

ARTICLE



Experience gained during vitreoretinal fellowships in the United Kingdom

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BACKGROUND: There are 16 vitreoretinal (VR) fellowships listed on the British and Eire Association of Vitreoretinal Surgeons (BEAVRS) website offering places to 23 applicants, however, this list is not exhaustive. The purpose of this survey was to evaluate surgical volume, training, and experience of VR fellows in the UK.

METHODS: An anonymous survey was disseminated online to current and past VR fellows who are members of BEAVRS. Participants were asked about their surgical experience and confidence, before and during their fellowship, in performing a variety of procedures. Participants were also asked about their academic achievements and their career prospects.

RESULTS: All 26 respondents felt that their fellowship met their surgical needs and would recommend it to others. Upon completion, 92% felt prepared to work as a consultant. Following fellowship completion, the median (IQR) number of procedures performed were: phacoemulsification: 91 (51–131), pars-plana vitrectomy (PPV): 351 (226–451), simple-retinal detachment (RD): 176 (126–226), complex-RD: 31 (16–51), scleral buckle (SB): 16 (8–26), membrane-peels: 76 (41–88), intraocular-foreign body (IOFB) removal: 3 (3–3), indirect laser: 51 (11–91), scleral-fixated intraocular-lens (sIOL): 3 (3–8), removal-of-dropped-nucleus (RODN): 16 (8–26), diabetic membrane delaminations: 16 (8–16); with an increase of confidence in performing all VR procedures ($p < 0.001$). Participants completed 2 (1–2) presentations and 2 (0–3) papers with no difference in academic performance between those with/without postgraduate qualifications ($p = 0.409$).

CONCLUSIONS: Overall, fellowships in the UK are of a high quality and prepare the fellow adequately for progression into a consultant post. They help increase surgical confidence and provide opportunities to complete academic work. Fellowships without VR on-call commitments can be improved by incorporating on-call duties. Finally, COVID-19 impacted exposure to elective cases.

Eye; <https://doi.org/10.1038/s41433-022-02168-2>

INTRODUCTION

In the United Kingdom (UK), a doctor must be on the GMC specialist register to apply for a substantive consultant post in Vitreoretinal (VR) surgery. This requires the applicant to have recently completed a GMC approved Ophthalmology training program and hold a certificate of completion of training (CCT) [1]. Alternatively, an applicant may have gained the equivalent competencies without having been in a GMC approved training job and had obtained a Certificate of Eligibility for Specialist Registration (CESR) from the GMC [2]. The latter is anecdotally more commonly taken by non-UK ophthalmology trainees. To gain further subspecialist training in VR surgery, most will undertake at least one VR Fellowship. The British and Eire Association of Vitreoretinal Surgeons (BEAVRS) lists 16 VR fellowships offering places to 23 applicants, however, this list is not exhaustive [3].

Although VR fellow experiences in the United States (US) have been previously published [4, 5], there is no published data on the experiences of VR fellows in the UK. In the US, the Association of University Professors of Ophthalmology (AUPO)-fellowship compliance committee (AUPO-FCC) set minimum recommended

surgical requirements that approved fellowship programs should comply with and these have been used as a benchmark when evaluating VR fellowships in the US [4, 6]. The AUPO-FCC is endorsed and supported by the American Society of Retina Specialists (ASRS), Macula Society, and Retina Society [6]. In the UK, ophthalmology training is highly structured with a curriculum containing minimum competencies that must be achieved [1]. There is currently no such definitive benchmark available for subspecialist training in VR surgery and no AUPO-FCC equivalent published recommendations for VR fellowships in the UK. A new ophthalmic speciality training curriculum has been proposed and will be implemented in 2024. This curriculum will restructure the training program into a four-level structure of training with an aim to remove the necessity for post-CCT fellowships, however, fellowships will remain as an option for those who do wish to undertake them [7]. In response to the new proposed curriculum the authors are aware that BEAVRS are currently in the process of determining a benchmark of competencies to be achieved by stage four of ophthalmology training or fellowship however these have not yet been published.

