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Representation of Women on Editorial Boards of Ophthalmology Journals: protocol for a cross-sectional study

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Manuscripts

Representation of Women on Editorial Boards of Ophthalmology Journals: protocol for a cross-sectional study

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ABSTRACT

Introduction

There is a notable underrepresentation of women in leadership positions in ophthalmology despite the increasing number of female ophthalmologists. Gender inequality in editorial boards of ophthalmology journals has not been investigated on a global scale. This study will aim to evaluate the representation of female editorial board members in ophthalmology journals across different regions, journal subspecialties and impact factors.

Methods and analysis

This will be a cross-sectional study describing the gender composition of editorial boards in ophthalmology journals globally. Ulrich's Periodicals Directory and SCImago Journal & Country Rank will be used to comprehensively identify journals indexed with the keyword, "ophthalmology." All journals with active websites and lists of editorial boards will be included. Journals will be categorized according to the World Bank's 2021 classification of countries by income and region, and classified into ophthalmology subspecialties based on publication scope. Impact factors will be obtained from Journal Citation Reports. The gender and academic degrees of each editor will be determined based on journal profiles, institutional websites, or name query feature on an online interface. The research impact of each editor will be ascertained from the author records on Web of Science. The gender proportion will be presented for all journals combined, and then for journals grouped by regions, subspecialties, and impact factors. Editor characteristics including academic degrees and research productivity measures will be compared between the male and female editors. These comparisons will be made using the chi-square test for categorical variables and the independent samples t-test for continuous variables.

Ethics and dissemination

This study did not require research ethics approval given the use of publicly available data and lack of human subjects. The results will be presented at scientific meetings and published in peer-reviewed journals. A preliminary version of the protocol is registered on Open Science Framework (10.17605/OSF.IO/HGFR6).

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This is the first study to investigate the representation of women in journal editorial boards within the field of ophthalmology globally.

- The main strength of this study is the characterization of various journal characteristics such as journal region, subspecialty focus and impact factor to understand their associations with editorial board gender composition.

- The study relies on binary characterization of gender based on publicly available data, and includes all English journals, which may have editors that are not indexed on databases.

INTRODUCTION

The editorial board of a scientific journals plays an important role as gatekeepers for the advancement of academic surgeons and in shaping what published research and knowledge become available to the public. Despite the steady increase in the number of female ophthalmologists and women authoring ophthalmic publications,[1,2] there appears to have been only a marginal growth in the female representation in leadership positions.[3] In 2011, Amrein et al. identified a significant underrepresentation of women in editorial board membership amongst the top 5 ophthalmic journals with no female representation in the editor-in-chief (EiC) position.[4] A decade later, a report by Camacci et al. demonstrated that women continue to comprise a small proportion of the editorial board members in the 20 highest-ranked journals.[5] However, these studies have only characterized the select top journals within the field, majority of which were based in North America. The gender inequality may vary across different countries and continents as demonstrated in a recent study by Holman et al. with especially low proportion of female authors publishing in STEMM (science, technology, engineering, mathematics, and medicine) fields in certain countries like Japan, Germany, and Switzerland.[6] As such, it is essential to evaluate the gender inequality in editorial boards of ophthalmology journals across the globe, as the geographical origin of a journal may influence female participation in leadership positions. Furthermore, there are differences in ophthalmic surgical subspeciality representation of women and no reports to date have characterized the gender composition of editorial boards based on different subspecialties in ophthalmology. This is important to consider as several subspecialties within ophthalmology including vitreoretinal surgery, are traditionally considered to be male-dominated specialties.[7]

Study Objectives

The purpose of this study is to evaluate the representation of women in all ophthalmic journal editorial boards globally. We will describe the proportion of female board members in journals grouped by different ophthalmic subspecialties and journal impact factors. We will also compare the publication productivity and demographic characteristics between the male and female members.

METHODS AND ANALYSIS

Study Design

This will be a cross-sectional study describing the gender composition of editorial board members in ophthalmology journals globally from inception up to October 10, 2021, as well as the productivity and demographic characteristics of board members based on gender. A preliminary version of the protocol was registered on Open Science Framework (OSF) (10.17605/OSF.IO/HGFR6).

Databases Used

The Ulrichsweb is an online version of Ulrich's Periodical Directory, which contains detailed information on more than 300,000 periodicals of all types. The SCImago Journal & Country Rank is a public portal that contains journals rank indicators developed from the Scopus database. A comprehensive list of journals will be obtained through a sensitive search on the Ulrichsweb, and this list will be cross-checked using the list of journals generated by the SCImago Journal & Country Rank to ensure all highly ranked ophthalmology journals are included.

