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A Community Outreach Blood Pressure Clinic: Experiential practice site for pharmacy and dental hygiene students trained in physical assessment

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Abstract

Background: The application of skills in physical assessment is recognised as an important part of providing pharmaceutical care. However, the number of quality experiential opportunities for pharmacy students to practice these skills is currently limited.

Objective: To describe the implementation and evaluation of a Community Outreach Blood Pressure Clinic for pharmacy and dental hygiene students.

Procedures: Three blood pressure clinics were designed to provide a unique learning environment for pharmacy and dental hygiene students to practice their skills in physical assessment. A 5-point Likert scale and open comments were used to measure student's confidence, comfort, and knowledge on performing a blood pressure reading on a patient. To evaluate the impact of the clinic on the community, participant satisfaction and the proportion of individuals who have not had a blood pressure reading in the previous year were also captured.

Results: All participants reported being satisfied or very satisfied about the blood pressure clinic. Among the participants, 18 (56%), 19 (35%), and 30 (54%) did not recall or know what their typical blood pressure reading was at the College of Pharmacy, Community Centre, and Residential Home, respectively. The percentage of students that agreed or strongly agreed to feeling confident (44/46 or 96% vs. 12/18 or 67%, $p<0.05$), comfortable (44/46 or 96% vs. 13/18 or 72%, $p<0.05$), and knowledgeable (45/46 or 98% vs. 14/18 or 79%, $p<0.05$) about performing a physical assessment of vitals on a patient was higher after the experiential site than after the online module, respectively. No differences in responses between pharmacy and dental hygiene students were observed.

Conclusions: This study suggests that a Community Outreach Blood Pressure Clinic provided a satisfactory experience for students to apply their skills in performing a blood pressure reading and assessment. Student reported confidence was improved after the experiential exposure compared to the practice lab and online module. Findings from this study will be used to improve existing experiential programs related to the advancement of skills in physical assessment.

Keywords: *Blood Pressure, Community Outreach, Experiential Site, Pharmacy Education, Physical Assessment*

Introduction

The application of skills in physical assessment is recognised as an important part of providing pharmaceutical care (Longe, 1995; Pauley *et al*., 1995; Da Camara *et al*., 1996; Spray & Parnapy, 2007; Simpson & Wilson, 2007; Association of Faculties of Pharmacy of Canada, 2010; Barry *et al*., 2012). The incorporation of a physical assessment module into the pharmacy curricula aligns with the educational outcomes (1.2, 1.8) and accreditation standards (27.5) set out by the Association of Faculties of Pharmacy of Canada and the Canadian Council for Accreditation of Pharmacy Programs, respectively (Association of Faculties of Pharmacy of Canada, 2010; Medina *et al.,* 2013). However, the number of quality experiential opportunities for pharmacy students to practice these skills is currently limited.

Community outreach focused on cardiovascular health and increased access to blood pressure measurement services is one area of public health service wherein pharmacy students can engage with the older adult community while practicing their skills in physical assessment. Incorporating service-learning and community-based activities into the pharmacy curriculum has the potential to foster attitudes for providing care to patients and their communities. A Community Outreach Blood Pressure Clinic was implemented as an experiential practice site for pharmacy and dental hygiene students at the University of Manitoba in the spring of 2015. This site was designed to provide pharmacy and dental hygiene students with a unique learning environment for practicing their skills in performing a manual blood pressure reading. No studies to date have described or

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examined the implementation of a community outreach blood pressure clinic as a site for students to practice and apply their skills in physical assessment. We aim to describe the implementation of this practice site and to assess the student's level of comfort, confidence, and knowledge in performing a physical assessment after exposure to the practice site.

