

ปัจจัยที่มีความสัมพันธ์กับการตีพิมพ์งานวิจัยของแพทย์ประจำบ้านจักษุวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล: การศึกษาย้อนหลัง 10 ปี

วิลาวัลย์ แสนพันธ์¹ สุพัตรา สว่างกุล²

¹ฝ่ายวิจัย คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล

²ภาควิชาจักษุวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล

Received: August 16, 2022

Revised: September 14, 2022

Accepted: October 19, 2022

บทคัดย่อ

ภาควิชาจักษุวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล เป็นสถาบันฝึกอบรมแพทย์ประจำบ้าน เพื่อผลิตบุคลากรที่มีความรู้ความชำนาญในการประกอบวิชาชีพเวชกรรม ภายใต้ราชวิทยาลัยจักษุแพทย์แห่งประเทศไทยและแพทยสภา ซึ่งแพทย์ประจำบ้านที่มีสิทธิเข้าสอบเพื่อรับวุฒิบัตรฯ นั้น จะต้องมีการตีพิมพ์ผลงานวิจัยที่เสร็จสมบูรณ์ โดยได้รับการตีพิมพ์ในวารสารทางการแพทย์ หรือได้นำเสนอในการประชุมวิชาการทางการแพทย์มาแล้ว การศึกษานี้เพื่อประเมินและเปรียบเทียบปัจจัยที่เกี่ยวข้องในการตีพิมพ์ผลงานวิจัยของแพทย์ประจำบ้านภาควิชาจักษุวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล ระหว่างปี พ.ศ. 2550-2559 และศึกษาถึงปัจจัยที่ส่งผลให้ได้รับการตีพิมพ์ เก็บข้อมูลย้อนหลังจากแบบเสนอโครงการวิจัยที่ได้รับอนุมัติทำการวิจัยในคนของแพทย์ประจำบ้านภาควิชาจักษุวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล ตั้งแต่ปีการศึกษา 2550-2559 ข้อมูลที่เก็บ ได้แก่ เพศ เวลาเริ่มโครงการวิจัย สถานะของแพทย์ประจำบ้านในโครงการวิจัย การออกแบบการวิจัย สถานที่ทำวิจัย ทุนวิจัย ความเชี่ยวชาญเฉพาะด้าน และระยะเวลาที่ได้รับการตีพิมพ์หลังได้รับอนุมัติทำการวิจัยในคน จำนวนโครงการวิจัยของแพทย์ประจำบ้าน ภาควิชาจักษุวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล ระหว่าง พ.ศ. 2550-2559 มีทั้งหมด 102 เรื่อง ได้รับการตีพิมพ์ทั้งในวารสารระดับชาติและนานาชาติ ร้อยละ 41.2 เป็นแพทย์ประจำบ้านเพศหญิง ร้อยละ 76.2 ผลงานที่ได้รับการตีพิมพ์ส่วนใหญ่แพทย์ประจำบ้านจะเป็นผู้ร่วมวิจัย เป็นโครงการวิจัยที่ไม่ได้รับทุนสนับสนุน เป็นโครงการที่ศึกษาในสถานที่เดียว เป็นโครงการวิจัยที่ศึกษาแบบย้อนหลัง ได้รับการตีพิมพ์ 1 ปีหลังได้รับอนุมัติทำการวิจัยในคน โดยผลงานวิจัยที่ได้รับการตีพิมพ์ของแพทย์ประจำบ้านที่เริ่มปฏิบัติงานปี พ.ศ. 2550-2554 มีจำนวนมากกว่าแพทย์ประจำบ้านที่เริ่มปฏิบัติงานปี พ.ศ. 2555-2559 อย่างมีนัยสำคัญ [29 (ร้อยละ 69.1) vs. 13 (ร้อยละ 31.0); $p < 0.001$] ผลการวิจัยพบว่า แพทย์ประจำบ้านที่เริ่มปฏิบัติงานระหว่างปี พ.ศ. 2550-2554 มีความเกี่ยวข้องอย่างมีนัยสำคัญกับการได้รับการตีพิมพ์ผลงานวิจัย เนื่องจากอัตราการได้รับการตีพิมพ์ของแพทย์ประจำบ้านที่เริ่มปฏิบัติงานระหว่างปี พ.ศ. 2555-2559 ลดลงอย่างเห็นได้ชัด ฉะนั้นควรจะมีการพัฒนาหรือนำความรู้ด้านการวิจัยมาปรับปรุง และสนับสนุนให้แพทย์ประจำบ้านจักษุวิทยา ให้ตีพิมพ์ผลงานวิจัยให้ได้มากขึ้นต่อไป

