

A Study Looking at the Teaching of Peripheral Arterial Disease to Medical Personnel in Nepal: How well are we doing and how might we be able to improve?

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ABSTRACT

Background

There is currently no data showing the prevalence of peripheral arterial disease in Nepal, although they have a high incidence of risk factors in their population such as diabetes, hypertension, and high volume of smoke inhalation.

Objective

To quantify a gap in medical education curriculum in Nepal as it pertains to medical trainees that have a lack of exposure to peripheral arterial disease (PAD) in a clinical setting as well as improve lecture quality on peripheral arterial disease.

Method

A survey was sent out to 615 medical trainees in Nepal with a survey completion rate of 44%. The results indicate that both medical students and intern doctors feel most confident in their ability to diagnose peripheral arterial disease and comfortable ordering a workup for peripheral arterial disease when their education includes both a dedicated lecture and care of a patient.

Result

The self-reported ability to diagnose peripheral arterial disease increased in medical students from 21.9% in the lecture only group to 44.4% in the group who had both lecture and cared for a patient. The current curriculum at the Kathmandu University School of Medical Sciences only allows two hours in the medical school to cover all vascular topics and is taught with a traditional PowerPoint method.

Conclusion

To improve this area of curriculum, we recommend increasing the allotted time for lectures as well as demonstrate on live patients the evaluation for peripheral arterial disease.

KEY WORDS

Medical education, Peripheral arterial disease, Peripheral vascular disease

INTRODUCTION

Peripheral arterial disease (PAD) is a condition that involves blockage of arteries in the body, excluding the brain and heart. People with PAD are known to be at increased risk for amputations, heart and cerebrovascular disease.⁴ Patients with PAD have a 2.5x increased risk of morbidity due to coronary heart disease and stroke than those without PAD.³ Identification of patients with PAD and intervention on these patients is thought to decrease the risk of disability and death. In order to decrease the death and disability related to PAD, it must be diagnosed and then intervened upon. Intervention may include treatment of dyslipidemia, hypertension, diabetes and cessation of smoking. With sufficient screening, diagnosis, and management of PAD, we may be able to decrease myocardial infarctions, strokes, and amputations for patients and overall decrease the burden of this disease on society in Nepal. This has the potential to address the need of increasing awareness of vascular disease in Nepal and help grow the field of vascular surgery in this country.¹⁰

It is our concern that the current level of training of medical personnel in Nepal dedicated to PAD may be too low. The medical students at Kathmandu University Medical School currently receive only two hours of dedicated lecture on vascular topics as a theory class, in which topics taught are peripheral vascular disease, varicose veins, deep vein thrombosis, and vascular malformation. The method of lecture is using a PowerPoint presentation. More active learning methods have been largely replacing didactic lectures, providing evidence of improving student understanding of topics and improving patient care.^{5,9} Medical students in India report preferring interactive “chalk and talk” lectures to PowerPoints for more dynamic and conceptual topics, while preferring PowerPoints for learning terminology and anatomy.⁸

The current PowerPoint didactic lecture teaches the basic pathophysiology, diagnosis and workup of PAD. The modalities of workup taught included angiograms, ultrasound and ankle brachial indices. We aimed to quantify how medical students and residents perceive their own understanding of the ability to diagnose PAD, as well as how comfortable they feel in ordering tests to evaluate for PAD. This preliminary study is to determine where the present level of education of PAD exists at our institution.

METHODS

A multiple-choice question survey was created to evaluate medical students’ and residents’ understanding of PAD in Nepal.

An email list was created consisting of contact emails for the medical students at Kathmandu University School of Medical Sciences, paramedics from Nepal Health

Professional Council, primary care providers, surgeons, bachelor of dentistry students, nurses, and physical therapy students.

