

A survey of the attitude towards research and research education among South African Ophthalmology trainees

by

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Declaration

A survey of the attitude towards research and research education among South African Ophthalmology trainees.

I, Linett du Toit (student number DTTLIN003), hereby declare that the work on which this dissertation is based is my original work (and where the work of others has been used, whether quoted verbatim, paraphrased or referred to, it has been attributed and acknowledged) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree to this or any other university.

The work has not been published prior to registration for the MMed degree in ophthalmology.

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Chapter 1: Introduction and literature review

1. Introduction

After much debate in the past regarding the place for and role of research during training, research has become an important part of specialist training world-wide.¹ Previously performing research during ophthalmology specialist training was optional, but since 2009 the Health Professions Council of South Africa (HPCSA) requires trainees to complete a research dissertation or Masters of Medicine (MMed) degree in order to qualify as an ophthalmologist in South Africa (SA).

The curriculum of ophthalmology training requirements are standardized on a national level and broad outcome guidelines are provided by the Colleges of Medicine of South Africa (CMSA). Changes implemented to incorporate the research dissertation component are however not specified by CMSA and left up to the discretion of each training unit. It appears that the training institutions in SA have variable capacity to support the new research dissertation requirement.²

There are currently eight universities in SA providing ophthalmology specialist training. Walter Sisulu University, located in Mthatha, has two satellite training facilities in Port Elizabeth and East London. Hence there are in total ten training institutions where specialists are trained that are listed in the table below.

Training institution and Location
Sefako Makgatho University – Pretoria
Stellenbosch University – Cape Town
University of Cape Town – Cape Town
University of the Free State – Bloemfontein
University of KwaZulu Natal - Durban
University of Pretoria – Pretoria
University of Witwatersrand - Johannesburg
Walter Sisulu University – East London
Walter Sisulu University - Mthatha
Walter Sisulu University – Port Elizabeth

Although a previous survey was conducted regarding the South African trainees' perception of their ophthalmology training program in general,³ no previous papers have been published that specifically assessed the trainees' views on research.

In SA, the amount of published ophthalmology research is lacking compared to the rest of the world.⁴ The reason for this discrepancy should be identified. Barriers to performing research have been determined and possible solutions to overcome them have been suggested in other studies performed in SA.^{2,3,5} However, firstly it is important to specifically determine the attitude of ophthalmology trainees towards research. Are the next generation of ophthalmologists not interested in performing research, or do they feel that their training does not adequately prepare them to do so? The aim of this study is to establish the answers to these questions as possible contributing factors for the comparative deficiency of published research from SA.

The writer of this review was privileged to have worked at two of the above-mentioned training institutions in SA and experience the variation in the different ophthalmology training programs. Due to having a desire to do research but personally struggling to do so, the idea of a supportive national web-based research platform was born. Such a network would aim to provide standardised basic research education and support to all ophthalmology trainees in SA who are interested to perform research.

Prior to embarking on a journey to create a network, additional objectives of the study are to determine if there exists a perceived need for a web-based research network and if this will inspire future ophthalmology research even after compulsory research during training has been completed.

Literature search strategy

A PubMed, Cochrane and Google search was performed using the MeSH search terms “research”, “training/education”, “surgery”, “survey”, “trainees”, “South Africa”, “web-based/on line research support network” and “ophthalmology”. The literature most relevant to our discussion was selected for further appraisal.

2. Research as part of surgical specialist training

Whether performing research should be a compulsory component of specialist training has been much debated.^{6,7,8,9} Although opinions differ, research has been incorporated into and forms an important part of many specialist training programs world-wide.^{1,8,9}

In the UK, a survey among research fellows, who mostly undertook research fellowships prior to their specialist surgical registrar posts, found that they did so for the sole purpose of career advancement.¹⁰ The quality and relevance of this research was brought into question and it was recommended that research be performed during specialist training.^{10,11} The reason for this appeared to be to reduce the amount of “basic science” projects undertaken and to increase the amount of “patient orientated research that matters.”¹⁰

Ongoing research is essential to enable the practicing of good evidence-based medicine. Surgeons performing research have made valuable contributions to surgical science and knowledge.⁶ A survey performed among general surgery graduates evaluating their research experience during surgical training, indicated that residents who strongly desired a period of research during surgical residency were more productive in the laboratory and those who spent more time doing research were more likely to subsequently hold academic positions.¹

3. Research as part of ophthalmology specialist training world-wide

Studies evaluating the trainees’ perspective of ophthalmology training programs in general have been performed in many countries like Saudi Arabia,¹² India,¹³ United States,¹⁴ United Kingdom¹⁵ and SA.³ Research on this topic would be valuable as it is important to take the

trainees' perceptions into consideration so as to help guide future changes to programs with the aim of improving post-graduate training.¹⁶

Research focusing on certain aspects of training like the surgical component have been performed in India¹⁶ and Africa.¹⁷ Variation at national level between ophthalmology training programs in terms of surgical, academics and research components have been reported in India.^{16,18} The study from Africa included the same training institutions set out in the introduction above and these institutions will also be included in the proposed study at the end of this review. The study from Africa was not powered to demonstrate variations among the institutions but the author proposed to include comparison between the institutions in future research on the topic.¹⁷ Hence a statistical comment on whether variation in ophthalmology surgical training between these institutions exists at national level cannot be made.

