

# An Online Patient Completed Aberdeen Varicose Vein Questionnaire Can Help to Guide Primary Care Referrals

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## WHAT THIS PAPER ADDS?

The study suggests novel concept and would influence varicose vein referral pathways.

**Objectives:** To determine the feasibility and reliability of an online patient completed Aberdeen Varicose Vein Questionnaire (AVVQ) as a tool to guide specialist referral.

**Methods:** This was a prospective qualitative and quantitative study. One hundred and six patients completed an online questionnaire. Some 43 (40%) completed the AVVQ questionnaire at home and 63 (60%) did it immediately before their appointment.

Venous Clinical Severity Score (VCSS) and CEAP grades were assigned by a consultant vascular surgeon. In 11 patients, the questionnaire was repeated at the time of surgery to assess reproducibility and bias.

**Results:** The AVVQ correlated with the specialist's VCSS scores (Spearman coefficient 0.795;  $p < 0.01$ ) and similarly with CEAP grade ( $P < 0.01$ , ANOVA test). AVVQ was reproducible with close agreement (Spearman coefficient 0.89;  $p < 0.01$ ) between both 1st AVVQ score of 21.61 (sd 10.26; range 6.12–40.14) and 2nd AVVQ score of 21.03 (sd 10.50 range 4.51–42.57). Patients' feedback about the online AVVQ was positive.

**Conclusions:** An online questionnaire is acceptable to patients, correlates with clinical findings and using a threshold value could be used by healthcare Commissioners to guide varicose vein referrals.

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## INTRODUCTION

Varicose veins are a common health problem, affecting 40% in men and 32% of women in the United Kingdom (UK).<sup>1,2</sup> It is estimated that 1–2% of the UK annual budget is spent on venous disease.<sup>3</sup> There is a desire from commissioners of health to make appropriate use of their limited resources.

There is no standardised method to guide specialist referral. In the UK varicose veins treatment are designated as "low clinical priority" with strict criteria for referral and treatment.<sup>4</sup> A scoring system may reduce variation in referral practice which currently results in a 'postcode lottery'.<sup>5–7</sup>

Solutions should be patient-centred with emphasis on Patient-reported outcome measures (PROMS).<sup>8</sup> Online questionnaires are effective and there has been a gradual shift from paper to computerised administration of healthcare. A user friendly patient completed questionnaire to guide varicose vein referrals might be beneficial. This study used an online Aberdeen Varicose Vein Questionnaire (AVVQ) as a tool to determine eligibility for referral to a specialist varicose veins clinic.

## METHODS

### Study population

Patients referred to varicose vein clinics at an NHS Independent Sector treatment Centre between September 2010 and December 2010 were recruited prospectively. The study was approved by the Clinical Governance and Risk Management Committee of the Nottingham Treatment Centre and it was agreed that ethics approval was not required. At the time of the study, the local healthcare commissioners did not apply strict referral criteria so patients with CEAP 2 disease were included.

A total of 117 patients were eligible, of which 11 patients were excluded because of technical difficulties with email submission, cancellation of appointments, or concern over the security of information. There were 62 women (59%) and 44 men (41%) with a median age of 56 years (range 21–84). Forty-three (40%) completed the AVVQ questionnaire at home while the remainder completed it online immediately before their clinic appointment.

### Healthcares scorings

A previously piloted online version was used,<sup>9</sup> based on 12 of the 13 questions used in the original AVVQ developed by Garratt.<sup>10</sup> Question 1 was excluded as drawing the

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distribution of veins was not easy to do online. (Table 1 plus supplement). Patients answered 16 secondary questions about the questionnaire.

One consultant vascular surgeon (BDB) completed the Venous Clinical Severity Score (VCSS) and the clinical CEAP grade in clinic.

**Recruitment and questionnaire process**

Informed consent was obtained, and a link to the questionnaire website and unique code were emailed to patients so they could complete it at home before their appointment. When online access at home was not possible, the questionnaire was done using a computer terminal at the clinic before the appointment. Patients and the specialist were blinded to the questionnaire results.

Eleven patients who were offered surgery, during the study period, completed a second online AVVQ on the day of their procedure to examine whether the decision to allow them to have treatment altered their responses.

Patients’ opinions about the questionnaire were obtained using Short semi-structured interviews. CEAP grade and VCSS were correlated with AVVQ scores. Several threshold scores for the online AVVQ were assigned to determine their effect on which patients would be referred if the system were used to guide referrals.

