Seeing new opportunities to help smokers quit: A UK national survey of optometrist delivered smoking cessation behavioural support interventions.

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ABSTRACT

Background: Smoking is a risk factor for various eye conditions. Brief smoking cessation interventions have demonstrated effectiveness when delivered by a range of healthcare professionals. Optometrists are well-placed in the community to advise otherwise healthy smokers to quit, yet remain relatively neglected in smoking cessation research and policy. In a national survey, this study investigated self-reported practices of UK optometrists for delivering brief tobacco smoking cessation interventions to patients.

Methods: A randomly selected sample of 1,200 optometrists out of the 9000 optometrists registered on the UK College of Optometrists database were invited to complete a 40-item, web-based survey assessing: training related to smoking cessation; current practice [i.e. the proportion of patients to which components of very brief advice (Ask, Advise, Assist) and other evidence-based smoking cessation behaviour change techniques were delivered]; and barriers/enablers to intervention delivery.

Results: In total, 408 (34%) responses were received. Most (83%) optometrists received no training in practical skills for delivering smoking cessation support. A third (34%) routinely assessed smoking status. Fewer self-reported advising smokers to quit (22%), offering assistance (via referral to dedicated services) (3%), or advice on smoking cessation medications (2%). Perceived barriers included insufficient knowledge/training (81%) and time (65%). Optometrists were more likely to assess and advise on smoking cessation if they practised in Scotland ($\chi^2(2)=32.95$, $p<0.001$), an independent optometry practice ($\chi^2(1)=4.27$, $p=0.39$), or had received smoking cessation training $\chi^2(1)=13.1$, $p<0.001$).

Conclusions: Substantial gaps exist in UK optometrists' current smoking cessation training and practice. Evidence-based training resources are needed to support the implementation of smoking cessation interventions into routine optometry practice.

IMPLICATIONS

Optometrists are well placed in the community to delivery brief advice interventions to a large population of smokers. This survey provides a comprehensive description of current UK optometry practice related to the provision of evidence-based brief tobacco smoking cessation interventions to patients. Although optometrists perceive advising on smoking cessation as part of their role, numerous substantial gaps in current practice and training remain which need to be addressed through targeted interventions to increase implementation.

INTRODUCTION

Behavioural support interventions for smoking cessation have been shown to be highly effective and cost-effective (1). Such interventions aim to maximize smokers' motivation to quit, promote effective use of pharmacological interventions, and facilitate relapse prevention and coping (2-4). Behavioural interventions can be delivered at different intensities- from very brief advice (VBA) (i.e. the 3A's: Ask about smoking status, Advise on smoking cessation, Assist the smoker to quit), delivered once off, over a few minutes, with the primary aim of promoting quit attempts (5); to more intensive cessation focused, multi-session support delivered by specialist advisors in dedicated stop smoking services (1).

The UK National Institute of Health and Care Excellence (NICE) Smoking Cessation Quality Standards (2013) (6) and equivalent guidelines internationally (7) recommend that all healthcare professionals routinely assess smoking status in patients. Various healthcare professionals have become involved in delivering VBA interventions, including: General Practitioners (i.e. GPs/ family physicians), cardiologists, nurses, pharmacists, psychologists, midwives, and dentists (8, 9). Smokers receiving VBA from such healthcare professionals are more likely to make a quit attempt, and succeed, compared to those offered no advice or support (5). However, to date, optometrists have remained a relatively neglected healthcare professional group in smoking cessation policy, research and service provision; representing an untapped resource with the potential to contribute to smoking cessation (10, 11).

This overlooked opportunity is surprising, given smoking is one of the leading modifiable factors associated with age-related macular degeneration- the most common cause of blindness in the UK (12), and other ocular conditions such as cataracts (13) and thyroid eye disease (14). However, public awareness in the UK of links between smoking and ocular

health risks is low (15). Furthermore, it has been argued that optometrists are especially well placed to deliver smoking cessation support to a wide range of smokers, who are otherwise healthy and may not come into regular contact with healthcare professionals (16). The role of optometrists in healthcare delivery has recently expanded to include broader health promotion. Optometrists often advise on dietary lifestyle changes to patients at risk of, or newly diagnosed with, age-related macular degeneration (17). It has therefore been suggested that optometrists should also advise on smoking cessation; to the extent that in the UK, the College of Optometrists has responded to the NICE Smoking Cessation Quality Standards requesting the role of optometrists in delivering smoking cessation support be recognized (18).

