

A Health Virtual Community Perspective for Peripheral Arterial Disease

The Need of an E-solution for PAD

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Abstract: This paper summarizes the result of a survey conducted on 239 subject in Toronto to gauge their awareness of Peripheral Arterial Disease (PAD) and educate them about it. The results show that awareness of PAD is scarce and that the campaign resulted in a significant increase in awareness. This intervention suggest that an e-education tool is of paramount importance to address the lack of awareness. The paper argues that a PAD Virtual Community might play a pivotal role in educating the public about PAD and providing a platform for awareness and prevention.

1 INTRODUCTION

PAD is a condition caused by blockages of the arteries that provide blood flow to the extremities. The ankle-brachial index test compares the blood pressure measured at the ankle, to the blood pressure measured at the arm. A lower ankle-brachial index number represents blockages or narrowing of the arteries. Since PAD is a condition involving narrowing and blockages of the arteries, an ankle brachial index test can help recognize its presence (Kim et al., 2012).

PAD is defined as an ankle-brachial index of less than 0.9 (Doraiswamy et al., 2009). The ankle brachial index is the ratio of the blood pressure in the lower legs to the blood pressure in the arms. The ankle-brachial index test is a method of measuring an individual's risk for peripheral artery disease and is non-invasive.

Peripheral Arterial Disease (PAD) is an important public health problem worldwide. It is a widely prevalent condition affecting 800,000 Canadians, of

which twelve to twenty-nine percent are elderly (Lovell et al., 2009). It has been estimated that more than 200 million people were living with PAD (Fowkes et al., 2013).

The incidence of PAD increases with age and exposure to the risk factors of atherosclerosis. However, PAD is given little attention and is referred as a 'silent' cardiovascular disease, with thousands of Canadians being at risk for preventable heart attacks. Approximately one-half of all individuals with PAD are asymptomatic. Studies show that at least one-third of individuals with asymptomatic PAD, and with at least one full blockage in a major artery of the leg. In Canada, the population-based prevalence of PAD has not been directly assessed. However, approximately four percent of the population older than forty years of age in developed nations have PAD (Lovell et al., 2009).

PAD is a strong indicator of diffuse atherosclerotic disease; patients have 4 times higher risk of developing myocardial infarction, and nearly triple the risk of getting cerebrovascular events

compared to the general population (Criqui et al., 1992; Wilterdink and Easton, 1992). In addition, patients with intermittent claudication, the usual initial symptom of PAD, have a 5-year morbidity and mortality of 20-30% from ischemic events of atherosclerosis, i.e. myocardial infarction and stroke (Criqui et al., 1992; McDermott, 2002).

PAD is still not well addressed in practice, even though peripheral arterial disease is simple to detect and has severe consequences and even though treating it, or avoiding it, results in significant health and economic gain (Al-Omran et al., 2006; Al-Omran et al., 2011; Chow et al., 2008; Criqui, 2001).

In order to (1) raise awareness about PAD in the Toronto community, (2) measure the level of awareness of the population about PAD and (3) gauge the readiness of the population for an Information and Communication Technology based solution, we have conducted an intervention that we present its findings in this paper.

2 THE INTERVENTION

Between September and October 2014 our team has conducted an awareness campaign in Toronto in 4 different areas of the city that were chosen based on a convenient sampling approach.

We've developed a questionnaire to gauge the knowledge of a subject on PAD symptoms, risk factors, preventable measures, treatment modalities and complications. A total of 239 subject answered a questionnaire in 3 different areas of Toronto.

The subjects were all asked questions about PAD and were given an explanation about the disease its symptoms, risk factors, preventable measures, treatment modalities and complications. Each subject was given a score based on her answers. A correct answer was given one point and an incorrect answer a zero. We have computed the scores at the baselines and the scores at follow-up after 6 weeks.

We divided the subjects into two groups experimental and control. The experimental group subjects received a pamphlet, the control group subjects did not. We hypothesized that those who received a pamphlet will have more retention spam than those who did not receive one. A follow-up interview by phone and email was conducted at six weeks to measure any change in PAD knowledge. In the follow-up the number of subjects dropped to 76, 38 of which were in the control and 38 in the experimental.