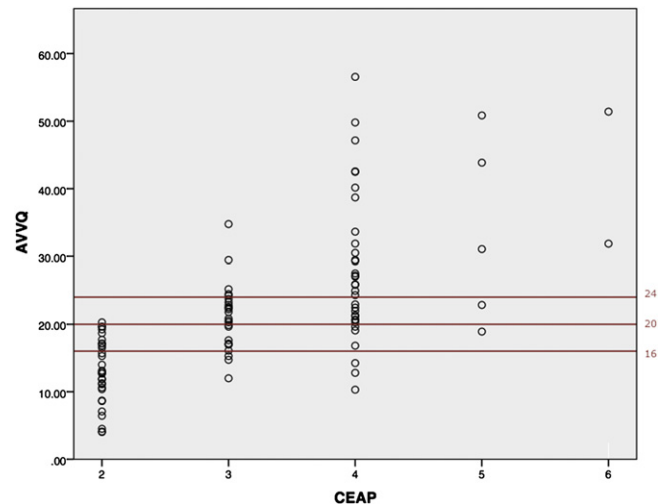
**Data analysis and statistical tests**

Statistical analyses were performed using PASW, version 18 software (SPSS Inc, Chicago, IL, USA). Spearman’s test was used to assess the correlation between AVVQ score and VCSS scores.

AVVQ scores were compared with CEAP using one-way analysis of variance (ANOVA) and the post-hoc Bonferroni test. Wilcoxon Signed Rank Test was used to assess test-retest reliability for 1st AVVQ and 2nd AVVQ scores.

**RESULTS**

The mean AVVQ score was 21.8 (±10.5) and the mean VCSS score was 18.6 (±10.7). The VCSS and CEAP grades were



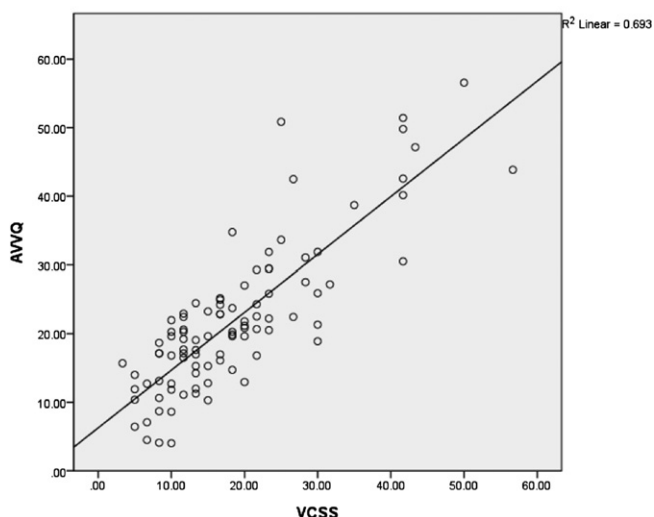
**Figure 2.** A scatter diagram showing patients’ AVVQ scores against CEAP grades along with potential threshold scores for rationing.

only assigned in 95 of patients. The CEAP grades were C2 ( $n = 30$ ), C3 ( $n = 25$ ), C4 ( $n = 33$ ), C5 ( $n = 5$ ) and C6 ( $n = 2$ ).

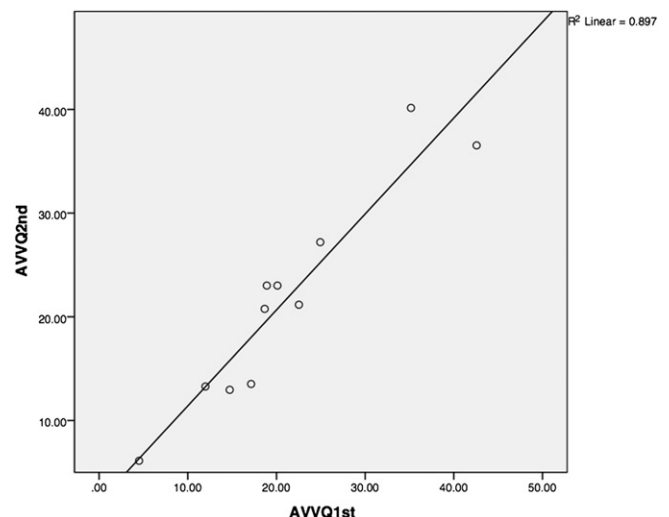
There was a strong correlation between AVVQ scores and VCSS scores (Spearman coefficient 0.795;  $p < 0.01$ ) [Fig. 1]. Similarly, there was strong correlation between AVVQ scores and CEAP grade ( $P < 0.01$ ) [Fig. 2].