However, there is limited knowledge regarding the extent to which optometrists currently deliver smoking cessation support to patients. The few studies conducted to date in the UK and internationally (i.e. Canada, USA, Australia) report that, although most optometrists are aware of the link between smoking and ocular conditions, and believe assessing smoking status in patients is part of their role (11, 19-21), there is wide variation in the proportion of optometrists (6% to 50%) that actually ask patients about smoking habits during a consultation (11, 17, 21, 22). An even smaller proportion of optometrists assess patients' motivation to quit (6%), or offer advice regarding possible strategies for quitting (2% to 13%)(23). Reported barriers to delivering smoking cessation interventions include lack of financial incentives, training, knowledge, and time (11, 23).

However, these studies are arguably not representative of current practice in the UK. Existing UK-based surveys have primarily been conducted over 10 years ago (21, 22). More recent surveys have either been conducted in different countries and/or healthcare systems (11, 20, 23), or do not comprehensively assess the delivery of all components of evidence-based

smoking cessation VBA (i.e. enquire about 'Ask' component but not 'Advise' or 'Assist') (17). There is thus a need to comprehensively assess and establish UK optometrists' current practice.

The aim of the current study was to conduct a national survey to determine current practice amongst UK optometrists regarding the delivery of brief evidence-based interventions (i.e. VBA) for tobacco smoking cessation. Secondary aims were to: i) investigate variation in service provision according to optometrists' characteristics (e.g. years of experience, training), and ii) examine optometrists' perceived barriers and enablers to delivering smoking cessation interventions to patients.

METHODS

This study received ethical approval from the City University London School of Health Sciences ethics committee (Ref: Opt/Proportionate Review/24).

Design

National web-based survey.

Participants and Sampling

Potentially eligible participants included currently practising optometrists registered on the membership database of the UK College of Optometrists. This database currently has 9,000 registered members. A pragmatic approach to maximizing response rate was taken by recruiting a randomly selected sub-sample of all registered members. This was deemed likely to increase response rate as a smaller sample facilitates identification of bounce back emails, regional selection, and personalization of invitation emails (24). Following the methods of Dabasia et al. (2014), the required sample size was calculated using Cochran's formula for continuous and categorical data (24, 25). Using this formula, based on a 5% error margin and

alpha set at 0.05, for a population of approximately 9,000 potential participants, a sample size of 370 responses was deemed necessary. Previous literature on optometrists' responses to surveys estimates a 30% response rate (24). Therefore, to account for this, 1,200 optometrists currently registered on the College of Optometrists database membership were randomly sampled and invited to participate in the survey.

Materials: questionnaire

A 40-item questionnaire was developed, informed by: i) the content of previous surveys of smoking cessation practice in optometrists (11, 17, 20, 22); and ii) a survey of UK specialist stop smoking practitioners' self-reported practices, attitudes and levels of training (26), which captures delivery of current, evidence-based guidelines for smoking cessation behavioural support interventions (3).

The questionnaire was structured into four sections. *Section 1*: Respondent demographics [e.g. years qualified, country, main place of work- i.e. independent practice vs multiple practice (small groups/ optometry chains), educational qualifications, and current/past smoking status]. *Section 2*: Respondent's training in smoking cessation [e.g. whether taught to assess smoking status (Yes/No/Cannot remember); extent to which respondent felt they have sufficient knowledge/training to deliver smoking cessation support (5 point Likert-scale from 1-'Strongly Disagree' to 5-'Strongly agree')]. *Section 3:* Current practice and service provision related to smoking cessation. Respondents were asked to estimate to what proportion of patients (1- None to 5- All) they deliver components of VBA (i.e. Ask, Advise, Assist), alongside other evidence-based smoking cessation behavior change techniques (27). *Section 4*: Listed potential barriers and enablers to delivering smoking cessation interventions (e.g. lack of knowledge/ skills, concern over intruding on patients' lifestyle choice), which

respondents were asked to tick all that apply. Respondents were asked to rate the extent to which they considered supporting patients to quit part of their role on a five-point Likert-scale from 1-'Not at all' to 5- 'Main part of my role,' and what level of appropriate funding/financial incentives would motivate them to offer smoking cessation services within their practice.