Internationally, perceived variations among training programs do exist.¹⁹ This stimulated a comparative study to take place between ophthalmology programs in Hong Kong and China.²⁰ Although international variation exists, it is important to attempt to standardise ophthalmology training at national level.^{16,18}

Surveys focusing on ophthalmologists and/or ophthalmology trainees' views on research specifically, have been tabulated below:

Study	Country	Study population	Main focus of the study
Jaysundera, et al. ²¹ 2003	New Zealand	Ophthalmologists, fellows and Ophthalmology trainees	Purpose: Determine the attitudes to research and research training
Gogate, et al. ¹⁸ 2018	India	Young Ophthalmologists	Purpose: Determine perception of usefulness of dissertation and academics in order to improve research output during present residency programs
Mahmoud, et al. ²² 2012	Nigeria	Nigerian ophthalmologists	Purpose: To study the views of ophthalmologists on their attitude to and the resources for ophthalmic research in Nigeria and draw appropriate policy implications

In the survey by Jaysundera, et al. they included ophthalmologists, fellows, as well as trainees and they had a good response rate of 71,3%. They concluded that New Zealand ophthalmologists approve of and support a place for research during ophthalmology training with 97,5% suggesting that some form of research should be part of the training. Interestingly, most supported less complex research to be undertaken like case reports (44,4%) or a short-structured course (42,0%). Eighty six percent felt that research methodology should be taught in a more structured way and supported shorter courses of 2-4 weeks (44,3%) or seminars of 1-2 weeks' duration (38,6%).

In the survey by Gogate, et al. they found that peer-reviewed publications from Indian residency training dissertations were few. Even though there was a huge range among the

responses, they still felt that doing a research dissertation added value to their training. Variation between different institutions was reported with some programs having excellent support while there were others where support for academics and research was rudimentary.

In the survey from another African country, Nigeria, the authors found that ophthalmologists wanted to perform research to advance knowledge, but lack of access to funds and little time, due to high clinical workload, were identified as barriers to performing research. Periodic retraining on conducting research and the funding application process, as well as protected research time were advocated to overcome these barriers.

4. Research as part of specialist training in South Africa

Current specialist training in SA

Doing an MMed to qualify as a specialist in SA is not unique to ophthalmology training, but is also required by the HPCSA in other specialist fields.² The quality of specialist training in SA is monitored by the HPCSA.

Studies evaluating specialist training in general (including research)

Surveys performed among otolaryngology and ophthalmology trainees in South Africa evaluating the trainees' perspective of the quality of their training in general found many shortcomings that needed to be addressed.^{2,3}

The content of these studies pertaining to the research aspect of training were evaluated to identify matters that may not be as prominent in other parts of the world and may be unique to SA. Both these studies involved trainees from the same training institutions that will be evaluated in our proposed study. Variation among the training institutions in terms of available resources are alluded to in these studies.

Study	Study population	Problems identified specifically pertaining to research
Peer. ² 2012	Otolaryngology registrars/trainees	At some but not all institutions: <ul style="list-style-type: none"> • Lack of protected research time • No library • No free internet access • No on line journals and research tools
Majola. ³ 2019	Ophthalmology registrars/trainees	<ul style="list-style-type: none"> • Struggle to find research topic • Inconsistent supervisor availability • Supervisors lacking experience and interest in research • Slow ethical approval • Poor record keeping making data collection difficult • Lack of statisticians • Lack of access to journals • Poor collaboration in multicenter studies • Lack of step by step guidance

In the survey performed by Peer and Fagan, seven out of the eight universities are represented in the responses and only one Ear Nose and Throat (ENT) registrar/trainee from each institution participated. One of the specific objectives of the study was to determine if the training institutions could support the HPCSA dissertation requirement. Concerns were reported for five out of eight institutions that responded produced less than two publications over the previous five years and some institutions were deficient in terms of research tools. Clear variation between institutions in terms of research resources were reported.

Specific solutions to address research-related problems were not made as this was not the objective of the study. They did, however, suggest the involvement of regulatory bodies such as HPCSA, in ensuring adequate resources are available and that they do regular inspections to confirm that the institutions fulfil the necessary requirements to adequately train ENT specialists. This would also apply where regulatory bodies needed to play a greater role in regulating and enforcing specifications related to the research component of training. They further suggested feedback from trainees in the form of a scoring system, emphasizing the importance of the trainees' perception of training. It would therefore be beneficial to determine ophthalmology trainees' attitudes towards research in order to guide future possible changes to the training program.

The survey performed by Majola evaluated the South African registrar/trainee program in general with a 48% response rate from all the universities in SA. Supernumerary registrars who often hail from countries outside of SA were also included in the survey and the author did not mention what proportion of the respondents they constituted or at which universities they trained. Majola reported that 74% indicated that they received "enough research support from their universities and their department heads," yet many problems were identified in this study pertaining to research and are summarized in the table above. The questionnaire that was used in the survey, was not made available so it remains uncertain what the specific questions were and how the reported problems were identified and statistically validated. General recommendations were made, for example, barriers need to be identified and removed and better interaction for collaborative research, but no suggestion as to how or who should take responsibility for this, was made. Furthermore, suggestions like, "access to internet and journals" were made, as well as for "statisticians and editors" to be made available. The author also voiced the opinion that training should be extended to five years to incorporate time to do research.

From the above study it appears that trainees are satisfied with their training yet in contradiction many problems were identified. It is thus necessary to specifically focus on the research training component to determine the trainees attitude towards research and their research training.