There was close agreement between both AVVQ scores for the 11 patients who had surgery during the study with a median AVVQ score on 1st completion 18.91 ((4.51–42.57) IQR = 10.2) and on 2nd completion 21.17 ((6.12–41.14) IQR range = 13.92) [Fig. 3].

Threshold AVVQ scores were assigned for their effect on excluding patients in an attempt to guide specialist referral. A score of 16 excluded 28 (26%) patients including all patients with mild disease that were declined surgery, a score of 20 excluded 50 (47%) patients including most with CEAP grade 2, and a score of 24 excluded 75 (71%) patients [Fig. 2] (Table 1).



**Figure 1.** A scatter diagram showing patients’ AVVQ scores against VCSS scores.



**Figure 3.** A scatter diagram showing patients’ AVVQ scores on 1st and 2nd completion.

All patients interviewed felt comfortable using the online version of the AVVQ. Patients' opinions of the online questionnaire as a tool, use of computers and Internet access are summarised in Table 2.

The Mann Whitney test was used to compare AVVQ scores of patients who completed the questionnaire in clinic and those who completed it at home. There was no statistical difference between the two groups,  $p$  value = 0.95.

**Table 1.** Primary 12 questions of online completed AVVQ questionnaire and recording values.

Q1	In the last two weeks, for how many days did your varicose veins cause you pain or ache?	None at all Between 1 and 5 days Between 6 and 10 days More than 10 days
Q2	During the last two weeks, on how many days did you take painkilling tablets for your varicose veins?	None at all Between 1 and 5 days Between 6 and 10 days More than 10 days
Q3	During the last two weeks, how much ankle swelling have you had?	None at all Slight ankle swelling Moderate ankle swelling (eg. Causing you to sit with your feet up wherever possible) Sever ankle swelling (eg. Causing you difficulty putting on your shoes?)
Q4	In the last two weeks, have you worn tights or support stockings?	No Yes, those I bought myself without a doctors prescription Yes, those my doctor prescribed for me which I wear occasionally Yes, those my doctor prescribed for me which I wear everyday
Q5	In the last two weeks, have you had any itching in association with your varicose veins?	No Yes, but only above the knee Yes, but only below the knee Both above and below the knee
Q6	Do you have any purple discolouration caused by tiny blood vessels in the skin, in association with your varicose veins?	No Yes
Q7	Do you have any rash or eczema in the area of your ankle?	No Yes, but it does not require any treatment from a doctor or district nurse Yes, and it requires treatment from my doctor or district nurse
Q8	Do you have a skin ulcer associated with your varicose veins?	No Yes
Q9	Does the appearance of your varicose veins cause you concern?	No Yes, their appearance causes me slight concern Yes, their appearance causes me a great deal of concern
Q10	Does the appearance of your varicose veins influence your choice of clothing including tights?	No Occasionally Often Always
Q11	During the last two weeks, have your varicose veins interfered with your work/housework or other daily activities?	No I have been able to work but my work has suffered to some extent I have been able to work but my work has suffered to a moderate extent My veins have prevented me from working one day or more
Q12	During the last two weeks, have your varicose veins interfered with your leisure activities (including sport, hobbies and social life)?	No Yes, my enjoyment has suffered to a slight extent Yes, my enjoyment has suffered to a moderate extent My veins have prevented me from taking part in any leisure activities

**Table 2.** Patients' opinion of online questionnaire.

Opinion question	n/all responses (percentage)
Ease of completion	103/106 (97%)
Completion in less than 5 min	95/106 (90%)
Completion in less than 10 min	10/106 (9%)
Preference of online over paper copy	56/106 (53%)
Use of computers and access to internet	n/all responses (percentage) [only 97 participant in this section]
Daily use	35/97 (36%)
Frequent weekly use	25/97 (26%)
Occasional weekly use	11/97(11%)
No internet use but has help at home	7/97 (7%)
No Computer/internet use and need assistance	19/97 (20%)
Felt comfortable to fill in online AVVQ	94/106 (89%)