Two optometrists with expertise in smoking cessation reviewed an initial draft of the questionnaire for content validity. The final questionnaire is available as Supplementary File 1.

Procedure

The survey was conducted in June 2015. The questionnaire was uploaded and hosted online using the tool 'SurveyMonkey' (a provider of web-based surveys; www.surveymonkey.com). A personalized, explanatory letter of invitation to take part in the survey was sent via email from the College of Optometrists to the sub-sample of randomly selected 1,200 optometrists. Weekly reminders were sent to non-responders up to four weeks following the initial invitation email. Consent to take part in the survey was implied by completion of the questionnaire.

Analysis

After closure of the survey, all data were imported into SPSS 21.0, anonymised and cleaned to remove any duplicate responses. Data were summarized using descriptive statistics [i.e. percentages (*n*), or mean/ standard deviation] as appropriate.

In post-hoc analyses, the association between the delivery of VBA intervention components- Ask, Advise, Assist, and key optometrists' demographic characteristics (i.e. years qualified,

training, country, place of work, and smoking status) was examined using Chi-squared analyses. Some response options were collapsed to avoid small group sizes. Items in Section 3 of the survey regarding the proportion of patients to which optometrists report delivering evidence-based components of VBA interventions to were collapsed into two categories for analysis: 'infrequent delivery' (i.e. 'None of them,' 'Few of them,' and 'Some of them' responses) and 'frequent delivery' (i.e. 'Most of them' and 'All of them' responses). Similarly, 'years qualified' was collapsed into three categories: 'Less than 5 years,' '6 to 25 years,' and '25 years plus.' Optometrists were categorized as either 'having received formal training' or 'not having received formal training' in smoking cessation. Location of current practice was collapsed according to country (i.e. England, Scotland, Wales, Northern Ireland).

RESULTS

Response rate

In total, 408 responses were received (34% response rate). To maximize available data for each survey item, we included all available responses to each item, including from incomplete surveys. Rate of missing data varied between 0.4% and 30.4% for each questionnaire item (mean 7.1%). No attempt was made to impute missing values. The number of responses per item included in the analysis is presented in Tables 1-3.

Section 1: Respondent demographic characteristics

Respondent demographic characteristics are presented in Table 1. The greatest proportion of respondents were female (61.2%, n=249), qualified for five to 15 years (26.3%, n=107), held a highest educational qualification of a BSc or equivalent (46.4%, n=187), were currently working full-time (60.9%, n=248), in England (47%, n= 191), as a multiple practice

employee (28.5%, n=115). Very few respondents reported being current smokers (2.4%, n=10).

[TABLE 1 HERE]

Section 2: Training related to smoking cessation

Only one quarter of optometrists reported having been taught how to assess smoking status during a routine eye examination (25.3%, n=98). Even fewer reported having received formal training in how to support smokers to quit in practice (16.7%, n=56) (Table 2). Only a small proportion of respondents had been formally assessed in their smoking cessation knowledge and/or practical skills (4.2%, n=16) (Table 2).

The majority of respondents reported having sufficient knowledge on the relationship between smoking and eye disease (73.8%, n=307) (Table 2), which is reflected in the fact that 'the relationship between smoking and eye disease' was selected as the most frequently covered topic in the curricula of smoking cessation training respondents reported receiving (Supplementary File 2). In contrast, the least frequently covered topics in the curricula of smoking cessation training included: 'practical delivery of smoking cessation interventions in clinical settings (e.g. observations in practice)' (2.1%, n=5), and 'smoking cessation medications' (3.2%, n=9) (Supplementary File 2). In turn, most (48.9%, n=190) respondents felt inadequately trained to advise patients of smoking cessation in practice (Table 2).

[TABLE 2 HERE]

Section 3: Current practice and service provision related to smoking cessation

Most optometrists reported their practice did not have any patient educational materials, leaflets or flyers related to smoking cessation (66.8%, n=249). Similarly, most optometrists (83.3%, n=309) reported their practice did not have any guidance documents outlining recommendations for delivering stop smoking support to patients (e.g. manuals/protocols).

The proportion of patients with whom optometrists reported delivering each evidence-based component of very brief advice (3 A's) interventions is presented in Table 3 and summarized below.