Journal Citation Reports is a publication of Clarivate Analytics that provides basic bibliographic information about academic journals, and will be used to search journal impact factors. Web of Science is a database that provides citation information and research impact metrics for a given journal article or an author. The research productivity measures for individual editors are available on the author profile after searching the first and last names using the name search feature.

Identification of Ophthalmology Journals

The Ulrichsweb will be used to identify the ophthalmology journals. The search will involve using the advanced search function with the keyword, "ophthalmology," to identify all periodicals containing the term "ophthalmology" in the subject classifications. Furthermore, the results will be limited to periodicals with "active" status indicating a periodical is currently being published as of October 10, 2021, and "journal" as the serial type. Additionally, in order to verify that a comprehensive of journals has been selected, the SCImago Journal & Country Rank will also be used to identify a list of ophthalmology journals. The lists from the two databases will be merged and any duplicate journals identified will be removed. The list will be then manually reviewed by the investigators to identify scholarly journals predominantly pertaining to ophthalmology based on their title, affiliated societies, and target audience. Journals without a valid journal website, and/or without a list of editorial board members will be excluded from the analysis. Journals with websites in non-English languages will also be excluded if an automatic English language conversion/equivalent is not provided by the website or Google (as translation of names and designations may be inaccurate or incomplete).

Journal Data Characteristics

For each included journal, the first publication year, years in publication, and gender

composition of editors-in-chief (EiC) and editorial board members will be ascertained from the

journal website. For the journals identified in the SCImago Journal & Country Rank, the 2020

SCImago Journal & Country Rank indicator (a measure of journal's impact based on the number

citations received in the three previous years), and whether the journal was open access from

SCImago Journal & Country Rank will be obtained. The journal impact factor will be

determined from Journal Citation Reports, and the journal impact factor quartile (Q1, Q2, Q3 or

Q4) based on the category ranking will also be obtained from Journal Citation Reports. Impact

factors for journals not listed on Journal Citation Reports will be determined from Academic

Accelerator (https://academic-accelerator.com/) or the journal website. The country of

publication will be abstracted from the journal website and will be categorized according to the

World Bank's 2021 classification of countries by income (low vs. lower middle vs. upper middle

vs. high income) and geographical region.[8] The journal subspecialty will be determined from

the journal website by identifying terminology that classifies the journal into the following

subspecialty categories: general (comprehensive, ethics, and medical education, all subspecialties

combined), cataract/refractive surgery, cornea, glaucoma, retina and vitreoretinal surgery, ocular

oncology, ocular immunology/ocular inflammation/uveitis, paediatrics, neuro-ophthalmology,

ocular histopathology, oculoplastics, and basic science. Those belonging to sister journals as a

part of a network of journals will be noted.

Editorial Board Data Characteristics

EiCs from all included journals and editors from the journals with impact factors listed on

Journal Citation Reports will be considered for the analysis of editorial board characteristics. An

editor will be defined as anyone that is not EiC holding positions with decisive functions

regarding manuscript acceptance. This definition will include positions such as senior editors,

associate editors, section editors as well as advisory board members. Administrative staffs such

as managing, copy, illustration, video and technical editors will not be included.[9] For each EiC

or editor, gender (man vs. woman) will be identified through profiles (biography and/or

photograph within the past 10 years) on institutional affiliation websites. If no profiles are

available, gender will be defined using an application programming interface (https://gender-

api.com) which generates a percentage value indicating the certainty of the gender determined by

the first name. A cut-off of 90% certainty will be used, and any individual whose gender cannot

be determined with certainty equal to or greater than 90% will have their gender verified via an

exhaustive Google search.[10] If the gender cannot be determined after the above-mentioned

steps, the editorial member will be denoted to have an unknown gender. The designation of

ophthalmologist versus non-ophthalmologist, as well as any academic degrees including Doctor

of Medicine (MD), Doctor of Philosophy (PhD), and any non-MD or PhD degrees will be

collected via the journal website profiles or institutional affiliation profiles. If this information is

not readily available from the website and institutional profile, the editorial board member will

be determined to be an ophthalmologist if they were either listed on the websites of the physician

governing bodies (e.g., American Board of Ophthalmology, Canadian Ophthalmological Society

American Society of Retina Specialists) or had professional profiles indicating ophthalmology

residency training or their position as ophthalmologists.[11] Board members not meeting any of

the criteria above will be designated as non-ophthalmologists (or unknown if no information can be identified). Information on academic degrees will be obtained from the editor's most recent two publications.

The Web of Science will be accessed to determine each EiC and board member's country of origin, total number of publications, number of publications in the recent five years, number of citations by other documents, and h-index (defined as the number of publications (h) that have received at least h citations). Lastly, the m-quotient, which is a metric that facilitates comparisons of research productivity amongst authors with varying lengths of academic careers, will be calculated by dividing the h-index by the number of years since the first published paper. If the data on editor research impact is not available on Web of Science, the Scopus database will be used to collect the above-mentioned variables for each editor included in the study.