Study evaluating the research dissertation component of specialist training specifically
A paper on the perception of surgical registrars in SA on the compulsory research project reported that despite the many challenges, the respondents viewed research as an important part of their careers.⁵

Study	Study population	Problems identified specifically pertaining to research	Proposed solutions
Patel, et al. ⁵ 2016	General Surgery registrars	<ul style="list-style-type: none"> • Insufficient time • Inadequate training in the research process • Inadequate supervision • Inadequate financial resources • Lack of research continuity 	<ul style="list-style-type: none"> • Dedicated research block • Research methodology course • Supervision by a faculty member with an MMed or higher postgraduate degree • Greater research exposure as an undergraduate

In this survey, all medical schools in SA were sampled and 51.5% of general surgical registrars or trainees completed the questionnaire. There is no indication of how many respondents are from which university or training center so the university representation is unknown. The answers to the questions of their questionnaire are clearly tabulated with the problems identified indicated in hierarchical order of the most to lesser importance. Practical solutions were proposed by the authors and are summarized in the table above. Inadequate training in the research process was the second most prominent problem with the suggested solution from trainees being research methodology courses.

5. Web-based research platforms

If we assumed that ophthalmology trainees from the same training institutions would have similar barriers to performing research, as mentioned in the SA studies above, some of the proposed solutions, for example, creating courses in research methodology could be addressed by creating a web-based support system. This would be accessible to all ophthalmology trainees and ophthalmologists nationwide. The author was privileged to have worked at two different training institutions in SA and experienced the variation in training programs. It would be difficult to standardise other components of training, for example the surgical component, but a web-based platform could act as a means of standardising certain aspects of research education.

There are a variety of existing medical research platforms that fulfil different roles. Examples of these are summarized in the table below.

Research platform	Uniform Resource Locator
National Institute for Health Research	https://www.nihr.ac.uk/explore-nihr/support/clinical-research-network.htm
Worldwide Universities Network	https://wun.ac.uk/research-development.html
Oxford University	https://researchsupport.admin.ox.ac.uk
University of Cape Town	http://www.researchsupport.uct.ac.za

University of Pretoria	https://www.up.ac.za/graduate-support-hub/article/2227681/postgraduate-research-support-flyhigherup
University of Johannesburg	https://www.uj.ac.za/library/research-support/Pages/research-output.aspx
ResearchGate	https://www.researchgate.net/

The National Institute for Health Research supports patients, the public and health care organizations across England in participating in research. The Worldwide Universities Network creates opportunities for international collaborative research. Universities like Oxford, as well as some in SA, like the University of Cape Town, Pretoria, and Johannesburg, have research-orientated websites for their own staff and students that offer support in various ways. ResearchGate is a European commercial social-networking site for scientists to share papers, communicate and collaborate.

Some research platforms are trainee-led and specific to a certain specialist group, like ophthalmology.²³ In theory, this may have an added advantage for trainees and may tailor the support to suit their specific needs and structure the available resources accordingly.

Would creating a web-based national supportive research platform potentially overcome some common problems that have already been identified by other South African researchers? Our idea would be to create a platform for South African ophthalmology trainees and ophthalmologists by South African-trained ophthalmologists. This would be a basic research teaching platform addressing research methodology and step-by-step guidance on how to complete the research dissertation. Publications by South African ophthalmologists would be showcased to serve as inspiration for younger researchers. Suggestions for future research by experienced researchers could help to guide new researchers to choose topics that would meaningfully add to the body of knowledge from SA. In addition, similar to the platform ResearchGate, interaction between researchers could take place and provide scope for more experienced researchers to act as supervisors for those more junior. Such a website could also create a platform for national and later international collaborative research, as suggested by Spence, et al. and potentially lead to increased research output from SA.²⁴

It is, however, not known whether there is a perceived need for such a platform and whether future researchers feel that this would stimulate them to perform research even after their training was completed.

6. Conclusion

Research has become an integral part of specialist training programs world-wide, including SA. The attitude towards research amongst ophthalmology trainees and the support provided to them could influence and contribute to the paucity of published ophthalmology

literature from SA. The source of the problem should be identified in order for it to be rectified and supportive platforms, with the aim of improving research training and increasing research output, should be created.

The study that follows is aimed at clarifying if trainees are interested in performing research and if they feel that their current research education is adequate. Additionally, it aims to determine if there is a need for a web-based research support network and whether this network would potentially stimulate future research.

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Chapter 2: Publication ready manuscript

1. Title page

A survey of the attitude towards research and research education among South African Ophthalmology trainees.

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Declaration

I hereby declare that this research is done independently and was self-initiated. This research or parts thereof has not been submitted for another degree at any other university. This work has not been published before. This research complies with the principles of the Helsinki Declaration. The research was approved by the UCT Human Ethics Committee (HREC Ref: 408/2019) and the Surgery departmental research committee (2018/112).

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The views submitted in this research are that of the author and do not represent that of the institution and/or departments which is represented.

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This is an unfunded project

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HREC

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Conflict of interest declaration

Nothing to declare. This was an unfunded project.

2. Abstract

Background

Completing a research dissertation or Master of Medicine (MMed) degree during ophthalmology specialist training has now become compulsory in order to qualify as an ophthalmologist in South Africa. At a national level there is currently no co-ordinated effort to standardize research training and resources for trainees.

Objectives

The primary objective was to determine if South African ophthalmology trainees were interested in doing research. Secondary objectives were to determine: whether they felt that their current research training was adequate; whether a national web-based research support system would be desirable; and whether such a support platform would stimulate involvement in further research once training was completed.

Methods

A questionnaire was designed and anonymously completed by the trainees in each training unit in South Africa. Categorical responses were summarized using crude and weighted means with 95% confidence intervals (CI). Free text responses were analyzed thematically using an inductive approach.