3 RESULTS

Our convenience sample included 156 female (65.3%) and 83 male (34.7%) who were interviewed at three community center and the City Hall.

Most of the subjects (76.1%) were over 41 years old; 32.2% were 41-60 and 43.9% were over 60 years old. Only 2.9% were under 20 and 20.9% were between 21 and 40. It is well known that PAD is related to age, and our sample did represent the older age group.

Most of the subject (78.66%) did not hear about PAD (Figure 1). This confirms a well known fact that Most Canadians do not know that PAD is a major risk factor for heart attack, stroke and death (Lovell et al., 2009)

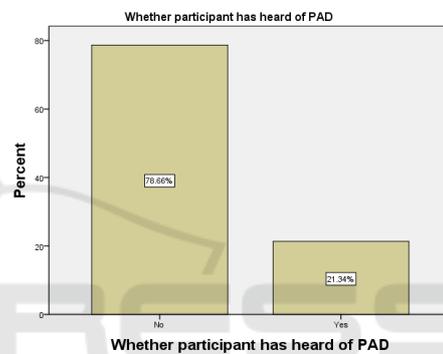


Figure 1: Subject's Awareness of PAD.

Most of the subjects were highly educated 90.8% of the interviewee had a high school or a higher education degree while 4.2 % attended intermediate school and 5% attended only primary education (Figure 2).

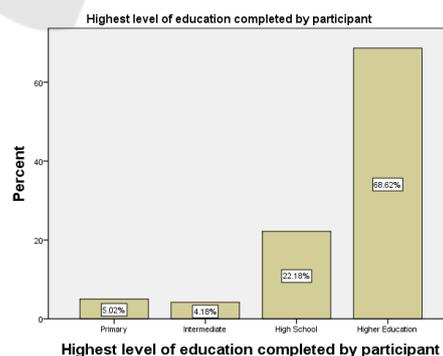


Figure 2: Subject's Education level.

We have used a t-test to test if the difference in scores between the subjects in the follow-up and their scores in the baseline. The difference in knowledge scores was found statistically significant in all 5 aspects of

PAD between baseline and follow-up for all the 76 subjects. We then tested the significance of change in scores for each group (experimental and control) for all the 5 aspect of knowledge. The change was found to be significant for all 5 aspects in the experimental group. In the control group that change was only significant for the knowledge of preventable measures and treatment modalities.

In terms of questions related to the user’s readiness in information and communication technology, the results showed that the younger population prefer to receive health information via mobile Apps while elderly prefer usual cell phone and are wary of Apps. All age groups valued receiving health information via web pages and email.

In terms of ownership, elderly are prone to have desktops and laptops more than smartphones iPads and the like.

High majority of respondents did not appreciate receiving health information through communication channels such Facebook, Twitter or YouTube.

When conducting a logistic regression analysis to see if age, gender, and education level had an effect on using a desktop or laptop to connect to the internet, the analysis showed that both age and the education level had an effect on the usage of desktops and laptops. Gender effect was not significant. Being in the group of people with Age above 40 and people with Education level high school or university is significantly correlated with the use of desktops and laptops to connect to the internet (figure 3 and 4).

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	253.576 ^a	.060	.083

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Figure 3: Logistic Regression Model Summary.

Variables in the Equation

Step 1 ^a	IsElderly(1)	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for Exp(B)	
								Lower	Upper
	Gender(1)	-.225	.316	.506	1	.477	.799	.430	1.484
	HigherEducation(1)	-.294	.400	.541	1	.462	.745	.341	1.631
	Over40(1)	-.858	.400	4.601	1	.032	.424	.194	.929
	HighSchoolOrUniversity(1)	-1.843	.889	4.292	1	.039	.158	.028	.905
	Age			.191	1	.662			
	Age(1)	.391	.896	.191	1	.662	1.479	.256	8.557
	EduLevel			1.361	1	.243			
	EduLevel(1)	1.283	1.100	1.361	1	.243	3.608	.418	31.155
	Constant	.950	.309	9.480	1	.002	2.587		

a. Variable(s) entered on step 1: IsElderly, Gender, HigherEducation, Over40, HighSchoolOrUniversity, Age, EduLevel.

Figure 4: Logistic Regression Variables.