คำสำคัญ: การตีพิมพ์ผลงานวิจัย แพทย์ประจำบ้านจักษุวิทยา การศึกษาแบบย้อนหลัง

ผู้สนับสนุนผลงาน:

สุพัตรา สว่างกุล

ภาควิชาจักษุวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล

2 ถนนวังหลัง แขวงศิริราช เขตบางกอกน้อย กรุงเทพมหานคร 10700

อีเมล: supattra.saw@mahidol.edu

Factors significantly associated with the research publication status of ophthalmology residents at the Faculty of Medicine Siriraj Hospital, Mahidol University: A 10-year retrospective study

Wilawan Sanpan¹, Supattra Sawangkul²

¹Research Department, Faculty of Medicine, Siriraj Hospital, Mahidol University

²Department of Ophthalmology, Faculty of Medicine, Siriraj Hospital, Mahidol University

Abstract

The Department of Ophthalmology in the Faculty of Medicine at Siriraj Hospital provides a residency program for medical doctors to become certified ophthalmologists under the Royal College of Ophthalmologists and the Medical Council of Thailand. Ophthalmology residents are required to publish a manuscript in a journal or present it at an academic conference before the final board examination. This study aims to evaluate and compare research-related factors among ophthalmology residents at the Department of Ophthalmology in the Faculty of Medicine at Siriraj Hospital, Mahidol University from 2007 to 2016, and to identify the factors significantly associated with successful publications. This retrospective study collected data with Institutional Review Board (IRB) approved research projects of ophthalmology residents from 2007 to 2016. The collected data included gender, starting period, authorship status, study design, number of study sites, funding status, ophthalmologic subspecialty, and time of publication after IRB approval. There were 102 IRB-approved research projects from 2007 to 2016. Of those, 41.2% of projects were published in national or international journals, and 76.2% were published by female residents. Most residents were co-investigators, had unfunded research, collected single center data, had a retrospective study design, and published their research one year after IRB approval. The number of published research projects during 2007-2011 was significantly higher than that during 2012-2016 [29 (69.1%) vs. 13 (31.0%); $p < 0.001$]. The results revealed entry into the ophthalmology residency program from 2007 to 2011 to be significantly associated with successful journal publication. Since the rate of successful journal publication decreased during the second half of the study period, strategies to improve research knowledge and support publication among ophthalmology residents need to be developed and implemented.

Keywords: research publication, ophthalmology residents, retrospective study

Corresponding Author:

Supattra Sawangkul

Department of Ophthalmology, Faculty of Medicine, Siriraj Hospital, Mahidol University
2 Wanglang Road, Bangkoknoi, Bangkok 10700, Thailand.

E-mail: supattra.saw@mahidol.edu

Introduction

Research is an important component of advanced education, including in the medical field. The research process facilitates the collection of focused knowledge, the exploration of novel concepts, the critical analysis of data, and the integration of multidisciplinary data to achieve improved insights and outcomes.

Under the Royal College of Ophthalmologists of Thailand and the Medical Council of Thailand, the Department of Ophthalmology of the Faculty of Medicine Siriraj Hospital, Mahidol University (Bangkok, Thailand) is one of Thailand's leading residency programs for training medical doctors to become board certified ophthalmologists. In addition to their training in clinical practice, ophthalmology residents are required to conduct or participate in at least one research project during the 3-year residency program¹. The accepted study designs include retrospective, prospective, cross-sectional, and randomized controlled (among others); however, more advanced types of research, such as a systematic review and/or meta-analysis, are also encouraged and accepted. Research projects can focus on never before investigated topics, or can be inspired by previous studies with a redirected focus within the context of the Faculty of Medicine Siriraj Hospital. Prior to starting the research project, residents and supervisors must participate in and pass human research ethics and good clinical practice (GCP) training. The proposed protocol for each research

project must be reviewed and approved by our center's institutional review board (Siriraj Institutional Review Board; SIRB) before commencement of the study, must employ appropriate methodology to investigate and answer the research question, and must be in compliance with all institutional, domestic, and accepted international guidelines.