A*sk about smoking status:* Approximately one third of optometrists reported asking about tobacco use/smoking status in 'most/all' new patients (35.2%, n=132). However, fewer reported doing so for 'most/all' return or follow-up patients (28.3%, n=106). For patients who smoke, just 10.4% (n=39) reported assessing patients' motivation to quit tobacco use (Table 3).

A*dvise about smoking cessation:* Although only 14.6% (n=56) of optometrists reported advising 'most/all' patients who smoke about the general harmful effects of tobacco use, 45% (n=167) reported providing optometry specific advice to 'most/all' smoking patients about links between smoking and age-related macular degeneration (Table 3). Most optometrists reported advising 'none/very few' patients who smoke to quit completely (54%, n=202), and/or to cut down or gradually reduce tobacco use (52%, n=194). A minority reported providing advice to 'most/all' patients who smoke on stop smoking medications (2.4%, n=9) (Table 3). This typically involved: 'general advice not specific to a particular medication' and/or 'recommending patients discuss medication options with another healthcare

professional' (i.e. GP) (52.4%, n=22). Advice on specific medications was most often for single or combined nicotine replacement therapy products (38%, n=16).

[TABLE 3 HERE]

A*ssist smoker to quit:* Only 3.2% (n=12) of optometrists reported providing in house assistance to 'most/all' patients who smoke to quit. Even fewer (0.8%, n=3) reported following up on whether or not the patient successfully quit (Table 3). If a patient expressed an interest in quitting, most optometrists reported that they would respond by advising the patient to see another healthcare professional (e.g. GP/ pharmacist) (65.1%, n=245) (Supplementary Figure 1). Although 12.3% (n=48) of respondents reported that they would refer a patient to a stop smoking service, a comparable proportion (13.6%, n=51) reported being unaware of smoking cessation services locally and thus were unsure how to refer patients (Supplementary Figure 1).

Differences in current practice according to optometrist demographic characteristics

No significant differences were observed in current practice according to the number of years optometrists had been qualified, or their current/past smoking behaviour (Table 4). However, optometrists were significantly more likely to assess smoking status in new patients if they were currently practising in Scotland ($\chi^2(2)=32.95$, $p < 0.001$) compared to England or Wales. A significantly higher proportion of optometrists who worked in an independent practice reported advising patients who smoke to quit completely than those based in a multiple site practice ($\chi^2(1)=4.27$, $p= 0.39$). Optometrists who had received formal training in smoking cessation were also significantly more likely to advise patients who smoke on the harms of smoking ($\chi^2(1)=9.45$, $p= 0.002$), to quit completely ($\chi^2(1)=13.1$, $p < 0.001$), and/or cut down ($\chi^2(1)=4.27$, $p= 0.39$), than those who had not received formal training (Table 4).

[TABLE 4 HERE]

Section 4: Barriers and enablers to delivering smoking cessation interventions

Although many respondents considered advising on smoking cessation to be a 'very small part of their role' (47.1%, n=173), most believed optometrists are ideally placed to discuss smoking cessation with patients within their practice (51.8%, n=188). The most frequently reported barriers were concerns over 'intruding on patient lifestyle choice' (71.4%, n=260), followed by 'lack of time' (64.6%, n=235), and 'lack of knowledge on the subject' (n=53%, n=194) (Supplementary Figure 2). The most frequently endorsed enablers were: 'Further knowledge' (74.2%, n=213) and 'practical skills training' (46.9%, n=134), as well as 'establishing a professional norm that optometrists are expected to provide smoking cessation advice' (48.1%, n=138), (Supplementary Figure 3). Although a third of respondents felt no financial incentives were required to encourage assessment and recording of smoking status (34.1%, n=104), approximately 20% (n=58) felt that £20 would be an appropriate financial incentive for provision of advice on smoking cessation and also for referring patients to local smoking cessation service (19.3%, n=60). However, a higher financial incentive of £50 was deemed appropriate by the majority of respondents (17.6%, n=51) for supporting patients to quit within their optometry practice.