Results

Out of 81 trainees (registrars) in South Africa at the time of the survey, 64 fully completed the questionnaire - a response rate of 79%. Seventy-two percent (95% CI 57% to 87%) of the trainees reported that they were interested in doing research. Only 28% (95% CI 18% to 41%) of respondents felt that their current research training was adequate. Ninety five percent (95% CI 86% to 99%) of trainees advocate a web-based support platform would be beneficial an eighty six percent (95% CI 74% to 93%) reported such would motivate them to continue to do research once their training was complete. The themes from the qualitative data were in keeping with the quantitative results and identified variation between training institutions in terms of available research resources, supervision and allocated time to perform research.

Conclusion

The trainee ophthalmologists in South Africa are interested in performing research. They feel that their current research training programs are inadequate. There is a strong need for nationally standardised research guidance to eliminate the current variation between training institutions. Guidance on dedicated time allocation to complete the research component of training should be provided by regulatory bodies. A proposed web-based support system may be a good option to standardize selected available research resources and provide equal access to all trainees nationally as well as to supplement research output during and after specialist training. Further research should address the reported lack of supervision and elucidate additional barriers to performing research in South Africa.

3. Introduction

Research has become an important part of specialist training world-wide.¹ Previously, completing a research dissertation (Master of Medicine) was optional during ophthalmology registrar training in South Africa, but since 2009 it has become a compulsory component. The requirements of ophthalmology training are determined by the Health Professions Council of South Africa (HPCSA) and the nationally standardized guidelines of training for clinical and surgical required skills are provided by the Colleges of Medicine of South Africa (CMSA). Specialist training at the various institutions are measured against this national standard curriculum and they have varying capacity to support the universal requirement to complete a master's degree by research dissertation. Details pertaining to research training like course material and time allocation during working hours are not specified by the CMSA and left up to the discretion of each individual training unit.

In a survey performed on the quality of training of otolaryngology specialists in South Africa it was found that some training institutions did not provide an adequate training platform and that the HPCSA failed to regulate the quality of training in South Africa.² In this publication, from 2012, the authors raised the concern that training institutions might not have had the research and publishing track record to support the new requirement of completing a research dissertation to qualify as a specialist in South Africa. Four years later (2016), another publication highlighted the challenges that surgical registrars in South Africa faced in completing the compulsory research component, but despite these obstacles, trainees viewed this project as an important part of their careers.³

The question has been asked whether there is a place for research in surgical specialist training and it has been debated whether it should be compulsory.^{4,5} Internationally, the answer seems to be that research has increasingly become an integral part of surgical specialist training.^{4,6}

In the UK, a survey among research fellows, who mostly undertook research fellowships prior to their specialist surgical registrar posts, revealed that they did so for the sole purpose of career advancement.⁶ It was recommended in the UK that research rather be undertaken during the period of specialist training itself.⁶ The reasoning behind allocating this time to perform research appeared to be to decrease the amount of basic science projects and to better the amount of meaningful and patient orientated research that would be valuable to patient care.⁶

Surgeons performing research contribute to scientific knowledge and quality research enables the practicing of evidence based medicine.⁴ A survey performed among general surgery graduates in Los Angeles, which evaluated their research experience during surgical training, indicated that residents who strongly desired a period of research during surgical residency were more productive in the laboratory and those who spent more time doing research were more likely to subsequently hold academic positions.¹

With ongoing alterations to the structure of training programs across the globe, research to evaluate ophthalmology training programs as a whole have been performed in countries like Saudi Arabia⁷, India⁸, United States,⁹ United Kingdom¹⁰ and South Africa¹¹ to obtain the

trainees perspective on their training programs. Some surveys focus on specific aspects of the training; for example, studies performed in India¹² and Africa¹³ evaluated the surgical component of training. Research establishing the trainees' perspective of various aspects of training serve to guide improvement of post-graduate training programs.^{12,14}

Specifically focusing on the attitude towards research during ophthalmology training, a study performed in India concluded that, although there was a range of responses, most young ophthalmologists felt that their research dissertation added value to their ophthalmology training.¹⁵ A study performed in New Zealand among Ophthalmology trainees and specialists found that they generally approved and supported a place for research within the ophthalmology training program and the authors advocated that a more structured design to the training was required.¹⁶

Published ophthalmology literature from South Africa is lacking compared to other countries.¹⁷ Is the reason for this discrepancy because young ophthalmologists in South Africa are not interested in performing research or do they perhaps feel that their training does not adequately prepare them to do so? The aim of this study was to determine the answers to these questions by determining the attitude towards research of the next generation of ophthalmologists.

The main author of this article personally struggled to perform research and from there the idea of a national web-based research support network was born. Many medical web-based research platforms are in existence. These fulfill different roles and offer support in various ways. Please see table 1 for a summary of examples of research platforms mentioned in this article. The authors suggest a national web-based research platform focusing on basic research education and support to complete the research dissertation during training. The suggested platform would also allow for expansion with the aim to inspire collaborative research among ophthalmologists and thereby increasing publications from SA. Additional objectives of this study were to determine if there is a perceived need for such a web-based research platform and if it would stimulate young ophthalmologists to perform more research once their training was completed.

4. Methods

A questionnaire was designed and tested by a pilot group of young ophthalmologists and ophthalmology trainees at the Young Ophthalmologists gathering at the Ophthalmological Society of South Africa national congress in Sandton, Gauteng in 2018. The questionnaire was refined after feedback from the pilot group.

The final questionnaire contained eight questions with binary responses. A ninth question provided opportunity for making additional comments. The questionnaire is attached as Appendix I.