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Received: 25 January 2022 Revised: 23 May 2022 Accepted: 28 June 2022

Published online: 11 July 2022

Table 1. Cohort characteristics.

	n (%)
Age (years)	37.4, 37 (35.9–39.6) ^a
30–34	3 (12)
35–39	18 (69)
40–44	5 (19)
Ethnicity	
White	15 (58)
Asian or Asian British	8 (30)
Black or Black British	0 (0)
Mixed	2 (8)
Other	1 (4)
Training route	
CCT from GMC approved Ophthalmology training program	13 (50)
Ophthalmology training in European country	8 (31)
Ophthalmology training in non-European country	5 (19)
UK training program	13 (50)
East Midlands	2 (15)
London North	1 (8)
North Western	3 (23)
Northern	1 (8)
Scotland- North	1 (8)
Scotland- South east	2 (15)
West Midlands	3(23)
TSC comparable to a fellowship	8 (62)
TSC length 6 months	2 (15)
TSC length 12 months	10 (77)
TSC length >12 months	1(8)
Number of prior VR fellowships completed	
0	12 (46)
1	11 (42)
2	2 (8)
3 or more	1 (4)
Academic qualifications	
No postgraduate degrees or qualifications	5 (19)
Diploma	1 (4)
Masters	12 (46)
MD	4 (15)
PhD	4 (15)
Employment status	
In a substantive VR consultant post	19 (73)
In a locum non-VR post	1 (4)
Currently doing a fellowship	6 (23)

CCT certificate of completion of training, TSC Trainee selected component, VR vitreoretinal.

^aMean, median (IQR).

We report results of an electronic survey of VR fellows who have completed fellowships in the UK. The purpose of this survey was to evaluate surgical volume, training, and experience of VR fellows in the UK.

METHODS

An anonymous survey was sent to all BEAVRS members via email inviting those who have completed a VR fellowship within the past five years to share their experiences. The study adhered to the principles of the Declaration of Helsinki. A proportionate approach to consent was adopted, and participants taking time to complete the questionnaire were deemed to have provided implied consent.

Demographic and baseline information was collected including age, ethnicity, training route and baseline academic achievements prior to fellowship commencement. Participants were asked about their surgical experience prior to and during their most recent VR fellowship. Participants were asked to provide their surgical numbers as primary surgeon and perceived confidence in performing a variety of procedures prior to and following their fellowship. The procedures specified were phacoemulsification cataract surgery, all pars plana vitrectomy (PPV), simple retinal detachment (RD) repair, complex RD repair, scleral buckle (SB), membrane-peels, intra-ocular-foreign-body (IOFB) removal, indirect laser, scleral-fixed intraocular-lens (sIOL), removal-of-dropped-nucleus (RODN) and diabetic membrane delaminations). Confidence was rated along a linear scale from 1 (very low confidence) to 5 (very high confidence).

Participants were also asked about their academic achievements and their career prospects; specifically, regarding their prior academic qualifications, number of publications and oral or poster presentations at national or international conferences.

The survey available in English (Supplementary Table 1) was administered through Google forms software online. The survey was open from 16th February 2021 to 31st May 2021.

Statistics

Statistical significance was defined as $p < 0.05$ and high statistical significance was defined as $p < 0.01$. Prior to analysis, normality of continuous variables was assessed using the Shapiro–Wilk test and found not to be normally distributed. Hence, data are primarily reported as medians and interquartile ranges (IQRs) throughout. When data was collected in ranges (e.g., procedure numbers) the midpoint of each range was used to estimate the mean, median and IQR when appropriate. Mann Whitney U and Kruskal Wallis Test were used to compare two and three independent groups respectively. Wilcoxon signed-rank test was used to compare paired data. Spearman's rank correlation coefficient was used to compare ranked correlations. The survey data were downloaded to an Excel spreadsheet. All statistical analysis was performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp, Armonk NY).

