

TRIAL PROTOCOL

VENUM (Vascular Education in Undergraduate Medicine) Protocol

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Plain English Summary

Why we are undertaking the research: We currently do not know how well medical students are taught about vascular disease. This includes diseases that may cause pain on walking due to reduced blood flow to the legs (peripheral arterial disease), strokes due to narrowed artery in the neck (carotid stenosis), or even problems affecting your veins (varicose veins). This means that patients with vascular diseases could potentially be better managed by new doctors if we improve how they are taught.

What we aim to do: This study allows us to work out which areas of vascular medicine teaching require improvement, and then raise awareness of this in the vascular community and within medical schools.

Key words: education, vascular disease, undergraduate

Trial registration: MREC 21-015 - Vascular Education in Undergraduate Medicine (VENUM). Granted 7/12/12

Background

Peripheral arterial disease (PAD) is most commonly an atherosclerotic condition affecting the lower limbs, which usually manifests as muscle pain during exertion.¹ The gold standard of PAD diagnosis, an ankle brachial pressure index (ABPI) of ≤ 0.9 , can be done at the bedside.¹ PAD affects up to 5% of patients aged 60–69 years, increasing to over 20% of those aged over 80 years, and is notoriously medically undertreated compared with other cardiovascular diseases such as myocardial infarction or stroke.^{1,2} A 2018 retrospective observational cohort study of patients from The Health Improvement Network (THIN) using data from 11 million UK primary care patients found that a large proportion of PAD patients did not receive their recommended secondary prevention.³ PAD has often been reported as a 'missed opportunity' for cardiovascular reduction, as PAD patients (n=34,160) had significantly less uptake of statins, antiplatelets and angiotensin-converting enzyme inhibitors compared with their coronary artery disease counterparts (n=9,570) in a large Danish cohort study.⁴ While vascular surgery teaching encompasses not just patients with PAD, it is difficult to determine whether these findings relate to the education of medical students or beyond into postgraduate training. VENUM (Vascular Education in Undergraduate

Medicine) hopes to establish the perceptions of medical students about their vascular undergraduate curricula.

Vascular undergraduate teaching of UK medical students has been poorly evaluated.⁵ A recent international scoping review identified only two UK studies: one in 2019 with only 11 participants and a grey literature abstract in 2015 which claimed that a quarter of Swansea medical students reported having no vascular teaching.⁵ A single-centre study at the University of Toronto found that Canadian medical students had sub-optimal knowledge of PAD compared with coronary artery disease.⁶ Another study evaluating vascular surgery education in Greek medical schools concluded that the lack of vascular surgery teaching in undergraduate medical curricula led to inadequate early diagnosis and treatment of vascular diseases in primary care.⁷ The need for a vascular surgery programme as part of undergraduate teaching was asserted.⁷ Currently, there are no national studies of the provision of vascular surgery education within UK medical undergraduate curricula.

Lack of exposure to the vascular surgery speciality through clinical placements, projects or clinical teaching arguably results in fewer students wishing to pursue a career in vascular surgery compared with specialties which receive greater

exposure in the undergraduate curriculum. Equally, this lack of exposure and training will also significantly impact the overall care of patients with vascular disease across many medical and surgical specialities. Indeed, there is a particular concern that primary care clinicians have very limited exposure and training in vascular surgery and its associated conditions. This is a major problem on a national scale for patient care as the responsibility for the medical care of the patients is primarily placed on primary care by National Institute for Health and Care Excellence (NICE) guidelines. For example, PAD patients presenting with intermittent claudication are expected to be treated in primary care without referral to secondary care vascular surgery.⁸ Primary care clinicians often have the best opportunity to aggressively manage the risk factors that so often lead to vascular pathology. The demand for vascular surgery specialists is increasing and is entirely predictable given the rise in the burden of cardiovascular disease.⁹ The Vascular Society workforce planning survey in 2018 predicted an increase in general and vascular surgery workforce requirements by 67% by 2029.⁹

Previously, vascular conditions such as PAD have not attracted much national attention compared with myocardial infarction, cerebrovascular disease or malignancies. However, vascular pathologies such as PAD have higher morbidity and mortality rates compared with patients who have coronary artery disease alone.¹⁰

It is therefore of paramount importance to increase the body of evidence in this area. VENUM has the potential to highlight areas for improvement in the training and education of the next generation of clinicians and surgeons who will be managing this highly challenging and co-morbid patient cohort.