Rationale and Objectives

At the College of Pharmacy at the University of Manitoba, a module on Skills in Physical Assessment focusing on vital signs was initially implemented into the Pharmacy Skills Laboratory 3 (PSL-3) course for third-year pharmacy students in the 2013-14 academic year. The physical assessment module consisted of three components: (1) An online module (didactic lectures); (2) a practical skills laboratory (3.5 hour simulation and practice workshop); and (3) a clinical experiential practice site. A detailed description of the online module and practical skills laboratory has been described previously (Leong *et al.*, 2014; Leong *et al*., 2015). Dental hygiene students were also required to complete the same online module as part of their *Preclinical Dental Hygiene* course, but their practice skills lab was conducted separately. The experiential practice site is expected to help students improve their competence, confidence, and comfort in carrying out physical assessment activities independently in their future practice. Accordingly, we implemented a community outreach blood pressure clinic for enhancing the student practice experience for both pharmacy and dental hygiene students to apply their skills in physical assessment in 2014-15.

The specific objectives of this community outreach program are as follows:

1. To enhance the educational experience of pharmacy and dental hygiene students for learning skills in physical assessment by providing students with an opportunity to gain supervised practice experience on blood pressure measurement and interpretation on live individuals
2. To implement a community outreach blood pressure clinic to screen for uncontrolled blood pressure and to promote awareness of cardiovascular disease.

Materials and Methods

Experiential Practice Site Description

In collaboration with the Heart and Stroke Foundation, three free blood pressure clinics for the public were implemented to screen patients at risk for high blood pressure and to raise awareness about cardiovascular health.

Two of the blood pressure clinics comprised of six to seven blood pressure stations and were held on two different days in April 2015. These clinics were held at an active living community centre for older adults and an independent residential home for seniors, respectively. A third mini clinic comprised of four blood pressure stations was also held in March 2015 at the College of Pharmacy building for eight pharmacy students who were unavailable to participate in clinic activities in April. All clinics were open and accessible to the public. To inform the public of the outreach clinics, advertisement in the form of posters, community newsletter advertisement, and communication with activity coordinators of 55+ residential homes in the surrounding area were carried out to promote the event and to target patients who may benefit from the clinic services.

A total of 55 third-year pharmacy students and 17 first-year dental hygiene students partook in this activity. All participating students received formal training on physical assessment skills as part of their education curriculum prior to their involvement in the blood pressure clinic. Pharmacy and dental hygiene students had to successfully complete and pass the online module and practical skills laboratory prior to participating in the experiential practice site. This training included the performance and interpretation of findings obtained through a physical assessment of vital signs, such as blood pressure, pulse rate, respiratory rate and body temperature. In the practical skills laboratory, all students were required to demonstrate their ability to perform a blood pressure measurement based on a checklist derived from *Bickley's Bates' Guide to Physical Examination and History Taking* (Bickley, 2007).

For the blood pressure clinics, students were divided into pairs, and each pair was assigned at least one clinic slot (1.5 hours in duration) between 9:30am and 3:30pm. All 17 dental hygiene students were paired with one pharmacy student, but the remaining pharmacy students were paired with each other for this activity. At each blood pressure station, one pair of students worked together to perform a series of blood pressure readings using a teaching stethoscope and an aneroid sphygmomanometer on each patient seen. Each station was equipped with one manual blood pressure sphygmomanometer, one teaching stethoscope, one automated blood pressure monitor, standard health assessment forms, and patient-specific educational materials on cardiovascular health provided by the Heart and Stroke Foundation. The use of a teaching stethoscope allowed both students at each station to listen to the Korotkoff sounds for determining the blood pressure reading. Each student within a pair had the opportunity to take a blood pressure reading. If there was a discrepancy of greater than 5 mmHg for the systolic or diastolic blood pressure reading between the two students, a third blood pressure measurement was taken. If a discrepancy of greater than 5 mmHg still occurred from one of the previous readings, an automated machine was present at each station as another check. There was also always at least one instructor supervising the activities of two blood pressure stations (ratio of one instructor for every four students) in the event that students were having difficulties with the blood pressure measurement or if an abnormal blood pressure reading was observed. Supervising instructors were present to observe for

incorrect blood pressure technique among the students (*e.g.* incorrect placement of the stethoscope on the patient's arm, incorrect placement of the stethoscope earpiece into the ears, deflation of the cuff pressure too rapidly) and to provide guidance accordingly. Any participant who did not have a regular physician was provided with a government pamphlet on how to access a family physician in the province. A registered dietician from the Heart and Stroke Foundation was also present to provide lifestyle education for participants all day at both of the April clinics.