One of the roles of the Research Division of the Department of Ophthalmology is to provide research guidance, training, and support to ophthalmology residents to help them fulfil the curriculum's research requirement. A timeline of the 3-year ophthalmology residency program research requirement is shown in Figure 1. Other types of support that are provided by the Research Division include providing an ophthalmologist supervisor to each resident, managing the documents to be submitted to the Siriraj Institutional Review Board (SIRB) throughout the project, and submitting research project progress reports to the grant or funding agency. In addition, a research day event is conducted annually with experienced researchers that provide information and counselling to residents regarding how to start their research project, how to collect and analyze data, how to prepare the manuscript, and how to share their research findings with the medical/scientific community.

In order to satisfy the research requirement in the 3-year ophthalmology residency curriculum, ophthalmology residents are required to submit proof of a published research article or case report, or submit a

manuscript with proof that the manuscript has been submitted to a journal for publication before the final board examination¹.

The aim of this study was to evaluate and compare research-related factors among ophthalmology residents at the Department of Ophthalmology, Faculty of Medicine Siriraj

Hospital, Mahidol University, Bangkok, Thailand, during 2007-2016, and to identify factors significantly associated with successful journal publication. The results of this study will be used to improve research training and strategies for future ophthalmology residents at our center.

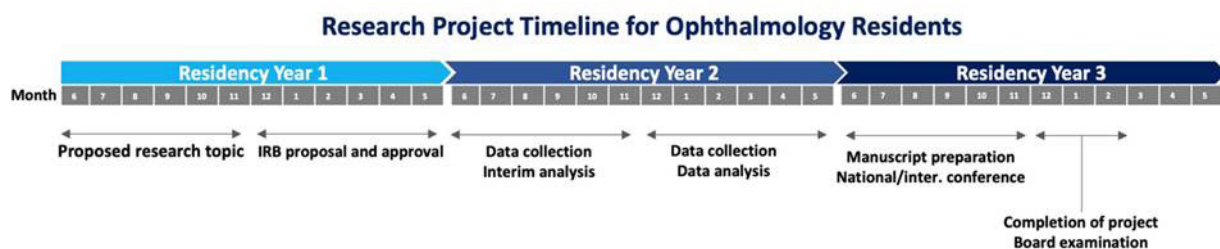


Figure 1 Research project timeline for physicians attending the 3-year residency program at the Department of Ophthalmology of the Faculty of Medicine Siriraj Hospital, Mahidol University

Methodology

Data collection

This study retrospectively collected data specific to SIRB-approved research projects of ophthalmology residents conducted at our center during the 2007-2016 study period. Collected data included gender, time period during which the residency program was started (2007-2011 or 2012-2016), authorship status (primary investigator or co-investigator), study design (retrospective or prospective), type of study site (single-center or multicenter), funding status (no funding/self-funded or supported by outside funding), ophthalmologic subspecialty selected, and time of publication after IRB approval (≤ 1 year or > 1 year after SIRB approval). Unfinished, discontinued, or retracted projects were

excluded from analysis. The protocol for this study was approved by the SIRB no. 026/2565 (Exempt), and written informed consent was not obtained from the authors of included papers due to our study's retrospective, anonymity-preserving design.

Statistical analysis

Evaluated data were summarized using descriptive statistics. All data evaluated in this study were categorical, and the results of those analyses are shown as number and percentage. Comparisons of categorical data were performed using chi-square test for large sample sizes, and Fisher's exact test for smaller samples sizes. Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) and SPSS Statistics version 18 (SPSS, Inc.,

Chicago, IL, USA) were used for data collection and analysis, respectively. A *p*-value less than 0.05 was regarded as being statistically significant for all tests.

Results

General information about included research projects

As shown in Table 1 and Figure 2A and 2B, there were 102 SIRB-approved research projects conducted by ophthalmology residents during 2007-2016 at our center. A total of 10 studies were conducted each year during this 10-year study, except for years 2015 and 2016 in which 11 studies were conducted in each of those 2 years. Residents were project leader or principal investigator in 7% of projects, and the other 93% were co-investigators. The study design was prospective and retrospective in 45% and 55% of the projects, respectively. The vast majority of research projects (99%) were conducted in a single-center setting, and only 1% evaluated data collected from more than one center.

Sixty-one percent of projects had no known source of funding or were personally funded, whilst 39% were supported by various sources. The Faculty of Medicine Siriraj Hospital was the main supporter of research projects accounting for 85% of all funded projects. Others included Routine to Research (R2R, 8%), Mahidol University (5%), and external funding agencies (3%).