DISCUSSION

This survey investigated the self-reported practices of UK optometrists related to smoking cessation. The findings provide an up-to-date, nationwide description of the extent to which UK optometrists currently deliver evidence-based smoking cessation interventions to patients who smoke. Approximately a third of optometrists reported currently assessing patients' tobacco use. However, assessing and recording smoking status alone is insufficient. There is evidence that it is specifically advice to quit, and offering assistance to do so, that leads to more quit attempts (5). It is thus particularly concerning that the present survey identified that few UK optometrists go on to advise patients who smoke on the benefits of quitting and available options for support to do so, and that even fewer subsequently offer to assist the smoker to quit, either in house or via a referral to dedicated services.

The present findings are to an extent unsurprising. Although smoking cessation intervention options, service provision and policy in the UK have evolved significantly over the last decade (e.g. establishment/promotion of NHS Stop Smoking Services, indoor smoking ban, licensing of new pharmacological interventions, electronic cigarettes), the proportion of optometrists offering advice and support to quit has remained unchanged relative to findings from UK surveys conducted in 2006 (23) (i.e. 23% vs 22.7% , respectively advising patients who smoke to stop; 2% vs 3% offering assistance to quit via a referral to a local stop smoking service). Furthermore, the present findings are consistent with those of studies conducted more recently in other countries, such as Canada (11, 23, 28) and Australia (20); indicating that the gap in optometrists' current practice related to smoking cessation is a global and enduring issue.

The present survey also identified barriers and enablers to optometrists delivering smoking cessation support in practice. The most frequently endorsed barriers were lack of time and fear of intruding on a patient's lifestyle choice. These barriers have previously been reported by optometrists internationally (11, 20), and by other healthcare professional groups (e.g. GPs) (5, 29, 30). However, there is no evidence to support the notion that asking about smoking or uninvited advice on cessation are detrimental to provider-patient relationships (3, 31), including in the context of optometry and smoking cessation (32).

Limited time is an enduring issue in healthcare service provision. VBA interventions are not designed to be time consuming, and are deliverable over a few short minutes (3). These are arguably minutes well spent, given the vast potential public health and socio-economic benefits of generating more quit attempts. It has been suggested that development of clinical tools to support optometrists to capture relevant information related to smoking status may help address time constraints and embed smoking cessation support within routine clinical practice (20). Yet, the present findings demonstrate most optometry practices do not have any procedural guidance resources, such as treatment manuals, to inform smoking cessation service provision. There is evidence that stop smoking practitioners working for services that have treatment manuals, who perceive manuals to be useful, and utilize manuals routinely in practice have higher successful quit rates than those that do not (33).

Furthermore, adequate training in how to optimally deliver smoking cessation interventions more efficiently in clinical practice could in part help optometrists overcome time constraints and to deliver advice in a sensitive manner. Training could

also help raise awareness amongst optometrists of potential issues and challenges related to advising on cessation and how to overcome these. For instance, although asking about tobacco use is a vital first step, optometrists should be aware of potential issues around smoking deception (i.e. under-reporting or failing to report tobacco use); which has been identified as a more prevalent issue in smokers with age-related macular degeneration than in the general population (34). However, the majority of respondents in the present survey have not received any such smoking cessation related training. Respondents endorsed further knowledge and skills training as a key enabler to increasing provision of smoking cessation support. Optometrists' desire for further training related to smoking cessation has been echoed in other studies internationally (11), and was also identified in the 2006 UK survey (22). Yet a decade later, this training gap remains. A recent national survey of the curricula of all optometry undergraduate and pre-registration training programmes in the UK identified that optometry schools typically dedicate limited time (i.e. < 1 hour) to teaching on smoking cessation (35). This time is spent primarily teaching the negative health consequences of smoking, rather than practical skills for delivering smoking cessation interventions in practice (35). Similar gaps have been identified in surveys of optometry training curricula in other countries (e.g. Canada) (36).

Thus, if optometrists are to deliver evidence-based smoking cessation interventions, they must first be knowledgeable and adequately trained to do so. Indeed, the present survey identified that optometrists who received formal training in smoking cessation were significantly more likely to advise patients who smoke on cessation. A number of smoking cessation training resources have been developed (37-40), which could be used to address existing training gaps for optometrists. For instance, in the UK, a

national knowledge and skills accreditation programme has been developed to provide training in the delivery of evidence-based, specialist smoking cessation behavioural support interventions [National Centre for Smoking Cessation and Training, www.ncsct.co.uk]. This training programme has been shown to significantly increase knowledge and skills of specialist stop smoking advisors (26). The NCSCT has also developed a VBA training module, which takes no longer than 30 minutes to complete. It aims to equip trainees with the necessary skills to deliver evidence-based brief advice over a few minutes. Internationally, countries such as New Zealand have plans to implement national training to educate optometrists on advising patients about nicotine replacement therapy (10).