This community outreach was funded by the National Association of Boards of Pharmacy (NABP) District Five Individual Study Grant and exempted from review by the University of Manitoba Human Research Ethics Board. All participants signed an informed consent stating that a cuff will be used to apply pressure to their arm to take a series of blood pressure readings, all readings will be provided to the patient and it is the responsibility of the patient to communicate with their physician about their blood pressure reading, health advice will not be provided by the student aside from the patient-specific education material provided by the Heart and Stroke Foundation, and all data obtained will be used for quality improvement of the education program and service. In consultation with the Heart and Stroke Foundation, University, and all clinic sites, the protocol for high-risk referrals were based on previous blood pressure clinic protocols carried out by external organisations and the Canadian Hypertension Education Program guidelines (Daskalopoulou *et al*., 2012; Hypertension Education Program, 2013). If a participant presented with a systolic blood pressure of ≥180 mmHg and/or a diastolic blood pressure of ≥110 mmHg, students were instructed to have one of the supervising instructors present while the student measures the reading again ensuring proper technique. If the reading was still high, participants were advised to follow-up with their physician within two weeks or within a few days if the participant had a history of target organ damage (*e.g.* chronic kidney disease). Participants were advised to seek immediate attention if they presented with acute signs of hypertensive emergency (*e.g.* acute stroke, chest pain) or if they presented asymptomatically with a diastolic blood pressure of ≥130 mmHg.

Outcomes Measured

Upon completion of the blood pressure clinic experience, specific outcomes were measured to assess the implementation of the clinic. To evaluate the potential impact of the clinic on the community, the following information was captured: (1) proportion of individuals with a high blood pressure reading; (2) proportion of individuals who have not or do not recall if they have had a blood pressure reading checked in the previous year; (3) proportion of patients who did not have a regular family physician; and (4) participant satisfaction with the event. A 5-item student survey using a 5-point Likert scale was administered to pharmacy students at three different times (post-module, post-laboratory, post-clinic) to evaluate their level of comfort, confidence, knowledge, and satisfaction with the online module, practical skills laboratory, and experiential site in terms of learning skills in physical assessment. This survey was also administered to the participating dental hygiene students post-clinic. Open-ended comments were reviewed and categorised based on common themes by CL. The number of participants allocated to each blood pressure station was also documented to monitor the magnitude of practice exposure for each student pair. Survey responses were collected anonymously and all documented data were de-identified and kept confidential. A Pearson's Chi-Squared test was used to compare student responses after the experiential practice site to the responses made after the online module only and after the practice lab, with an alpha <0.05 considered significant. All analyses were carried out using Microsoft® Excel® for Mac 2011 (Version 14.4.8).

Results

Participant Data and Evaluation of Community Impact

Participant demographics are displayed in Table I. Majority of participants were female and nonsmokers across all three clinic sites. As expected, the two clinics held at the community centre and residential home involved older participants (mean 69 years and 75 years, respectively vs. 34 years at College of Pharmacy) and had a higher proportion of patients with a history of hypertension (24/53 or 44% and 27/56 or 48%, respectively vs. 1/32 or 3% at College of Pharmacy). We identified six participants at each of the three sites who did not have a family physician (11% Community Centre, 11% Residential Home, 19% College of Pharmacy), in which a Find-a-Doctor brochure was provided. Nineteen (59%), 48 (87%), and 49 (88%) participants reported that they have had their blood pressure checked in the last year; but 18 (56%), 19 (35%), and 30 (54%) participants did not recall or know what their typical blood pressure reading was at the College of Pharmacy, Community Centre, and Residential Home, respectively.