## DISCUSSION

This study demonstrates that an online AVVQ questionnaire is acceptable to patients and could be used as a guide for referral for specialist varicose vein assessment. Most patients questioned had access to the internet from home (80%) and all found the process easy. Patients' opinions and active involvement in their care pathway are increasingly important in modern healthcare.<sup>8</sup> The reliability and reproducibility of an online tool correlated well with a specialist's clinical assessment, using VCSS and CEAP, both of which are validated and accepted methods.<sup>11–13</sup>

The original AVQQ has been used as a screening and evaluation tool.<sup>14</sup> The modification and conversion of the AVVQ into an electronic version should ease adoption of this tool. Patients' acceptance appears to be because of the ease of use at home and possibly the reduced expense and inconvenience of unnecessary appointments when they were not eligible for NHS funded treatment. The potential for health professionals should be the triage of patients who do not meet the criteria set by the commissioners of healthcare. This has cost benefits for the purchasers and efficiency benefits for the hospital provider. Only those patients who are eligible for treatment would be sent appointments. The findings of this study might be most relevant in publicly funded healthcare systems such as the NHS but also in health insurance funded systems.

Patients might be tempted to over-estimate their symptoms to gain an appointment so there is a risk of bias. This needs to be minimised e.g. one attempt per user or an audit of responses to filter and reduce misreporting. In this study there was no apparent over-estimation of symptoms by patients when compared with clinical scores. In addition, although the sample size of 11 was small, there was close correlation to suggest that patients did not appear to change their scores when tested twice. The risks of bias by patients over-estimating symptoms, to gain treatment, exist

with conventional consultations because of increased awareness of varicose vein treatment restrictions and patient information on various websites.

This study only evaluated patients' perspective and the feasibility of the tool. It was not designed to assess post treatment AVVQ and clinical outcome. There is known to be a poor correlation between pre and post op AVVQ scores with many patients gaining improvements that were not predicted by the pre operative CEAP grade.<sup>12</sup> Patient completed AVVQs better reflect the impact of varicose veins on each patient. Perhaps it is time to move to patient guided care rather the clinician dictated care?

The referral threshold AVVQ score, in the presented study, was for eligibility for specialist assessment not for predicting treatment success. A threshold of 20, excluded most patients with CEAP class 2, a grade usually associated with cosmetically unacceptable varicose veins. No patient with a more severe CEAP grade would have been excluded if this value were used. Since the study, the local commissioners have chosen this value as their threshold for referral. Despite this, a potential shortcoming which might make the presented method of limited value is the inability to derive a suitable cut-off which excludes C1 or 2 patients but includes 3 and above. There is a risk that patients with severe symptoms may under-score using the AVVQ and be inappropriately denied access to care. The addition of some specific questions might help the process. For example, questions about ulceration, bleeding or thrombophlebitis, would ensure that those patients with severe complications from their varicose veins would be referred regardless of the AVVQ score.

It is recognised that the AVVQ does not differentiate between unilateral and bilateral leg varicose veins but considers the overall disability to the patient. It may be of value to add a secondary question about unilateral or bilateral varicose veins, or to ask patients to answer questions relevant to the most severely affected leg.

The study was not used on patients with varicose veins who were not referred for treatment. Another study would be required to compare their AVVQ scores against those patients deemed suitable for treatment. Patients were only recruited from one clinic so a larger sample of patients from different locations might make the results more powerful. Further evaluation of the presented tool might include a control group of patients, and confounders such as education and socioeconomic status could be recorded.

It could be argued that any patient with varicose veins is entitled to a specialist opinion to ensure they are properly assessed. For many commissioners of healthcare this might be unacceptable if the specialist has a conflict of interest when they or their employer are paid for consulting with and treating the patient. This study has demonstrated that patients are both willing and capable of reporting their symptoms and generally support the tool as a fair method for accessing limited healthcare resources.

The online AVVQ tool appears to be a valid and reliable method for assessing patients' varicose veins and is acceptable and easy for patients to use. An AVVQ score can

be used to identify patients suitable for referral for a specialist opinion. This online AVVQ, perhaps with additional trigger questions, has potential to streamline and standardise varicose vein referral pathways and most importantly involves patients in their healthcare decisions.

#### CONFLICT OF INTEREST/FUNDING

None.

#### APPENDIX. SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at <http://dx.doi.org/10.1016/j.ejvs.2012.11.016>.

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