Regarding the selected subspecialties of ophthalmology residents, we found that most research was conducted in the field of

retina (20%), followed by glaucoma (15%), cornea and refractive surgery (14%), pediatric ophthalmology (14%), orbit and oculoplastic (12%), refraction and contact lens (10%), ocular immunology/uveitis (10%), and neuro-ophthalmology (7%) (Figure 2B).

Analysis of published research and the factors significantly associated with successful journal publication

A total of 102 residents (27 male and 75 female) were enrolled in the Department of Ophthalmology, Faculty of Medicine Siriraj Hospital, Mahidol University during 2007-2016, and 102 research projects for collected for inclusion in this study. We found that 42/102 (41%) research projects had been published, while the remaining 60/102 projects (59%) remained unpublished (Table 1 and Figure 2A and 2B).

Of the 42 published projects, 29 were published by residents who started their residency during 2007-2011, and 13 projects were published by those who started their residency during 2012-2016 (Figure 2A). Regarding gender, male and female ophthalmology residents were responsible for 10/42 (24%) and 32/42 (76%) published projects, respectively (Table 1). However, the proportion of published papers was slightly different when analyzed within group [10/27 (37%) for male vs. 32/75 (43%) for females].

Concerning study design, 17/42 (40%) of published studies were prospective studies, and 25/42 (60%) were retrospective studies. One project was a multicenter study, and the

remaining 41/42 (98%) were conducted in a single-center setting. With regard to funding, 25/42 (60%) had no known source of funding or were self-funded, whilst 17/42 (40%) were supported by internal or external funding agencies (Table 1).

Turning to the selected subspecialties of ophthalmology residents (Table 1 and Figure 2C), retina was the main area of study in most projects (11/42, 26%) during 2007-2016. Other subspecialties included cornea and refractive surgery (8/42, 19%), glaucoma (7/42, 17%), refraction and contact lens (6/42, 14%), ocular immunology/uveitis (4/42, 10%), neuro-ophthalmology (3/42, 7%), pediatric ophthalmology (2/42, 5%), and orbit and oculoplastic (1/42, 2%). We also found that 16/42 (38%) studies were published within one year after receiving SIRB approval, whilst the remaining 62% were published later than one year after SIRB approval (Table 1 and Figure 2C). Seventy-four percent of published projects were published in international journals, and the other 26% of papers were published in national/domestic journals (Figure 2C).

The details of unpublished research projects were also analyzed. We found that among the 60 unpublished projects, male and female residents participated in 17 (28%) and 43 (72%) projects, respectively. Twenty-one (35%) unpublished projects belonged to residents who started their residency during 2007-2011, and the other 39 (65%) projects belonged to those who started their residency during 2012-2016. The resident was the

primary investigator in 6 (10%) unpublished projects, and the other 54 (90%) residents were a co-investigator (Table 1).

Regarding study design, 29/60 (48%) of unpublished studies were prospective, and 31/60 (52%) were retrospective studies. All unpublished projects were conducted in a single-center setting. Sixty-two percent (37/60) of projects had no known source of funding or were self-funded, whilst 23/60 (38%) were supported by internal or external funding agencies (Table 1). The number of unpublished projects during 2007-2016 were stratified by subspecialty, as follows: retina (9 projects, 15%), cornea and refractive surgery (6, 10%), glaucoma (8, 13%), pediatric ophthalmology (12, 20%), orbit and oculoplastic (11, 18%), neuro-ophthalmology (4, 7%), refraction and contact lens (4, 7%), and ocular immunology/uveitis (6, 10%).

Factors significantly associated with successful journal publication

Our univariate analysis, which compared gender, time period during which the residency program was started, authorship status, study design, type of study site, funding status, and time of publication after SIRB approval, found entry into the ophthalmology residency program during 2007-2011 to be the only factor significantly associated with successful journal publication. The number of research projects published during 2007-2011 was significantly higher than the number published during 2012-2016 [29 (69.1%) vs. 13 (31.0%), respectively; $p<0.001$].