RESULTS

There were 26 responses to the survey. A summary of the cohort characteristics can be found in Table 1. The estimated mean (SD) age of participants was 37.4 (2.8) years. The largest age group of participants was the (35–39 age group) with 18 (69%) participants. The largest ethnic representation was from the white participants with a total of 15 (58%) participants. Half of the participants had completed their training in a GMC approved training program, all of which included a trainee selected component (TSC) previously known as an advanced subspecialty training opportunity (ASTO) placement. Ten of the 13 participants had completed a TSC of at least 12 months duration. The majority of our participants, 22 (84.6%) undertook a fellowship of less than 18 months; 14 participants (53%) were in a fellowship position between 12 and 18 months and 8 participants (30%) undertook a fellowship for more than 6 but less than 12 months. Four participants (15%) completed a fellowship of between 18 and 24 months duration. There were no fellows who completed a fellowship longer than 24 months.

Table 2 summarized the procedure numbers and perceived confidence scores from fellows before and after their fellowship. There was a statistically significant increase ($p < 0.05$) in the confidence scores for phacoemulsification cataract surgery and a highly statistically significant increase ($p < 0.01$) for all other procedures.

The most performed procedures by fellows were PPV, simple RD repair and phacoemulsification cataract surgery with a median

Table 2. Comparison of surgical numbers (as primary surgeon) and perceived confidence before and after fellowship completion.

	Procedure numbers (mean, median [IQR])		Confidence (mean, median [IQR])		p value
	Baseline	During fellowship	Before fellowship	After fellowship	
Phacoemulsification	720, 701 (501–901)	101, 91 (51–131)	5, 5 (4–5)	5, 5 (5–5)	<0.05
Pars plana vitrectomy	147, 76 (76–226)	367, 351 (226–451)	3, 3 (3–4)	5, 5 (5–5)	<0.001
Straight-forward RD	55, 26 (13–76)	180, 176 (126–226)	3, 3 (2–4)	5, 5 (5–5)	<0.001
Complex RD	5, 2 (0–3)	38, 31 (16–51)	2, 1 (1–2)	4, 4 (4–5)	<0.001
Scleral buckle	7, 3 (0–8)	16, 16 (8–26)	2, 1 (1–3)	4, 4 (4–5)	<0.001
Membrane peel	28, 16 (6–41)	68, 76 (41–88)	3, 3 (1–4)	5, 5 (5–5)	<0.001
IOFB removal	2, 0 (0–0)	3, 3 (3–3)	2, 1 (1–2)	4, 4 (4–5)	<0.001
Indirect laser	54, 31 (11–91)	60, 51 (11–91)	4, 4 (3–5)	5, 5 (5–5)	<0.001
Scleral fixated IOL	2, 0 (0–3)	6, 3 (3–8)	2, 1 (1–2)	4, 4 (3–4)	<0.001
Removal of dropped nucleus	7, 3 (3–8)	17, 16 (8–26)	3, 3 (2–4)	5, 5 (5–5)	<0.001
Diabetic delamination	3, 0 (0–3)	17, 16 (8–16)	2, 1 (1–2)	4, 4 (3–5)	<0.001

IOFB Intraocular foreign body, IOL Intraocular-lens, IQR Interquartile range, RD Retinal Detachment.

(IQR) of 351 (226–451), 176 (126–226) and 91 (51–131), respectively. The fewest performed procedures were IOFB removal and sflIOL with a median (IQR) of 3 (3–3) and 3 (3–8) respectively.

Academic performance and general fellowship details were summarized in Tables 3 and 4, respectively. All participants felt that their fellowship met their surgical needs and would recommend their fellowship to others. Two participants (8%) felt their fellowship did not prepare them for a consultant role; one citing the effect of the covid-19 pandemic effecting the number of elective case exposure and the other participant citing the absence of VR on-calls. Five participants (19%) had planned to do a further fellowship citing reasons such as to gain more clinical and surgical experience, improving their CV, gaining more academic achievements and to build on surgical confidence.