The head of the ophthalmology department at each of the ten training institutions (representing eight universities) in South Africa was contacted via e-mail, telephonically or in person and informed about the study with the request that each unit participates. The

questionnaire was sent as an e-mail attachment to the head of each department. Each department head was asked to nominate a trainee (registrar) representative who then distributed the questionnaire to all fellow trainees for voluntary completion. Supernumerary trainees who often hail from other African countries outside of South Africa were not included in the survey, because the survey aims to determine the attitude of South African ophthalmology trainees. Once the questionnaires had been completed anonymously, the representative returned the completed questionnaires to the investigator. The investigator confirmed the total number of current trainees in each training institution at the time of receiving the completed questionnaires.

Binary responses were summarized as count and crude proportion for the entire survey and grouped by university. Ninety-five percent confidence intervals for proportions were calculated with the Z-test for single proportions. Design-weighted averages were calculated by inverse probability of institutional representation based on the number of responses from each institution. This was done to acknowledge the multilevel structure of the survey response data wherein respondents are clustered in institutions. Association between categorical variables were tested by the χ^2 (Chi-squared) test. The quantitative responses were analyzed in RStudio (2016, version 1.1.419). Qualitative responses were independently reviewed by two investigators to identify common themes through an inductive approach. After independent revision, the two investigators combined their themes. We checked whether themes identified in the qualitative data agreed with our findings from the quantitative data.

Ethical approval for performing the survey was obtained from the Faculty of Health Sciences Human Research Ethics committee at the University of Cape Town. Each respondent was asked to acknowledge informed consent in writing prior to answering the survey questions. The research complies with the principles of the Helsinki Declaration.

5. Results

A total of 65 completed questionnaires were received out of a possible 81 ophthalmology trainees in the country at the time of the survey. One respondent did not provide informed consent and was excluded from the analysis making the total for analysis 64 consenting respondents - a 79% response rate. There were no missing data for the quantitative analysis for the rest of the responses. All ten academic training institutions participated in the survey. Walter Sisulu University has two satellite training centers in the Eastern Cape – one in East London and one in Port Elizabeth – each was considered a separate training institution in the analysis. Eight universities were thus represented in this survey.

In question one, the respondents were asked to indicate their training institution. The total number of registrars at each facility at the time of the survey, the number of respondents and percentage response rate is indicated in Table 2.

The questions that were asked in question two to eight of the survey as well as the responses, crude and weighted averages and 95% confidence intervals (CI) are given in Table 3.

Seventy-two percent (95% CI 59% to 82%) of registrars were interested in doing research. Out of the respondents, 86% (95% CI 76% to 94%) had more than three years of ophthalmology experience, yet only 36% (95% CI 25% to 49%) had authored or co-authored a research paper.

Despite the fact that the respondents indicated formal research courses were available at nine out of the ten training centers, only 28% (95% CI 18% to 41%) of them felt that their research education during registrar training was adequate.

Ninety-five percent (95% CI 86% to 99%) of respondents were of the opinion that there is a need for a structured support network in the form of a website and 86% (95% CI 74% to 93%) believed that if such a network was available they would use this resource to continue performing research once their training was completed.

The responses grouped by institution are given in Figure 1. Although answers appear to vary by institution, none of these observed differences in answers between institutions were significant when tested by Pearson's Chi-squared test. Table 4 reports the Chi-squared test values for each question.

Respondents from nine training institutions indicated that there were formal research courses available at their facilities. Thus only one of the training institutions did not have any formal research course available.

Twelve respondents (19%) answered the open question, question nine. The themes identified in their free text responses were: 1. Attitude towards research 2. Available research resources 3. Supervision 4. Time 5. Proposed web support. See Appendix II for the responses and a summary of the themes.

6. Discussion

All ten academic training institutions participated in the survey giving an accurate representation of the overall attitude towards research amongst ophthalmology trainees in South Africa. Due to the study population being relatively small, it was possible to include all South African trainees in the survey, thus eliminating the need for sampling of the study population and therefore making it highly representative. A healthy response rate of 79% enables us to draw meaningful conclusions from the data.

The weighted averages are similar to the crude averages. Weighted averages assume that institution are perfectly represented in the sample. Weights increase the contribution of smaller institutions to the average.

The quantitative data and the themes generated in the free text responses seemed to agree with each other. This discussion has therefore been structured in a manner that addresses both the quantitative as well the qualitative data simultaneously (although the free text responses were only few in number).

We found that the majority of ophthalmology trainees in South Africa are interested in doing research, which was in agreement with the qualitative theme of “Attitude towards research” where respondents felt that “research is a good idea” during their ophthalmology specialist training. A response like, “some of us have a real passion and hunger to know how to do proper research” conveys a positive message that, at least for some, performing research is more a desire than a chore. This is echoed by positive attitudes towards performing research in Africa found in other studies from South Africa among general surgeons³ and ophthalmologists from Nigeria, where the main motivation to perform research was to advance knowledge.¹⁸

Most of our respondents felt that their current research training was inadequate which was emphasized in the free text response of one respondent who wrote “our research training is not adequate.” In the qualitative themes, “Available research resources”, “Supervision” and “Time”, the responses may allude to the possible reasons for this inadequacy. In these themes, variation in the adequacy of research training at the different institutions also became apparent. In terms of available resources, the training program at one institution is positively reported to have monthly research tutorials, while another respondent writes, “As registrars, it becomes very difficult in an institution without a structured research program”. Other respondents suggest a “more structured program”, “more research training” and “additional support possibly provided by the university”. Other studies from South Africa reported that some training institutions did not provide access to online journals and research support staff were lacking to the extent that trainees had to remunerate statisticians privately in order to complete the research dissertation.^{3,11} Findings in our study also suggest a need for research support staff, in particular statisticians, were noted to be important.