4 DISCUSSION

The survey showed that a simple intervention with a

simple pamphlet had an effect on the knowledge/awareness of PAD. The most important is that even the knowledge of the control group was enhanced by the simple fact of being exposed to the verbal explanation during the awareness campaign. These results suggest that a future e-awareness based intervention might be more effective and might allow understand the different characteristics of the people seeking information and the features that increase the chance of retention.

On the other hand, since age is a factor affecting PAD, and people above 40 are correlated with the use of Desktop and laptops and people above 60 have are still using cell phones (not smart phones), any awareness e-tool should take into consideration these communication channels.

While younger population have a preference towards Apps; these results were expected. Finally, less than 5% of all surveyed had preference to Facebook, Twitter or YouTube, this might indicate some concerns related to security and confidentiality.

4.1 A Vision of PAD Virtual Community

A virtual community is a group of people meeting online to achieve a certain goal, using specific roles and specific software(Preece, 2000). The concept has emerged in 1990 with the emergence of the world wide web. Besides, following the development in the mobile devices, mobile virtual community were developed too (El Morr, 2007a, El Morr, 2007b, El Morr and Kawash, 2007). Soon health related virtual communities have developed with support to the healthcare delivery (Gustafson et al., 2001). The concept of patient centric healthcare delivery emerged and health virtual community could play an important role in this field.

Research has demonstrated effectiveness and efficiency effects linked to VCs for multiple health conditions (chronic kidney disease, pulmonary hypertension, cancer) (Bender et al., 2013; El Morr et al., 2014; Frost et al., 2014; Matura et al., 2013), especially the engagement of patients in the management of their own health (Matura et al., 2013; Vasconcellos-Silva et al., 2013).

A health virtual community for public awareness of PAD may allow the following advantages over paper based awareness campaign:

- 1- It will allow the users to have a tailored and detailed message that suits the personal characteristics of the person. For instance, the information can be communicated using a language that is most convenient for the potential

patient. We have noticed language barrier in a multicultural city like Toronto. An electronic delivery system allows the user to choose the language they want to receive the information. This is in line with the fact that for example some immigrant population has a low awareness of heart disease and stroke (Chow et al., 2008). As a result, it is possible that PAD is not explained in the context of different languages and cultures.

- 2- Besides, the virtual community allows people to communicate with each other, allowing mutual support (Welbourne et al., 2013).
- 3- Virtual Communities proved to be excellent tools for the evaluation of the physical health status of a community member, which includes objective clinical indicators and subjective assessment of coping ability (Seçkin, 2013). This will allow a more targeted awareness content and eventually clinical follow-up.
- 4- A PAD virtual community will have the advantage of collecting huge amount of data about individuals with PAD which constitute a great source for analytics and new findings.
- 5- A PAD virtual community allows the content to be tailored to different delivery channels that suits the profile of the user (e.g. Apps, web pages, cell phone short messages). The impact of a tailored messaging would enhance awareness.

In a PAD virtual community one can allow patients to receive information and to produce information (e.g. blood pressure, glucose level in the blood). Once the healthcare providers receive this information, they can adjust their treatment or advise the patients to adjust in a certain way (e.g. life style, medication).

In a PAD-oriented health virtual community the PAD awareness would be much more effective and efficient, having a direct impact on the population health in terms of prevention or chronic disease management (Winkelman and Choo, 2003; World Health Organization, 2005). The economic impact and social impact would be tremendous.

5 CONCLUSIONS

We conducted a PAD awareness campaign that measures the knowledge of a sample of the population in Toronto about PAD as well as their IT readiness. We followed up the sample after 6 weeks showed that the experimental group (group that received a pamphlet) showed significant enhancement in knowledge of PAD in terms of

symptoms, risk factors, preventable measures, treatment modalities and complications. We have observed that even the control group showed enhanced knowledge in preventable measures and treatment modalities. It is encouraging that awareness – even verbally- brings enhanced knowledge in the preventive measures that can be taken by an individual.

The sample showed clear preference to the use of desktop and laptops for browsing internet and searching for health information. Cell phone was a mode of communication preferred by elderly. A Health Virtual Community could have an impact in the under-served field of PAD and have impact on the health, social and economic aspects of the disease.

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