DISCUSSION

To the best of our knowledge this is the first survey of VR fellow experiences in the UK. In addition, only two surveys exist in the current literature on this topic, both are based on US data [4, 5]. In our UK survey 85% undertook a fellowship of less than 18 months duration which is shorter than fellowship programs in the US; these are normally 24 months and typically incorporate both medical and surgical retina [4, 5, 8]. The AUPO-FCC recommends a minimum of 100 PPVs and 20 SBs performed as either primary or assisting surgeon over the two-year period [8]. One survey on US surgical retina fellowships with 52 respondents observed a large variation in surgical volume but reported that most fellows achieved the minimum number of 100 vitrectomies with only one fellow (1.9%) who performed or assisted less than 100 vitrectomies; the largest group (28.7%) of fellows performed between 301 and 400 PPV as primary surgeon [4]. A large proportion of fellows (22.2%) from this same survey failed to achieve the required minimum numbers of SBs recommended by the AUPO-FCC (performing or assisting in 20 SBs) [4]. Furthermore, 38.9% of fellows reported performing less than 20 SBs as primary surgeon over their two-year surgical fellowship [4]. Another US study with 34 VR fellow responders found that 50% of them performed less than 20 SBs as primary surgeon with 38% performing 21–50 SB and 12% performing 51–100 SBs. When asked about Vitrectomies all fellows performed more than 151 with the majority performing either 201–300, 301–400, or 401–500 PPVs as primary surgeon (26% for each group) [5]. The AUPO-FCC has also published total number of cases reported by fellows in their exit survey with the most recent data from the 2017–2019 cohort [6]. Of the 80 fellows included the median (IQR) of PPV as primary surgeon was 389

(234–480) and for SB this was 42 (18–74). In comparison, we found that VR fellows in the UK performed as primary surgeon a median (IQR) of 351 (226–451) PPVs and a median (IQR) of 16 (8–26) SBs [6]. This was, however, over a shorter period of time with 31% of our respondents having a fellowship of less than 12 months and 54% with a fellowship length of more than 12 but less than 18 months. Furthermore, SB numbers cannot be directly compared between the US and UK fellows due to difference in practice with a higher tendency to perform 360 bands in the US, this requires a different skill set from segmental SBs that are more commonly performed in the UK.

One criticism of just comparing surgical numbers as reported in the US surveys is that the correlation between surgical volume and quality of training cannot be ascertained [9]. Therefore, in our survey we also assessed perceived confidence in performing the various surgical procedures mentioned above. Our data demonstrates that there was a statistically significant increase in the perceived confidence in all surgical procedures. This was also the case for procedures with a high baseline average confidence such as cataract surgery and indirect laser.

The procedures with the lowest confidence prior to commencing a fellowship were complex RD, SB, IOFB removal and diabetic membrane delamination, all of which had a reported median confidence of 1 out of 5. It must be noted that the scores rose to a minimum of 4 out of 5 after completion of the fellowship ($p < 0.01$), despite relatively lower surgical numbers of these procedures being performed.

Of interest, there was no statistical significance in fellows' academic performance when comparing those with additional postgraduate degrees or qualifications (diploma, masters, MD, or PhD) with those who have no additional postgraduate qualifications. Participants presented a median (IQR) of 2 (1–2) oral or poster presentations and 2 (0–3) papers submitted with no difference in academic performance between those with and those without postgraduate qualifications during the fellowship ($p = 0.409$). This is comparable with one survey in the US showing VR fellows gave an average of 3.8 presentations and 3.7 papers over the course of their relatively longer two-year fellowship [4]. In a more recent US survey of surgical retina fellows, they reported a mean(SD) of 3.12(2.15) presentations and 4.82(5.44) manuscripts submitted during the two-year retina fellowship [5].