It is apparent that supervision also varied between training Institutions – a respondent at one institution stated that “professor [A] really makes an effort to teach”, while a respondent from a different institution stated that “we don’t have access to on-site consultants with research experience in ophthalmology”. It also appears that even though research courses are mostly available, the trainees need more individualized support as mentioned by a respondent who wrote that, “physical and involved support would be more helpful pertaining to the candidate’s particular requirements”. This was reinforced by a respondent from a different institution who mentioned that a “mentorship program” would be ideal. These findings are in keeping with other studies from South Africa where a lack of supervision was reported to be a problem.^{3,11} In the survey performed in New Zealand they found that the majority of consultant ophthalmologists felt inadequately equipped to supervise and mentor trainees undertaking research and many felt further training would be beneficial.¹⁶ The reported lack of supervision should be addressed and further research in South Africa as to obstacles from a supervisor perspective may shed light on the problem and provide possible solutions.

In the “Time” theme, variation between institutions was further emphasized with some having “little to no research time set aside” and others saying “our institution has been kind enough to allow us research time each year”. The burden of service delivery contributes to this theme as indicated by another respondent who wrote “we are often too busy at our clinics to attend lectures during working hours’. Similarly, it was found that a major

constraint to performing research in Nigeria was protected-time from clinical functions.²⁷ We could argue that if a research dissertation is a prerequisite for qualifying as an ophthalmologist in South Africa, then allocated research time should not be seen as an option, but rather as an essential component (in addition to service delivery and other training). One respondent also felt that time spent on research was inefficient as “it becomes very difficult to conduct research in an institution without a structured research program and this makes doing research less interesting and takes time because you just don’t know what you are doing”. There is a need for regulatory bodies like CMSA to establish guidelines for the minimum amount of time that should be dedicated to research during specialist training in South Africa and this should be implemented at all training institutions in the country.

Due to the perceived variation in ophthalmology training programs, studies have been performed addressing this;¹⁴ for example, differences in programs between China and Hong Kong have been evaluated.¹⁹ Variation between training programs within the country, specifically in terms of the surgical component, academic program and research component have been reported in India.^{12,15} In Africa (including South Africa - the same training institutions were assessed in this study as in our study) a study evaluating surgical ophthalmology training was unfortunately not powered to detect variation between institutions, but it was suggested that this comparison would be included in future research.¹³

Although there is an expressed interest in conducting research, only 36% of respondents had authored or co-authored research papers. Our study did not evaluate the number of publications of the respondents, but in a study evaluating the shortcomings of otolaryngology specialist training in South Africa, the authors found that five of the eight university departments produced less than two publications per year.² The challenges faced in performing research by general surgery trainees in South Africa were reported to be: insufficient time, inadequate training in the research process, inadequate supervision, inadequate financial resources and lack of continuity.³ Other studies from Nigeria and South Africa also identified inadequate financial resources to be an additional barrier to performing research.^{3,18} Although this was not addressed in our study, lack of investigating this topic could be considered a shortcoming, since elucidating these barriers to research could have provided further insight as to the reasons for the low number of papers that were reported to be authored.

The prospect of a national web-based research support network was favored in the quantitative responses and this is reinforced in the qualitative theme. One respondent felt that this would also be beneficial for time management as “an online network will allow us to access information at any time”. As this brings to light another weakness of our study, in that the details of the web-based platform and exactly what it would entail, were not specified to the respondents.

Examples of web-based research platforms include ones that are created by institutions or universities to support their staff and students in various ways and also exist for some universities in SA. In the UK trainee-led ophthalmology research networks have been

established and have been supported by the Royal College of Ophthalmologists to possibly be “the way forward.”²⁰

Our idea is to start with a basic research teaching platform specifically for and applicable to South African ophthalmology trainees and researchers. A national web-based support system would aim to standardize available research material and methodology courses including steps to complete a research dissertation. Previous South African ophthalmology research and publications could be displayed, as well as future research proposals by these researchers. This may inspire novice researchers to identify suitable topics that would meaningfully add to existing knowledge. In addition, similar to the platform Research Gate, researchers would be able to share papers and collaborate and an opportunity created for more experienced researchers to guide those more junior. This could also serve as a platform for collaboration between institutions in performing “multicenter research” on a national level.

It is currently important to start with the basics, but should we repeat this survey at a later time and find trainees feel confident to perform research due to adequate training, then we could expand to international collaborations that would strengthen research capacity in sub-Saharan Africa, as suggested by Spence, et al.²¹ Having an existing platform where interaction between researchers is possible on a national level would support this notion.

This proposal by no means suggests a perfect solution, but rather an effort to create a support platform for ophthalmology registrars and ophthalmologists who would like to perform research. It would be a starting point that could be expanded and built on and, if found to be beneficial, expanded into other surgical disciplines in South Africa.

Strengths of this study are the high response rate (79%) and the inclusion of all training institutions in the country in the study sample. The agreement between crude and weighted average responses along with the consistency between quantitative and qualitative responses supports the generalizability of our findings to the entire country. The use of a mixed-methods approach and piloting of the questionnaire prior to the study supports the robustness of our findings.

Limitations of the study include this being a cross-section of the attitudes of trainees at the time of the survey which may differ from findings if the survey were to be repeated with a different cohort of trainees from preceding or subsequent years. Due to the small number of trainees in the country, this study is not powered to statistically test differences in responses between training institutions. The absence of statistical difference between institutions cannot be considered as evidence of homogeneity across institutions. Although sampling bias has been minimized by the high response rate, the survey is still vulnerable to response bias caused by demand characteristic and social desirability.