Findings from the present survey also highlight as an enabler 'establishing a professional norm and expectation that optometrists should provide smoking cessation advice.' Whilst most optometrists in the present survey, and other surveys internationally (23), acknowledge smoking cessation is part of their role, this notion should be reinforced through relevant professional bodies and policy initiatives. For example, optometrists in the present study were more likely to report assessing smoking status in new patients if they were currently practising in Scotland, where it is a healthcare service provision contractual requirement that optometrists record smoking status. In the UK, the College of Optometrists Scheme for Registration Trainee Handbook specifies the core competences that trainee optometrists are expected to acquire and demonstrate as part of their pre-registration training and assessment. However, a content analysis of the most recent edition of the competence framework identified no competence indicators related to smoking cessation service provision (35). There is scope to incorporate smoking cessation under existing

competence indicators in the framework, such as ‘assessing patient history related to general health and lifestyle,’ and ‘making appropriate referrals’ (35). Doing so would help reinforce smoking cessation as part of the optometrist role.

A limitation of the present study is the relatively low response rate (34%). However, this is comparable with other survey studies in this professional group (17), and is higher than other national surveys conducted of optometrists’ smoking cessation practice (i.e. Australia: 6% response rate) (20). Furthermore, the responses are prone to a number of biases. First, self-selection bias, whereby the optometrists with a specialist interest in smoking cessation are those more likely to have completed the survey. Second, self-report and social desirability biases, whereby optometrists are likely to have overestimated and reported the extent to which they deliver smoking cessation advice in clinical practice (41). However, this indicates that the present findings represent a ‘best case scenario’ of the extent to which optometrists currently deliver smoking cessation support to patients who smoke. The actual gap in current practice is thus likely to be even greater, as is in turn the consequent need for further training and initiatives to bridge this gap.

It is important to also acknowledge the limitations in the scope of the present survey. Smoking cessation is a complex issue, and in supporting smokers to quit it is important to consider the different types of tobacco consumption (i.e. chewed, water pipe), specific population groups that might face unique barriers to cessation (e.g. adolescence (42), pregnancy, mental health), and the importance of highlighting the broader consequences of smoking (e.g. of second hand smoke). However, in order to keep the survey succinct, minimize respondent burden, and potential drop out, we did not ask about smoking cessation advice at the more granular level, and instead limited

the scope of the survey items to enquiring about VBA more broadly (e.g. 'assessing smoking status,' 'providing advice on health consequences,' 'providing advice on cessation,' 'assisting to quit).

Conclusions

Substantial gaps exist in UK optometrists' current smoking cessation training and practice. Smoking remains a significant public health priority. Optometrists have potentially high public health reach in the community. If this potential is to be realised, evidence-based training and guidance resources are needed to support the introduction of smoking cessation interventions into routine optometry practice.

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Table 1. *Section 1:* Participant demographic characteristics

	Percentage (n)
Years qualified	
• < 5 years	16.9% (n=69)
• 5-15 years	26.3% (n= 107)
• 16-25 years	23.3% (n=95)
• 26-35 years	23.3% (n=95)
• 36-45 years	8.3%(n=34)
• 45 + years	1.7% (n=7)
Country	
• England	47.0% (n=191)
• Wales	19.4% (n= 79)
• Scotland	33.6% (n=137)
• Northern Ireland	0% (n=0)
Female	61.2% (n=249)
Optometry practice characteristics	
• Full-time	60.9% (n=248)
• Part-time	39.1% (n=159)
• Independent practice sole practitioner	15.1% (n=61)
• Independent practice partner	11.2% (n=45)
• Independent practice employee	14.9% (n=60)
• Independent practice locum	13.9% (n=56)
• Multiple practice director	4.9% (n=20)
• Multiple practice employee	28.5% (n=115)
• Multiple practice locum	3.2% (n=13)
• Other	8.2% (n=33)
Highest Educational Qualifications	
• BSc (or equivalent)	46.4% (n=187)
• MOptom	38.9% (n=157)
• MSc	2.5% (n=10)
• PhD	5.5% (n=22)
• Other	6.7% (n=27)
Smoking status and history	
• Current smoker	2.4% (n=10)
• Ever smoker	33.3% (n=135)
• Regular ex-smoker (i.e. 1+ daily cigarettes, 1+ cigar per week, or 30g + chewing tobacco per month, for longer than 1 year	14.5% (n=58)