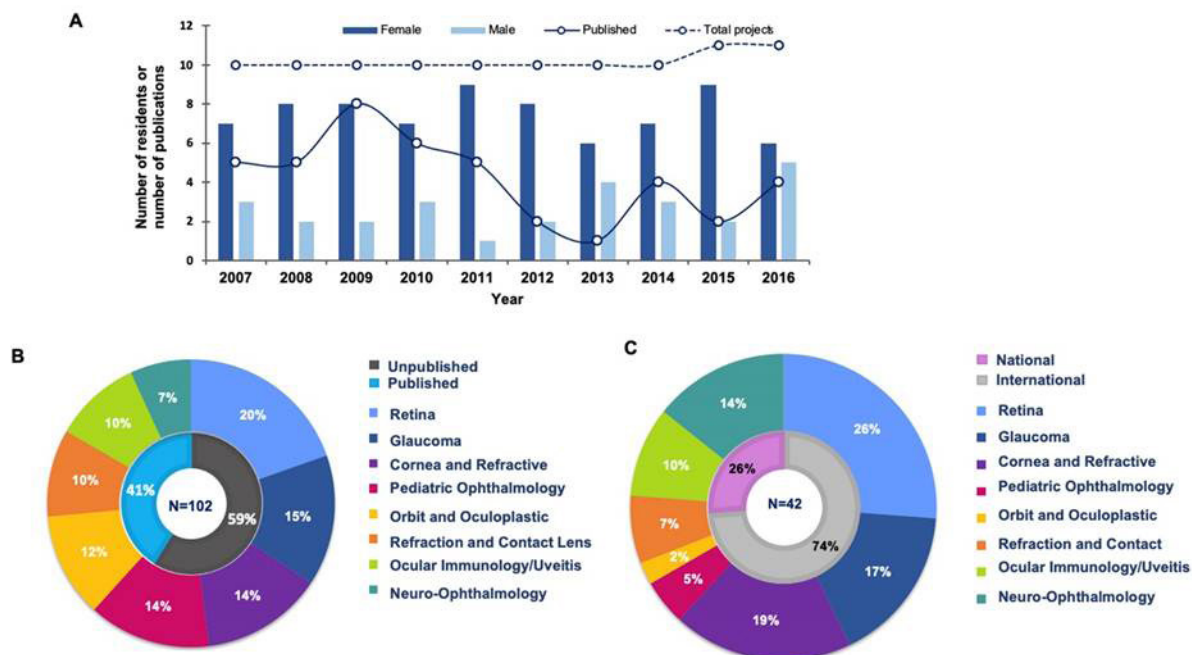


Figure 2 (A) Bar chart comparing the genders in the ophthalmology residency program by year during 2007-2016. A comparison between the number of overall research projects and the number of published research projects is also shown. (B) Pie chart showing the number of overall research projects, the proportion of published and unpublished projects, and the proportion of research projects for each ophthalmologic subspecialty. (C) Pie chart showing the number of published research projects, the proportion of research projects published in national and international journals, and the proportion of published research projects for each ophthalmologic subspecialty.

Table 1 Analysis for factors significantly associated with the publication status of ophthalmology residents at the Faculty of Medicine Siriraj Hospital, Mahidol University

Factors	Published (n=42)	Unpublished (n=60)	p-value
Gender ^a			0.610
- Female	32 (76.2%)	43 (71.7%)	
- Male	10 (23.8%)	17 (28.3%)	
Time period during which the residency program was started ^a			0.001
- 2007-2011	29 (69.1%)	21 (35.0%)	
- 2012-2016	13 (31.0%)	39 (65.0%)	

Table 1 (Con.)

Factors	Published (n=42)	Unpublished (n=60)	p-value
Authorship status ^b			0.235
- Principal investigator	1 (2.4%)	6 (10.0%)	
- Co-investigator	41 (97.6%)	54 (90.0%)	
Study design ^a			0.433
- Prospective	17 (40.5%)	29 (48.3%)	
- Retrospective	25 (59.5%)	31 (51.7%)	
Type of study site ^b			0.412
- Single-center	41 (97.6%)	60 (100%)	
- Multicenter	1 (2.4%)	0 (0.0%)	
Funding status ^a			0.827
- No known source of funding or personally funded	25 (59.5%)	37 (61.7%)	
- Received internal or external funding	17 (40.5%)	23 (38.3%)	
Subspecialty			NA
- Retina	11 (26.2%)	9 (15.0%)	
- Cornea and refractive surgery	8 (19.1%)	6 (10.0%)	
- Glaucoma	7 (16.7%)	8 (13.3%)	
- Pediatric ophthalmology	2 (4.8%)	12 (20.0%)	
- Orbit and oculoplastic	1 (2.4%)	11 (18.3%)	
- Neuro-ophthalmology	3 (7.1%)	4 (6.7%)	
- Refraction and contact lens	6 (14.3%)	4 (6.7%)	
- Ocular immunology/uveitis	4 (9.5%)	6 (10.0%)	
Time of publication after IRB approval ^a			0.157
Within the first year after IRB approval	16 (38.1%)	15 (25.0%)	
Later than the first year after IRB approval	26 (61.9%)	45 (75.0%)	