7. Conclusion

There is an interest amongst South African ophthalmology trainees in performing research. Current research training programs were found to be inadequate and vary between

institutions in terms of available research resources, supervision and time allocation. Standardization of time allocation during specialist training should be advised by regulatory bodies like the CMSA. There is a perceived need for a national research support website which may add to available research resources and support the reported desire among ophthalmology trainees to perform research during and after their training. Further research to determine obstacles from a supervisor perspective should be performed to address the issue of perceived lack of supervision of South African trainees.

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9. Tables

Table 1:
Examples of web-based research platforms and their Uniform Resource Locator (URL).

Research platform	Uniform Resource Locator
National Institute for Health Research	https://www.nihr.ac.uk/explore-nihr/support/clinical-research-network.htm
Worldwide Universities Network	https://wun.ac.uk/research-development.html
Oxford University	https://researchsupport.admin.ox.ac.uk
University of Cape Town	http://www.researchsupport.uct.ac.za
University of Pretoria	https://www.up.ac.za/graduate-support-hub/article/2227681/postgraduate-research-support-flyhigherup
University of Johannesburg	https://www.uj.ac.za/library/research-support/Pages/research-output.aspx
ResearchGate	https://www.researchgate.net/

Table 2:
Training institution location, total number of occupied training posts at the time of the survey, number and percentage of respondents and proportion of all responses.

Training institution and location	Total Number of Registrars/ Trainees at the time of the survey	Number of respondents; n (% of trainees at the institution)	Percentage of all responses
Sefako Makgatho University	6	4 (67)	6
Stellenbosch University	9	8 (89)	13
University of Cape Town	9	7 (78)	11
University of the Free State	7	6 (86)	9
University of KwaZulu Natal	11	7 (64)	11
University of Pretoria	8	7 (88)	11
University of Witwatersrand	24	19 (79)	30
Walter Sisulu University – East London	1	1 (100)	2
Walter Sisulu University - Mthatha	2	1 (50)	2
Walter Sisulu University – Port Elizabeth	4	4 (100)	6
Total in South Africa	81	64 (79)	

Table 3:
Crude and weighted response averages with 95% CIs. Weights calculated as inverse probability of representation by institution. Weights truncated to 0.3, 3.0. N=64.

Question Number	Question	Yes	Percentage (Crude average)	95% CI (%)	Percentage (Weighted average)	95% CI (%)
2	Are you interested in doing research?	46	72	59 - 82	75	57 – 87
3	Do you have more than 3 years ophthalmology experience?	56	86	76 - 94	91	80 – 96
4	Have you authored or co-authored research papers?	23	36	25 - 49	25	11 – 47
5	Is doing a formal research course part of your registrar training program at your training institution?	53	83	71 - 91	78	48 – 93
6	Do you feel your research education that you receive during your ophthalmology registrar training is adequate?	18	28	18 - 41	22	12 – 39
7	Do you feel that you will benefit from a structured research support network?	61	95	86 - 98	96	87 – 99
8	If a National on-line research support network is available do you think that you would use it to continue to do research after your training is complete?	55	86	74 - 93	86	74 – 93

Table 4:

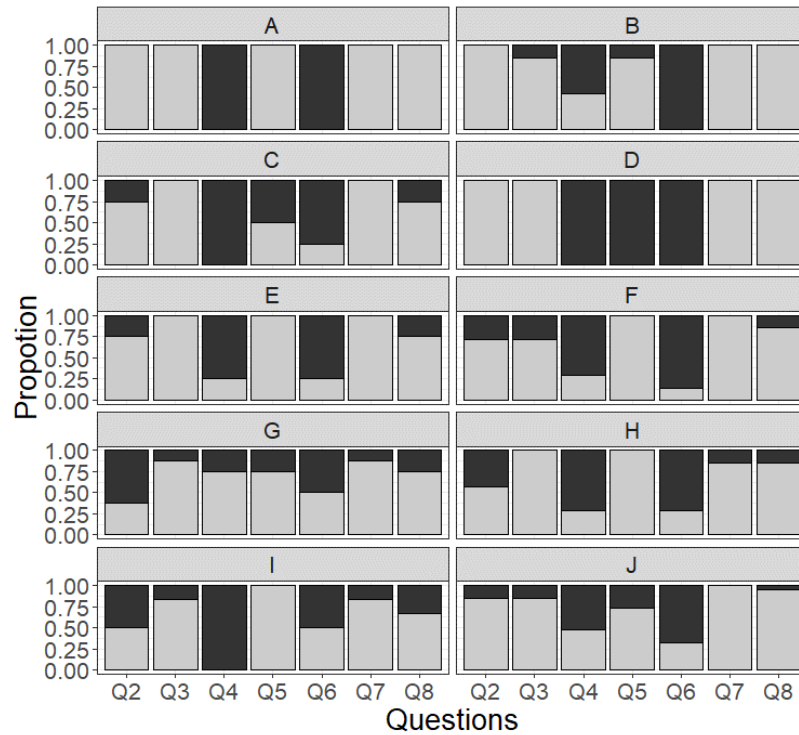
Association between institutions and answers (Pearson's Chi-squared test)

Question	X ²	p-value
2	11.84	0.223
3	4.39	0.884
4	13.80	0.130
5	14.53	0.105
6	7.65	0.570
7	6.58	0.681
8	6.12	0.728

Post-hoc power to detect an average effect size ($w=0.3$) at 5% level of significance given a sample size of 64 respondents is only 32%.

10. Figures

Figure 1:
Bar charts of responses for survey questions, grouped by institution. (Grey – “YES”, Black – “NO”).