The majority of participants had a systolic blood pressure reading between 100 mmHg and 139 mmHg, and a diastolic blood pressure reading between 60 mmHg and 89 mmHg (Table II). Participants with a high blood pressure reading were re-assessed under instructor supervision using both a manual and automated cuff. All participants with an abnormal reading reported that they were aware that this was their usual reading and were frequently being followed up by their family physician. No patients were symptomatic or fell in the high-risk category for urgent or emergency referral during the clinics.

All participants who completed the survey (72.3% response rate) reported being satisfied or very satisfied with the blood pressure clinic experience (Table III). The majority of open comments included positive comments about the professionalism and demeanour of the students.

Table I: Patient demographics by site (N=141)

Demographic	College of Pharmacy N=32	Community Centre N=53	Residential Home N=56
Gender (n,%)			
Female	24 (75)	41 (75)	49 (89)
Age (years)			
Mean	34	69	75
Minimum	19	26	29
Maximum	68	86	97
Not reported (n,%)	3 (9)	n/a	2 (4)
History of hypertension (n,%)	1 (3)	24 (44)	27 (48)
Receiving hypertension medications (n,%)	1 (3)	22 (40)	27 (48)
Lifestyle			
Nonsmoker (n,%)	32 (100)	43 (78)	35 (69)
Past smoker (n,%)	0 (0)	12 (22)	15 (29)
Current smoker (n,%)	0 (0)	0 (0)	1 (2.0)
Caffeine in last hour (n,%)	8 (25)	25 (45)	27 (49)
Alcohol (n,%)	14 (44)	14 (25)	19 (35)
Range beverages/week	0-5	0-28	0-6
Blood pressure checked in last year (n,%)	19 (59)	48 (87)	49 (88)
Don't recall/know typical reading (n,%)	18 (56)	19 (35)	30 (54)
No family physician (n,%)	6 (19)	6 (11)	6 (11)

Table II: Average blood pressure reading distribution by site, n(%) (N=141)

Blood Pressure Category	College of Pharmacy N=32	Community Centre N=53	Residential Home N=56
Systolic Blood Pressure (mmHg)			
<120	18 (56.3)	9 (17.0)	11 (19.6)
120-129	**11 (34.4)**	**14 (26.4)**	**13 (23.2)**
130-139	2 (6.3)	**17 (32.1)**	**16 (28.6)**
140-149	1 (3.1)	8 (15.1)	8 (14.3)
150-159	0 (0.0)	4 (7.5)	6 (10.7)
160-179	0 (0.0)	1 (1.9)	2 (3.6)
>/=180	0 (0.0)	0 (0.0)	0 (0.0)
Diastolic Blood Pressure (mmHg)			
<50	0 (0.0)	0 (0.0)	2 (1.8)
50-59	1 (3.1)	2 (3.8)	5 (8.9)
60-69	**9 (28.1)**	6 (11.3)	**15 (26.8)**
70-79	**10 (31.3)**	**21 (39.6)**	**22 (39.3)**
80-89	1 (3.1)	**19 (35.8)**	9 (16.1)
90-99	0 (0.0)	4 (7.5)	2 (3.6)
100-119	0 (0.0)	1 (1.9)	1 (1.8)
>/=120	0 (0.0)	0 (0.0)	0 (0.0)

Student Evaluation of Outreach and Practice Site Experience

The degree of practice exposure varied for each blood pressure station depending on the site of the clinic, time of day of the clinic, and speed of the students (Table IV). Students that participated in the clinic held at the College of Pharmacy had a greater number of participants to practice on (eight patients per blood pressure station). Students who participated in the remaining two clinics received 4.5 participants in 1.5 hours on average, with the exception of the late afternoon time slot at the Residential Home that saw an average of 1.2 participants. Pharmacy student responses to the survey post-module (32.7% response rate), post-laboratory (45.5% response rate), and post-clinic (83.6% response rate) were compared. The percentage of pharmacy students that agreed or strongly agreed to feeling confident (44/46 or 96% vs. 12/18 or 67%, $p<0.05$), comfortable (44/46 or 96% vs. 13/18 or 72%, $p<0.05$), and knowledgeable (45/46 or 98% vs. 14/18 or 79%, $p<0.05$) about performing a physical assessment of vitals on a patient was higher after the experiential site than after the online module, respectively (Figure 1). The proportion of pharmacy students that agreed or strongly agreed to feeling confident was also significantly higher after the experiential site than after