Aims

- Establish the provision of undergraduate vascular teaching through the experiences of final year medical students and newly graduated doctors.
- Explore the perceived confidence of students in performing vascular examinations.
- Report student perceptions of a career in vascular surgery.
- Report student uptake of vascular research, vascular mentorship and intention to pursue vascular surgery.
- Compare vascular and cardiovascular knowledge base of students.
- Disseminate new knowledge regionally to medical schools and to the national vascular community.

Proposed methodology

During the 2021/2022 academic year, medical students in the final year of UK medical schools will be invited to complete a 10-minute survey. Foundation Year 1 (FY1) trainee doctors across the UK will also be invited to complete the survey based on their graduating medical school. The students' exposure to vascular teaching during their time in medical school will be assessed. Students not in their final year will be excluded to avoid bias introduced due to the difference in timing of vascular teaching between medical schools.

Surveys will be conducted on JISC survey software under a collaborative authorship model, where medical student and doctor leads will be asked to recruit their fellow peers via social media or over email. Research leads must recruit 15 participants to be eligible for collaborative authorship status. The study design has been heavily influenced by that used by the British Urology Researchers in Surgical Training (BURST) committee in the "UroLogical tEaching in bRitish medical schools Nationally" (LEARN) study¹¹ and by the interventional radiologists in the "An evaluation of learning and exposure to the undergraduate Interventional Radiology curriculum" (ELIXIR) study.¹² A key difference is that our study has been ethically approved to use the methods described.

Ethical considerations

Ethical approval has been obtained from: Leeds School of Medicine Research Ethics Committee MREC 21-015 - Vascular Education in Undergraduate Medicine (VENUM). Granted 7/12/2012. University of Leeds. No monetary incentive was required for this study. To ensure students' time is effectively spent, the answers to the multiple-choice questions have been provided where students can view the survey as a free revision resource. Furthermore, it is possible for individuals to complete the survey more than once; however, medical students will be reminded of the General Medical Council probity guidance on entry to the survey.¹³

Recruitment

The survey draft was conceived and revised by the VENUM multidisciplinary team until no further improvements could be made internally. The aim was for the survey to take no more than 10 minutes. The prototype survey will be validated on a small number of fifth year medical students at the University of Leeds. This will be predominantly done through the University's Medicine Society's mailing list (those who have previously consented to be emailed opportunities and surveys) and social media. Participants of the prototype survey will be encouraged to contact the research team if they experience any issues completing the survey or have additional feedback. The preliminary surveys will then be reviewed and any changes necessary will be made to the survey before further dissemination.

Following survey validation and refinement, medical student and foundation year doctor leads will be recruited through social media channels and through the national vascular trainee association, Rouleaux Club. Rouleaux Club has a monthly newsletter which goes out to vascular-interested medical students and doctors who have consented to receive opportunities in vascular surgery. We aim to recruit medical students from all 34 established medical schools. Medical schools with no final year students for the 2021/2022 academic year (University of Sunderland, St Andrews, Universities of Kent and Canterbury Christ Church, University of Lincoln, Edge Hill University, Brunel Medical School, Aston University Medical School and Ulster University) will be excluded. Anglia Ruskin Medical School is the exception to this rule, where students will be

surveyed in their 4th year (no final year students). These may be separated from the main results if the findings significantly differ from the final year students.

The medical student and foundation doctor leads will each have a unique code, which will identify which participants they have recruited into the vascular study. The research leads will be given certificates and PubMed indexed collaborative authorship status if they have successfully recruited more than 15 participants. A second round of dissemination of the survey may be necessary if there is a lack of responses from particular medical schools.

Surveys will be conducted by JISC software under a collaborative authorship model, where the research leads will be encouraged to send the survey link to their peers; but only if they are able to send the survey to their entire year group at once either by email or over social media. This ensures that the link is not simply sent to just vascular orientated medical students, nor that it is sent only to the research lead's peer group. The survey will be open for three months to allow two rounds of recruitment, where participants will be able to withdraw their responses two weeks after the survey closes. Thirty participants from each medical school will be recruited initially before rolling out to foundation deaneries; this would make our initial target of 1,020 participants. In total, 77 medical student leads have expressed interest in becoming a survey lead, of which all 34 medical schools are represented. From this, it is expected that the results will have complete geographical representation in the UK.

Primary outcome measure

1. The proportion of vascular topics covered by medical schools across the UK as recalled by medical students and foundation doctors.

