among those between the ages of 45 and 64 years.² However, there are no data that suggest how this chronic disease can be better managed in an area such as Charlestown. This pilot project helped establish a better understanding of this community and how to develop effective strategies for creating an awareness of hypertension, encouraging follow-up with a physician and promoting drug therapy adherence.

HELP demonstrated that pilot screening was feasible. Approximately one-third of participants were found to have above-target blood pressure at the clinic. Most individuals with high blood pressure followed up with a physician within 1 month of this intervention. Eighty-six percent (6 of 7) of participants who were found to have above-target blood pressure readings reported having a good/very good understanding of

hypertension after this intervention. Poor medication adherence was reported among those who were prescribed antihypertensives prior to this intervention.

Utilizing technology would be an area for exploration in future clinics. Wherever the technology is available, pharmacists could act as conduits to physicians by faxing blood pressure readings directly to the physician. Unfortunately, this technology was not available to us.

The World Health Organization aims to eradicate modifiable risk factors of cardiovascular disease.² Pharmacists and pharmacy services are underused resources that could contribute to improved management of noncommunicable diseases. This pilot project could serve as a model for a pharmacy-based intervention, which is sorely needed in Guyana and other developing nations where access to adequate health care is scarce. ■

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Acknowledgments: We would like to thank our social worker, Mr. Higgins, and pharmacist, Mr. Sukhu, for their invaluable leadership and patient care. We are immensely grateful to our 3 peer health educators—Mr. Jagbandhan, Mr. Ramkarran and Mr. Ramrattan—who facilitated the seamless execution of HELP. We were humbled to have Dr. John Bachynsky and Dr. Richard Bayney share their pearls of wisdom when revising our manuscript. Thank you all for making this research possible.

Author Contributions: Navita Dyal developed the concept and framework for HELP. She analyzed the data obtained, in addition to drafting and revising the manuscript. Lisa Dolovich supervised the implementation of this intervention, provided insight on the analysis of the data and critically revised the manuscript. Both authors approved the final version of this manuscript.

Declaration of Conflicting Interests: The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding: The sphygmomanometer used in this study was donated by the nonprofit organization GLITR (Giving Life In The Rural). GLITR also paid for the costs of photocopying questionnaires used during the clinic. The authors received no other financial support for the research, authorship and/or publication of this article.

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