All together 615 email addresses were obtained, and 227 responses were received. The survey responders self-reported their level of understanding of ability to diagnose PAD, their comfort in the ordering of diagnostic modalities for the work up of PAD, if they had clinical exposure to a PAD patient, and if they had received a dedicated lecture on PAD. They were also asked if their understanding of PAD was due to lectures received or caring for patients with PAD. The lectures offered to the students were two hours long and covered the topics of peripheral vascular disease, varicose veins, deep vein thrombosis, and vascular malformation. The method of the lecture was a didactic lecture using PowerPoint slides. The lecture teaches the basic pathophysiology, diagnosis and workup of PAD. The workup modalities taught include angiograms, Doppler ultrasound, and ankle brachial indices.

The students were told that their participation in the anonymous survey was optional. The Institutional Review Boards at both Kathmandu University School of Medical Sciences and the Medical College of Wisconsin approved this study.

The responses we used for the data analysis and conclusions made in this study included those of medical students and of intern doctors since the focus is on the medical education. This excluded responses from paramedics, bachelor of dentistry students, nurses, and physical therapy students.

The data from the responses was analyzed using SPSS 18.0 software.

RESULTS

The survey completion rate was 44%. The majority of responders were medical students and residents. The other categories of medical personnel respondents were too small to perform any sort of noteworthy analysis and comments. There were 70 medical students and 15 intern doctors who responded.

Table 1 shows how comfortable medical students are with being able to diagnose and work up patients with PAD based on if they received a dedicated lecture, cared for a patient with PAD or both. In the medical student only population, those who had both lecture and cared for a patient with PAD reported the best understanding of both diagnosing and ordering work up modalities for PAD. The self-reported ability to diagnose PAD increased from 21.9% in the lecture only group to 44.4% in the group who had both a lecture and cared for a patient. The familiarity with ordering work up modalities increased from 43.8% in the lecture only group to 100% in those who had lecture and cared for a patient.

Table 1. Number of Medical Students who can Diagnose PAD / Order Modalities for Work-Up based on Different Learning Tiers

Groups	Lecture Only (32)	Lecture and Care (9)	No lecture and no care (29)
Ability to Adequately Diagnose PAD	7/32 (21.9%)	4/9 (44.4%)	2/26 (7.7%) (3 no response)
Comfort with Ordering Modalities for Work-Up	14/32 (43.8%)	9/9 (100%)	4/29 (13.8%)

Table 2 shows how comfortable intern doctors are with diagnosing PAD and ordering diagnostic modalities in the work up for PAD. Once again this was based on if they received only a dedicated lecture, only cared for a patient, or both. The number of respondents in this group is small, but there is the suggestion that with further training beyond medical school, there is improvement in the diagnosing and work up of PAD. All of the intern doctors surveyed (100%) felt they had a comfort level in ordering the diagnostic work up for PAD.

Table 2. Number of Intern Doctors who can Diagnose PAD / Order Modalities for Work-Up based on Different Learning Tiers

Groups	Lecture Only (3)	Lecture and Care (11)	No lecture and no care (1)
Ability to Adequately Diagnose PAD	3/3 (100%)	4/11 (36.4%)	0/1 (0%)
Comfort with Ordering Modalities for Work-Up	3/3 (100%)	11/11 (100%)	0/1 (0%)

Table 3 shows how comfortable all surveyed medical students and intern doctors (Total of 85) are with both the diagnostic modalities in the work up for PAD and feeling adequate to diagnose PAD based on if they received a dedicated lecture, cared for a patient, or both.

Table 3. Combined Medical Students and Interns who can Diagnose PAD / Order Modalities for Work-Up based on Different Learning Tiers

Groups	Lecture Only (35)	Lecture and Care (20)	No lecture and no care (30)
Ability to Adequately Diagnose PAD	10/35 (28.6%)	8/20 (40%)	2/27 (7.4%) (3 no response)
Comfort with Ordering Modalities for Work-Up	17/35 (48.6%)	20/20 (100%)	4/30 (13.3%)

Only 28.6% of the medical students and intern doctors that received a dedicated lecture on PAD, without care of a patient, felt adequate in diagnosing PAD and only 48.6% felt comfortable ordering modalities for the work up of PAD. When the respondents received a lecture and had cared for a patient with PAD the results improved to 40% and 100% respectively.