Table 2. *Section 2:* Extent of respondents' training related to smoking cessation

	Percentage (n)
Received formal training in supporting smoking cessation in practice *(e.g. undergraduate/ post-graduate/ LOC/ College of Optometrists/ CET events, lectures, and/or seminars)*	16.7% (n=56)
Taught to assess smoking status during routine examination	25.3% (n=98)
Knowledge and/or practical skills for delivering smoking cessation support has been formally assessed (*e.g. written exams, OSCE, role play, observations in practice)*	4.2% (n=16)
'I feel adequately trained to advise patients on smoking cessation'	
• Strongly disagree	16% (n=62)
• Disagree	32.9% (n=128)
• Neither agree or disagree	27.8% (n=108)
• Agree	20.1% (n=78)
• Strongly agree	3.1% (n=12)
'I have sufficient knowledge about the relationship between smoking and eye disease'	
• Strongly disagree	3.9% (n=15)
• Disagree	6.5% (n=25)
• Neither agree or disagree	17.9% (n=69)
• Agree	58.3% (n=255)
• Strongly agree	13.5% (n=52)
Useful sources of clinical knowledge regarding smoking cessation	
• Undergraduate education	41.3% (n=159)
• Post-graduate scheme for registration	18.2% (n=70)
• Workplace training/ experience	37.9% (n=146)
• CET/CPO lectures	89.4% (n=344)
• Professional newsletters/briefings	52.7% (n=203)
• Published research	48.8% (n=188)

Table 3. *Section 3:* Delivery of evidence-based smoking cessation interventions to service users

With what proportion of service users do you routinely perform the following activities?	**'None of them' (Percentage/ N)**	**'Very few of them' (Percentage/ N)**	**'Some of them' (Percentage/ N)**	**'Most of them' (Percentage/ N)**	**'All of them' (Percentage/ N)**
Asked about tobacco use for new patients	10.3% (n=41)	28.5% (n=107)	25.3% (n=95)	16.8% (n=63)	18.4% (n=69)
Asked about tobacco use for follow-up or return patients	14.2% (n=53)	32.1% (n=120)	25.4% (n=95)	13.6% (n=51)	14.7% (n=55)
Assessed the patient's motivation to quit tobacco use	42.1% (n=157)	28.4% (n=106)	19.0% (n=71)	7.5% (n=28)	2.9% (n=11)
Advised smokers about the harmful of effects of tobacco use generally (e.g. lung cancer)	39.4% (n=147)	22.3% (n=83)	23.3% (n=97)	9.6% (n=37)	5% (n=19)
Advised smokers about the link between smoking and age-related macular degeneration specifically	3.5% (n=13)	11.6% (n=43)	39.9% (n=148)	24.5% (n=91)	20.5% (n=76)
Advised patients who smoke to quit tobacco use completely	28.1% (n=105)	25.9% (n=97)	23.3% (n=87)	13.9% (n=52)	8.8% (n=33)
Advised patients who smoke to cut down or gradually reduce their tobacco use	28.1% (n=105)	23.9% (n=89)	26.0% (n=97)	13.9% (n=52)	8.1% (n=30)
Advise the patient on stop smoking medications	82.4% (n=308)	9.9% (n=37)	5.4% (n=20)	1.3% (n=5)	1.1% (n=4)
Advised patients about the use of e-cigarettes	88.7% (n=330)	5.4% (n=20)	5.1% (n=19)	0.3% (n=1)	0.5% (n=2)
Assisted the smoker to quit (i.e. either within the optometry practice or via referral to additional services)	75.7% (n=283)	11.5% (n=43)	9.6% (n=36)	1.9% (n=7)	1.3% (n=5)
Followed up or assessed whether patient successfully quit	90.1% (n=337)	5.4% (n=20)	3.7% (n=14)	0.5% (n=2)	0.3% (n=1)