Secondary outcome measures

1. The recalled amount of time spent on vascular surgery clinical placements.
2. The recalled amount of lecture-based teaching, practical teaching, vascular examinations and anatomical teaching.
3. The recalled number of vascular-based OCSE stations.
4. The recalled number of vascular examinations performed on patients and the number of ABPIs observed in practice.
5. The proportion of vascular research activities by medical students.
6. The proportion of vascular mentorship during medical school.
7. Student perceptions of a career in vascular surgery.
8. The confidence of foundation year doctors in managing vascular surgery patients.
9. The perceived confidence of students undertaking ABPIs, vascular histories and examinations.
10. The number of extra self-selected vascular modules undertaken by medical students.
11. The proportion of students who would consider a foundation rotation in vascular surgery or a career in vascular surgery.

Data analysis

Quantitative analysis will consist of a geospatial map of the participating 34 medical schools and a graphical analysis for each of the primary and secondary outcomes. Data will be analysed in IBM SPSS Statistics Statistical software¹⁴ and graphs will be synthesised using Origin 2020b.¹⁵ Qualitative analysis will consist of thematic analysis for participant perceptions of vascular surgery. The responses will be coded into themes that emerge from the data. These will then be represented in an organised table with anonymous quotes from the students.

Limitations

The study has limitations which have been mitigated by critical ethical analysis. The predominant limitation of this study is survey participant bias, with those students who are most interested in vascular-related specialities being more likely to complete the survey. This may mean that non-vascular-focused students feel that the survey is irrelevant. This is a component of many speciality surveys and can only be mitigated by adequate signposting. In VENUM, students are provided the answers to the knowledge-based multiple choice questions which is aimed to help their revision, which should make the survey appealing to all students. 'Peer-group bias' has been reduced by the study design whereby research leads must send the survey link to the entire year group at once.

Recall bias is unavoidable in this student-led study but should be minimised by obtaining a large sample size from each university, hence the multiple research leads from each institution. Moreover, students are able to complete the survey more than once. However, on entering the survey, they will be reminded of their professional duty of candour to the General Medical Council.¹³ This is a disadvantage of the JISC survey software. Using a paid survey software such as 'REDCap' would overcome this, but would also require significant funding.¹⁶ There is a minor risk of research leads fabricating responses to gain authorship, but this risk is expected to be small as research leads are only expected to collect 15 respondents. If this did occur there is a chance it could affect the validity of the data, thus the surveys will be screened for respondents who have answered chaotically, and these will be removed from the study results. Before the study period, the research leads will also be reminded of their duty of candour.¹³

Dissemination

The study results will be presented at the Vascular Societies' Annual Scientific meeting in 2022 and published in a peer-reviewed journal. Research leads may also be able to present the VENUM findings regionally at their own medical schools and relevant peer speciality conferences such as cardiology and general practice.

Potential research benefits

- Student-focused understanding of the current undergraduate vascular curricula.
- Make recommendations for medical schools to implement to enhance learning.

KEY MESSAGES

- Vascular undergraduate education has been poorly researched, with only two UK studies having been previously reported.
- We outline a protocol to establish the baseline of current vascular undergraduate education of medical students in the UK.
- We hope to highlight the issues of vascular education and make recommendations to improve vascular education, student perceptions and increase mentorship opportunities.

- Provide medical students with more vascular surgery role models.
- Better care for patients living with vascular diseases in the long term under all specialities.
- Better understanding of vascular disease across specialities in the long term by improving the curriculum.
- Improve medical students' perceptions of a career in vascular surgery by understanding their current perceptions.

Potential research risks

- Low risk study, as all aspects can be carried out remotely.
- Potential risk of adding to survey burden of medical students and foundation year doctors.
- Increases the pressure on medical schools to pool more resources in vascular disease into an already packed curriculum.

Perspectives of patients living with vascular disease

"As a patient with multi-site vascular issues, I feel that the project is absolutely necessary before real change in the collective mindset of the medical profession can happen. Hopefully, it will also draw attention of this much neglected condition to curricula compilers and course leaders. Education in PAD is important for patients, but if our GPs and emergency care doctors are not aware of our vascular problems, how can we possibly form a relationship where trust in the treatment is key?"

"One of my group ended up with an amputation after critical limb ischaemia was initially misdiagnosed in A&E and the ensuing delay made it impossible to save his foot. This was not patient ignorance, just an overworked and under-educated junior doctor."

"Thirdly, we all felt that the standard norm for PAD patients, male, over 70, overweight and smokers, leads many GPs to overlook a PAD diagnosis in people who fall outside of this norm. Education would save a lot of suffering and delay to a lot of people."

Conflict of Interest: None

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