There were no medical students or intern doctors that reported their experience as only caring for a patient with no lecture.

DISCUSSION

We can learn a number of things from our simple study. First off, doing a survey study during the COVID-19 pandemic has its limitations. What we believe is valuable, is that we have made an effort at trying to evaluate how effective our teaching methods have been when we were able to have face to face contact with the students. Knowing how we have been doing gives us direction in knowing we must improve. It is like a clinical outcomes study on how we are doing and how we can improve. If we were to look at the respondents that had neither received a dedicated lecture on PAD or cared for a patient with PAD as a control group, the dedicated lecture does have some benefit to aiding in understanding of PAD. This can be seen amongst both medical students and interns by their increased familiarity of PAD compared to those that had no lectures and had not cared for a patient with PAD. We obviously feel that we need to improve our teaching method. The dedicated vascular lectures alone are inadequate for students to learn about peripheral arterial disease. This is similar to the findings of Bridgewood et al. that reported among medical and nursing students a “modest to poor” overall knowledge for performing and interpreting physical exam findings related to PAD.^{2,6}

The PowerPoint presentations need to be improved upon. They will need to be examined for clarity and include photos and possible videos. It appears that when the students and interns are given lectures and exposed to patients with PAD their understanding of PAD improves. One way we hope to improve our lectures is to have a patient or model present during the lecture so that we can demonstrate how to do an examination for PAD. This is consistent with the finding that early clinical exposure to PAD may be as valuable as teaching to improve knowledge of PAD in medical trainees.²

Overall, the respondents were more confident in feeling comfortable to order work up modalities (48.6% of those who had lecture) than feeling adequate to diagnose (28.6% of those who had lecture). The lectures discuss angiogram, ultrasound, and ankle brachial index for tests to order for work up, although the survey did not ask them to clarify which they would order. We also surmise that the learning of work up modalities is straightforward and an easy concept to grasp.

It is also of note that the total time allotted for lectures is only two hours to cover multiple all of the topics needed for vascular topics. We believe this is too little exposure for students, either in time or number of lectures. We plan to approach the medical school about allocating more time for the learning of PAD.

We have a few recommendations to improve the medical school curriculum in its teaching of peripheral arterial disease. We suggest that more time is allotted for not just PAD, but all vascular topics in order to give students more exposure, as well as interactively going over a classic PAD

patient presentation to improve active learning and aid in clinical education skills.⁴ Medical students in India reported their preferred teaching method to learn clinical skills to be using mannequins, and also reported preference of videos and problem based learning to traditional didactic lectures.⁶ We also recommend following the method of Test Enhanced Learning which has been shown to enhance learning outcomes among medical students.¹ By giving the students pre and post lecture quizzes, not only can we assess their understanding and get real time teaching feedback based on the lecture, but it improves long term retention for the students as well.^{1,7}

A strength of our study is taking the initiative to identify areas to improve medical education in order to ensure better learning outcomes for medical students, which will help to improve patient outcomes down the line. The prevalence of PAD among the general public in Nepal is currently unknown, but helping medical professionals be able to diagnose this group of patients can help limit adverse cardiovascular events or incidence of stroke in this population of patients.^{1,3}

Limitation of the study is that trainees were asked to rank their own understanding subjectively, instead of having them take a short quiz or standardize a way to measure their knowledge of PAD and diagnosis.

CONCLUSION

The value of doing a study like this is quality improvement as it relates to teaching at Kathmandu University School of Medical Sciences. We are doing an inadequate job of teaching PAD and must therefore alter the teaching method that is presently being used. Considerations going forward are to increase the allotted time for lectures as well as include the presence of patients or models to demonstrate physical examinations. The increased time and demonstrations should also allow more for interactive learning. The ultimate goal is to be able to recognize PAD and initiate treatment so as to decrease the morbidity and mortality associated with PAD. If the curriculum is amended to include these changes in teaching of vascular disease it not only impacts students of Kathmandu University School of Medical Sciences but also can impact 9 affiliated medical colleges in Nepal under Kathmandu University with almost 700 medical students per year.

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