12. Appendices

Appendix I

Questionnaire

The purpose of this study is to determine if the ophthalmology registrars in South Africa feel that their formal research training is adequate and to establish if there is a need for a national support website to promote local research and publications.

The survey will take approximately 5 minutes to complete.

By continuing and completing the survey you consent voluntary participation and that the information may be used for research and publication purposes.

Information gathered will be treated with confidentiality. (Your answer will be seen as an anonymous reply)

Completing or abstaining from completing the questionnaire will not impact your training in any negative way.

Please tick the box provided if you consent to the above

Yes	<input type="checkbox"/>
-----	--------------------------

Please answer the following 9 questions by marking the appropriate box/boxes:

1. At which institution are you a trainee?

1	Sefako Makgatho University (MEDUNSA)	<input type="checkbox"/>
2	Stellenbosch University	<input type="checkbox"/>
3	University of Cape Town (UCT)	<input type="checkbox"/>
4	University of the Free State	<input type="checkbox"/>
5	University of Kwazulu Natal	<input type="checkbox"/>
6	University of Pretoria	<input type="checkbox"/>
7	University of Witwatersrand	<input type="checkbox"/>
8	Walter Sisulu University – East London	<input type="checkbox"/>
9	Walter Sisulu University – Mthatha	<input type="checkbox"/>
10	Walter Sisulu University - PE	<input type="checkbox"/>

2. Are you interested in doing research?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

3. Do you have more than 3 years ophthalmology experience?

Yes	
No	

4. Have you authored or co-authored research papers?

Yes	
No	

5. Is doing a formal research course part of your registrar training program at your training institution?

Yes	
No	

6. Do you feel your research education that you receive during your ophthalmology registrar training is adequate?

Yes	
No	

7. Do you feel that you will benefit from a structured research support network?

Yes	
No	

8. If a National on-line research support network is available do you think that you would use it to continue to do research after your training is complete?

Yes	
No	

9. Any additional comments or concerns that you would like to raise :

Appendix II

	Comment/ Answer	THEMES				Proposed web support
		Attitude towards research	Available research resources	Supervision	Time	
1	A National on-line research support network is an excellent idea but I also think a mentorship program would be ideal. We go through registrarship with the aim of just getting MMED research "over and done with "just to pass but some of us have a real passion and hunger to know how to do proper research in the fast changing medical world. Doing research is a must and proper research training is much needed.	passion and hunger to do proper research / must do research	research training is needed	need mentors / mentorship		website support network is good idea
2	As registrars it becomes very difficult to conduct research in an institution without structured research program and this make doing research less interesting and takes time because you just don't know what you are doing		no program, need structured program		wasted time because lack of structure /inefficient	
3	I feel the research training is probably adequate. Professor [A] really makes an effort to teach us appropriate research approaches and research methodologies through her monthly tutorials. However we have little to no research time set aside in our program which is the		Gets monthly tuts	Gets monthly tuts	Need allocated time	

	primary problem leading to delays and postponements					
4	I think we need more support from the university to do our MMED		need university support			
5	more structured research support is necessary		need structured support			
6	Our institution has been kind enough to allow us research time each year to complete MMED				We get allocated time	
7	Our research training is not adequate. We are often too busy at our clinics to attend lectures during working hours. An on line network will allow us to access information at any time.		inadequate program		clinical duties block access to existing resources	website will bridge the problem of time by being available when it suites the individual
8	physical and involved support would be more helpful pertaining to the candidates particular requirements			Mentorship required		
9	Research is a great idea for post-graduation training but I feel that there isn't enough support given to registrars to facilitate the program. More researchers and support staff need to be put in place to assist registrars.	research good idea	need research support staff			

10	stats support is NB		need statistical support			
11	we don't have access to on site consultants with research experience in ophthalmology to help. This makes things much harder but all isn't lost - we outsource			those who supervise has no research experience, need mentor on site		
12	we need this asap					Need website



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee



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16 July 2019

HREC REF: 408/2019

A/Prof N Du Toit
Ophthalmology
H-floor, OMB

Dear A/Prof Du Toit

PROJECT TITLE: THE ATTITUDE OF SOUTH AFRICAN OPHTHALMOLOGISTS IN TRAINING TOWARDS RESEARCH AND RESEARCH EDUCATION (MMED CANDIDATE: DR L DU TOIT)

Thank you for submitting your response to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

- Please note, no data from the pilot study may be used for the MMed thesis or publication.

Approval is granted for one year until 30 July 2020.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate Institutional approval, where necessary, before the research may occur.

The HREC acknowledge that the student, Dr Linett du Toit will also be involved in this study.

Please quote the HREC REF in all your correspondence.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE

HREC 408/2019

Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938
NHREC-registration number: REC-210208-007

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use: Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines. The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.



UNIVERSITY OF CAPE TOWN



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2 Apr 2019

Dr L Du Toit - De Wet
Department of Surgery
University of Cape Town

Dear Dr Du Toit - De Wet

RE: Project 2018/112

PROJECT TITLE: The Attitude Of South African Ophthalmologists In Training Towards Research And Research Education.

The above protocol has been reviewed by the Department of Surgery Research Committee. I am pleased to inform you that the committee approved the scientific merit of the study, and endorse the protocol for submission to the relevant ethics committee.

Although this letter serves as confirmation that the above protocol has successfully passed through the surgical DRC, respective ethics committees still require DRC chair signature before submission.

Please use the above project number in all future correspondence,

Yours sincerely

DR TIMOTHY PENNEL
CHAIRMAN: RESEARCH COMMITTEE

OUR MISSION is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society.

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