A p-value<0.05 indicates statistical significance (^aChi-square test, ^bFisher's exact test)

Abbreviations: IRB, institutional review board; NA, not applicable

Discussion

A 10-year retrospective study was conducted to collect and evaluate research projects from ophthalmology residents that were conducted during 2007-2016 at the Department of Ophthalmology of the Faculty of Medicine Siriraj Hospital, Mahidol University. We found that out of 102 projects, less than half (42/102 projects) were successfully published. It is possible that some studies

from ophthalmology residents who started their residency in the later years of the second 5-year half of the study were still collecting data, were still preparing their manuscript, and/or were still waiting for an announcement from their target journal. It is also possible that manuscript preparation and/or journal submission needed to be continued by supervisors or fellows after the residency period ended.

Another factor that might contribute to the publication status of ophthalmology residents is the selected subspecialty². More specifically, although the Faculty of Medicine Siriraj Hospital is the largest national tertiary referral center in Thailand, the number of patients seeking care from some ophthalmologic subspecialties may be insufficient for achieving the calculated minimum sample size. Therefore, although these residents could use their interim analyses to present their data for graduation, more time might be needed to complete the study. Moreover, some journals require a lengthy peer review process^{3,4} which makes this another factor that can lengthen the duration needed to successfully publish a paper.

Interestingly, although we informally hypothesized that funded research⁵ would be significantly associated with successfully published research since it is a granting agency requirement, we found no such association.

Most of the projects in this study were conducted in a single-center setting within the Department of Ophthalmology. To improve the breadth and depth of information exchange and networking, inter-department and inter-institution collaborations should be encouraged. These types of collaborations may result in new information and alternative approaches as previously demonstrated in a study conducted between the Department of Ophthalmology and the Division of Medical Oncology of the Department of Medicine that

revealed association between autoimmune retinopathy and non-ophthalmologic malignancies.

Limitations

The main limitation of this study is its single-center retrospective design, which renders it vulnerable to missing/incomplete data and to certain biases. Another potential limitation is our study's relatively small sample size, which could have limited our study's power to identify all statistically significant differences and associations between groups. The strength of this study is that the data were collected over a ten year period, and the number of studies was consistent from year to year. Further study is warranted to more carefully determine the causes of the observed decrease in the number of published studies during the second 5-year period of this study.

Conclusions

The results of this study revealed entry into the ophthalmology residency program during 2007-2011 to be significantly associated with successful journal publication. Since the rate of successful journal publication decreased during the second and most recent half of the study period (2012-2016), strategies to improve research knowledge and support among ophthalmology residents need to be developed and implemented at our center⁵⁻⁷.

Acknowledgements

The authors gratefully acknowledge Arnan Limmahachai, MD and Julaporn Pooliam, MSc for their assistance with statistical analysis.

Conflict of interest declaration

Both authors declare no personal or professional conflicts of interest relating to any aspect of this study.

References

1. Ophthalmology Rti. Subcommittee on training and examination of profession in medical practice Ophthalmology Royal College of Ophthalmologists of Thailand; 2017.
2. Morrison JC, Meeks GR, Martin Jr JN, et al. W. Resident research projects: frequency of presentation and publication in a national forum. *Am J Obstet Gynecol* 1994; 170:777-81.
3. Ali PA, R W. Peer review and the publication process. *Nurs Open* 2016;3:193-202.
4. Nguyen VM, Haddaway NR, Gutowsky LF, et al. How long is too long in contemporary peer review? Perspectives from authors publishing in conservation biology journals. *PLoS One* 2015;10:e0132557.
5. Smigielski EM, Laning MA, Daniels CM. Funding, time, and mentoring: A study of research and publication support practices of ARL Member Libraries. *J Libr Adm* 2014;54:261-76.
6. Al-Busaidi IS, Al-Shaqsi SZ, Al-Alawi AK, et al. Characteristics, trends, and factors associated with publication among residents of Oman medical specialty board programs. *J Grad Med Educ* 2019;11:104-9.
7. Abramson EL, Naifeh MM, et al. Research training among pediatric residency programs: A national assessment. *Acad Med* 2014;89: 1674-80.