Table III: Participant satisfaction survey by site, n(%) (N=102/141 participants responded to the survey)

Criterion	College of Pharmacy (N=18)	Community Centre (N=50)	Residential Home (N=34)
Satisfaction Criterion			
Not Satisfied	0 (0.0)	0 (0.0)	0 (0.0)
Somewhat Satisfied	0 (0.0)	0 (0.0)	0 (0.0)
Neutral	0 (0.0)	0 (0.0)	0 (0.0)
Satisfied	4 (22.2)	5 (10.0)	6 (17.7)
Very Satisfied	**14 (77.8)**	**45 (90.0)**	**28 (82.4)**
Comments			
Professionalism, demeanor	4 (22.2)	6 (12.0)	2 (5.9)
Informative	0 (0.0)	2 (4.0)	2 (5.9)
Appreciation	0 (0.0)	2 (4.0)	1 (2.9)
General (*e.g.* "good job")	3 (16.7)	5 (10.0)	4 (11.8)
No Comment	11 (61.1)	35 (70)	22 (64.7)
Response Rate	18/32 (56.3)	50/53 (94.3)	34/56 (60.7)

Table IV: Participants per Blood Pressure Station by site and time

Blood Pressure Station	College of Pharmacy N=32	Community Centre N=57*		Residential Home N=60*		
	PM	AM	PM	AM	PM1	PM2
1	8	4	4	4	7	2
2	8	5	3	5	4	1
3	8	4	6	5	3	1
4	8	6	6	3	4	
5		5	4	4	4	1
6		4	6	3	4	1
7				4		
AVG	**8**	**4.7**	**4.8**	**4.0**	**4.3**	**1.2**

Each block = 1.5 hours

*4 participants repeated a blood pressure reading at a different station

the practice lab (20/25 or 80%, $p<0.05$), but statements regarding comfort (23/25 or 92%, $p=0.15$) and knowledge (25/25 or 100%, $p=0.52$) were not statistically different. All pharmacy and dental hygiene students (83.3% response rate, or 60 out of total 72 students responded to the survey post-clinic) reported being satisfied or very satisfied with the experiential program to practice their skills in physical assessment. Open-ended comments were reviewed and six themes were identified by CL: (1) General positive experience; (2) Positive patient interaction; (3) Desire for more experiences like this; (4) Easier than expected; (5) Suggestions for improvement; (6) Surprised by variation between patients. The category of comments students provided according to theme is tabulated in Table V. No significant differences were observed in the level of satisfaction, confidence, comfort, or knowledge between pharmacy students and dental hygiene students (Table VI).

Table V: Student Open-Ended Comments on Practice Site

Comment Category	Example Comment	N
General positive experience	"I thought it was a good exposure! It puts me one step closer in the confidence level!"	28
Positive patient interaction	"People are very friendly/receptive to going through all the steps – paperwork, multiple readings, etc."	27
Desire for more experiences like this	"Having a wider range of patients various ages"	16
Easier than expected	"I was surprised at how quickly it takes to be comfortable with measuring BP"	12
Suggestions for improvement	"Having a quieter room; it was sometimes hard to hear"	11
Surprised by variation between patients	"Even though a target population is set, each person's Korotkoff sounds were different"	9

Table VI: Comparison between Pharmacy and Dental Hygiene Students responding "Agree" or "Strongly