Our results show that confidence of fellows in performing phacoemulsification cataract surgery was generally high at baseline with a mean, median (IQR) of 5, 5 (4–5), nevertheless, this did rise to 5, 5 (5–5) ($p < 0.05$). The Royal College of Ophthalmologists mandates a minimum requirement of 350 phacoemulsification

Table 3. Academic performance.

	All participants (n = 26) Mean, median (IQR)	No postgraduate degree or qualification (n = 5) Mean, median (IQR)	Postgraduate degree or qualification (n = 21) Mean, median (IQR)	p value
Baseline published papers	13.4, 8 (3–13)	7.5, 8 (5–10)	14.8, 8 (3–15)	P = 0.950
Papers submitted from fellowship	1.8, 2 (0–3)	2, 2(2–2)	1.8, 1 (0–3)	P = 0.409
Presentations from fellowship	2.2, 2 (1–2)	2, 2 (2–2)	2.2, 2 (0–3)	P = 0.659

Table 4. Fellowship details.

	n (%)
Fellowship in tertiary referral center	23 (89)
Time passed since completion of fellowship	
Less than 1 year	7 (27)
1 year	6 (23)
2 years	7 (27)
3 years	3 (12)
4 years	2 (8)
5 years	1 (4)
Duration of fellowship	
6 < 12 months	8 (30)
12 < 18 months	14 (53)
18 < 24months	4 (15)
Fellowship met the participant's surgical needs	26 (100)
Fellowship prepared participant for consultantship	24 (92)
Participant has planned a further fellowship	5 (19)

cataract surgeries for CCT [1, 10]. However, this minimum number does not necessarily equate to surgeon confidence and competence. A survey of ophthalmology trainees concluded that the minimum 350 completed cataract cases appears insufficient for independent cataract surgery [11]. They found that in trainees who had completed more than 350 cases (11 of 22 participants) only two stated they could complete a case involving posterior capsule rupture (PCR) and vitreous loss without senior support and the only final year respondent who had just received their CCT had only managed PCR 3 times. Interestingly, they also found a statically significant positive correlation between the number of elective vitrectomies performed during supervised VR rotations, and confidence in dealing with PCR and vitreous loss. One conclusion of the statistically significant increase in our respondent's confidence in performing cataract surgery may be that VR fellows will be dealing with referrals relating to management of complicated cataract surgeries such as RODN as well as performing many vitrectomies and gaining transferrable skills to cataract surgery.

One of the limitations of this survey is that participants were asked to provide self-reported surgical numbers which may therefore introduce bias of recall and perception. In addition, our survey was distributed to BEAVRS members via an email list with voluntary participation which may have resulted in selection bias. Finally, a direct comparison with previous surveys published on US VR fellowships cannot always be made due to the differences in practice and duration of fellowships.

In conclusion, although there is some variability in the fellowships offered in the UK they are generally of high quality and prepare the fellow for progression into a consultant post.

They help increase surgical confidence and provide opportunity to complete academic work. Fellowships without VR on-calls can be improved by incorporating this. Finally, COVID-19 impacted exposure to elective cases for some fellows. A similar system of fellowship regulation and endorsement such as that provided by AUPO in the US could be adopted by the Royal College of Ophthalmologists in partnership with BEAVRS. This can also include a yearly compulsory exit survey to ensure standards remain high.

Summary

What was known before

- VR Fellowships exist in the UK and fellow experience is normally shared anecdotally between medical professionals.

What this study adds

- VR fellowships are of a high standard giving fellows the experience necessary to improve perceived confidence allowing progression into consultant posts.
- Prior academic background does not statistically impact a fellow's academic potential during the fellowship.

DATA AVAILABILITY

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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AUTHOR CONTRIBUTIONS

All authors contributed to the conception of the study, data analysis, revision of the manuscript and approval of the final version

COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1038/s41433-022-02168-2>.

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