Table 4. Comparison of optometrists' reported delivery of Very Brief Advise intervention components according to demographic characteristics

Demographic Variable	% of optometrists reporting ASKING most/all new patients about smoking status	% of optometrists reporting ASKING most/all return/follow-up patients about smoking status*	% of optometrists reporting ADVISING most/ all patients who smoke on harms of smoking	% of optometrists reporting ADVISING most/all patients who smoke to quit completely	% of optometrists reporting ADVISING most/all patients who smoke to cut down	% of optometrists reporting ADVISING most/all patients who smoke on stop smoking medications	% of optometrists reporting ASSISTING most/all patients who smoke to quit (i.e. in house/ via referrals to other services*
Years Qualified							
• Less than 5 years	27.8% (17)	0% (0)	12.3% (7)	21% (12)	19.2% (11)	1.8% (1)	0% (0)
• 6-25 years	39.0% (73)	0% (0)	14.6% (26)	25.5% (46)	23% (41)	3.9% (7)	0% (0)
• 25+ years	32.8% (41)	0% (0)	16.7% (18)	19.6% (21)	21.2% (23)	0% (0)	0% (0)
• Comparison	$\chi^2(2)=2.962$, $p=.23$	-	$\chi^2(2)=.587$, $p=.75$	$\chi^2(2)=1.475$, $p=.48$	$\chi^2(2)=.383$, $p=.82$	$\chi^2(2)=4.603$, $p=.10$	-
Country							
• England	26.3% (46)	0% (0)	13.6% (24)	22.2% (39)	19.5% (34)	1.7% (3)	0% (0)
• Wales	21.9% (16)	0% (0)	21.2% (15)	22.3% (16)	18.1% (13)	4.2% (3)	0% (0)
• Scotland	54.8% (69)	0% (0)	13.6% (17)	23.8% (30)	27.8% (35)	2.4% (3)	0% (0)
• Comparison	**$\chi^2(2)=32,95$, $p < 0.001$**	-	$\chi^2(2)=2.531$, $p=.28$	$\chi^2(2)=.113$, $p=.94$	$\chi^2(2)=3.71$, $p=.16$	$\chi^2(2)=1.32$, $p=.52$	-
Type of practice							
• Independent	38.9% (72)	0% (0)	15.4% (32)	25% (52)	20.7% (43)	2.7% (5)	0% (0)
• Multiple	29.9% (38)	0% (0)	12.3% (17)	15.8% (22)	19.7% (27)	1.4% (2)	0% (0)
• Comparison	$\chi^2(1)=2.67$ $p=.10$	-	$\chi^2(1)=.67$, $p=.41$	**$\chi^2(1)=4.27$, $p=.039$**	$\chi^2(1)=.48$, $p=.83$	$\chi^2(1)=.40$, $p=.53$	-
Formal training in smoking cessation							
• Received	45% (28)	0% (0)	27.9% (17)	40.3% (25)	32.3% (20)	6.5% (4)	0% (0)

• Not received	33% (104)	0% (0)	12.5% (39)	19.2% (60)	19.9% (62)	1.6% (5)	0% (0)
• Comparison	$\chi^2(1)=3.23$, $p = .072$	-	**$\chi^2(1)=9.45$, $p = .002$**	**$\chi^2(1)=13.1$, $p < 0.001$**	**$\chi^2(1)=4.27$, $p = .039$**	n/a**	-
Smoking status							
• Ever smoker	30.9% (39)	0% (0)	14.3% (18)	20.5% (26)	20% (25)	2.3% (3)	0% (0)
• Never smoker	37.1% (92)	0% (0)	15.4% (38)	23.9% (59)	23.1% (57)	2.4% (6)	0% (0)
• Comparison	$\chi^2(1)=1.39$, $p = .24$	-	$\chi^2(1)=587$, $p = .77$	$\chi^2(1)=587$, $p = .44$	$\chi^2(1)=467$, $p = .50$	$\chi^2(1)=.001$, $p = .98$	-

*Not possible to analyse variation in delivery of these VBA intervention components as frequency of optometrists reporting delivering this component to most/all patients was zero.

**n/a= Expected minimum frequencies are not all greater than 5- chi-square analyses assumptions therefore not met.