Question	Pharmacy (N=46)N (%)	Dental Hygiene (N=14) N (%)	*P*-value
I am satisfied with the practice environment used to practice skills in physical assessment.	46 (100%)	14 (100%)	N/A
I feel confident in performing a physical assessment of vitals on a patient.	44 (95.6%)	12 (85.7%)	0.19
I feel comfortable with conducting a physical assessment of vitals on a patient.	44 (95.6%)	14 (100%)	0.43
I feel knowledgeable about physical assessment.	45 (97.8%)	13 (92.9%)	0.36

Discussion and Conclusions

The implementation and evaluation of a community outreach blood pressure clinic for pharmacy and dental hygiene students was described. The degree of student satisfaction with the outreach clinic was high, supporting the view that this initiative was a satisfactory learning environment to practice skills in physical assessment. Moreover, students reported feeling more confident, comfortable, and knowledgeable about performing physical assessment skills after the practice site compared to the online module. The students also reported feeling more confident, but not significantly more comfortable or knowledgeable about performing these skills after the experiential site compared to the practical skills laboratory. This was expected as the laboratory and experiential site similarly allowed students to engage in the actual activity of performing a blood pressure measurement. The student's level of comfort and knowledge post-lab were also already significantly increased compared to post-module. Based on the feedback provided by participants and the proportion of individuals identified as not having a family doctor, knowledge of previous blood pressure readings, and receipt of a blood pressure measurement in the last year indicates that this event has the potential to provide an important service to the community.

This is the first study of its kind to describe and evaluate the implementation of a community outreach initiative focused on blood pressure screening services as a practice environment for pharmacy and dental hygiene students. Previous studies have reported other types of outreach initiatives, such as medication reviews for elderly patients, and medication and disease state education outreach (Burkiewicz & Sweeney, 2006; DeRemer, 2008). Nemire & Brazeau highlighted the importance of incorporating service-learning and community-based activities into the pharmacy curriculum to foster attitudes for providing care to patients and their communities (Nemire & Brazeau, 2009). Community-based activities also provide an environment where interpersonal skills are refined through exposure with diverse individuals in community settings. Introducing an outreach blood pressure clinic aligns with the accreditation standards for pharmacy programs that emphasise the role of pharmacists in wellness promotion and disease prevention.

There were a few limitations worth noting. All responses are self-reported and as a result there may have been some degree of social desirability bias. Moreover, the student response rate post-module and post-laboratory were low compared to the post-clinic survey. This is because the former two surveys were made available online whereas the post-clinic survey was provided in-person at each respective clinic. There may have been some missing, inconsistent, or inaccurate documentation of health information, as most of the information provided by the patient was based on recall. While all students must have completed and passed the online modules and practical skills laboratory prior to participating in the blood pressure clinics, there is still a

chance that students may obtain an inaccurate blood pressure reading. In an attempt to improve the accuracy of the blood pressure readings measured, the teaching stethoscopes used at the clinic were tested by the instructors prior to the event and were used in the event to allow for agreement between partners during the blood pressure reading. Although this clinic involved students from both the pharmacy and dental hygiene program, this study did not include an evaluation of interprofessional collaborative learning. In addition, we did not evaluate the value of this event on the learning of physical assessment skills of dental hygiene students separately, since their practice laboratory was conducted separately from the pharmacy programme. No surveys were provided to the dental hygiene students post-module or after their practice laboratory. However, dental hygiene students are provided with many opportunities throughout the year to practice these skills during their clinic rotations. All participants with an abnormal blood pressure reading stated that they were already aware that their reading was abnormal, but students had the opportunity to provide these patients with educational material and a means for connecting to a family physician for follow-up. It is recognised that other non-pharmacy healthcare providers routinely measure vital signs as part of their daily practice, which may limit the number of opportunities to practice physical assessment skills for pharmacy students.

Based on these findings, the study suggests that a community outreach blood pressure clinic provided a satisfactory learning environment for practicing skills in physical assessment and blood pressure technique. Increasing the duration, number of participants per station, and/or number of exposure sites for students would help improve this learning experience for students.

Disclosure Statement

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