Study Outcomes

The overall gender proportion of EiCs and editors will be presented separately. Additionally, the gender proportions based on specific journal characteristics including first publication year, years in publication, SCImago Journal & Country Rank indicator, open access status, journal impact factor and impact factor quartiles, geographical region category, and journal subspecialty category impact will be characterized and compared.

The study will also compare the composition of ophthalmologists vs. non-ophthalmologists, degrees (medical, PhD, and non-medical or non-PhD degrees), country of origin, as well as productivity measures (total number of publications, number of publications in the recent 5 years, number of citations, h-index, and m-quotient) between the male and female editorial board members. Journals will be classified into having low versus high representation of

women based on the cut-off proportion of 25%, which is derived from the female proportion of the 20 highest-ranked ophthalmology journals as reported by Camacci et al.[5] The above-mentioned editorial board characteristic variables will then be compared between the journals categorized into having low vs. high representation of women.

Data Collection

A standardized data collection sheet (Table 1) will be used for the study. All study variables will be collected by four separate investigators. As a part of a quality check, three investigators will independently dually extract data for a random selection of 5 journals (representing approximately 10% of the data set), in order to assess interrater reliability of the data collection. The kappa statistic and percent agreement will be reviewed and reported.

Table 1: Overview of journal and editor parameters

Journal data	Editor data
Journal Title	Name
First publication year	Position
Total years in publication	Gender
Country of origin	Source used to determine gender
World Bank country income	Ophthalmology training
World Bank country region	Doctor of Medicine
Journal subspecialty	Doctor of Philosophy
Journal network	Other academic degrees
Impact factor	Editor country of origin
Impact factor source	Total publications
Impact factor quartile	Publications within 5 years
SCImago indicator	Total citations
Total number of editors-in-chief	Year of first publication
Number of female editors-in-chief	H-index
Number of male editors-in-chief	M-quotient
Total number of editors	
Number of female editors	
Number of male editors	

Missing Data

If any of the variable of interest is unavailable or unclear from the above-mentioned resources, investigators will directly contact the journal based on the contact email information provided for the editorial office and/or EiC. Two attempts to contact will be made over a two-week period. If no response is obtained, the data will be coded as missing for all analyses.

Statistical Analysis

The interrater reliability will be assessed using Kappa statistic, and a cut-off of 0.8 will be used to determine if the investigators are in good agreement with regards to the data collection for a random selection of 5 journals. If the Kappa value is less than 0.8, the investigators will re-establish standard grading criteria and repeat quality check until Kappa value of 0.8 is achieved. All findings will be reported descriptively in tables or figures, and continuous variables will be reported using means and standard deviations, while categorical variables will be reported using percentages and proportions. The proportion of gender composition will be compared amongst journals grouped based on country income, geographical regions, subspecialty sections, and journal impact factor quartiles using the chi-square test. Linear regression analysis will be conducted with journal impact factor as the independent variable and female gender proportion as the dependent variable. Comparisons between the male and female board members as well as between journals of low and high female representation will be made using the chi-square test for categorical variables and the independent samples t-test for continuous variables. A p-value of 0.05 will be considered for statistical significance. Data will be analyzed using SPSS version 27 (SPSS Inc., Chicago, IL).

Patient and Public Involvement

The development and design of the protocol involved consultation with academic ophthalmologists and members of the scientific community that consume literature in the field of ophthalmology. The opinions and documented experiences that illustrate the challenges of female ophthalmologists during their training and career shaped the research question. Furthermore, the outcome measures were developed to provide explanations for why such gender disparity exists in ophthalmology leadership positions. The results from this study will be disseminated to local and national ophthalmology communities including professional societies and journals.

DISCUSSION

Women are underrepresented in medical leadership positions, especially in surgical specialties such as ophthalmology. This will serve as the first study to identify all ophthalmology journals including the non-English journals, and to investigate the underrepresentation of women in editorial roles within the field of ophthalmology globally. It is anticipated that the gender inequality of ophthalmic editorial board members may vary across different regions as the culture and political structure of a country may influence female participation in leadership positions. Furthermore, several subspecialties within ophthalmology including vitreoretinal surgery, are traditionally considered to be male-dominated specialties, and similar trend may be observed amongst the editorial board members of journals with greater emphasis on surgery. This study will also characterize impact factors, and the investigators hypothesize that there will be a lower representation of women in editorial boards of higher impact journals, and this gender

disparity may be even more apparent in the EiC position based on a previous study evaluating gender composition of the 20 highest-ranked ophthalmology journals.[5]

It is important to acknowledge the potential limitations of this study. Although we will be the largest and most comprehensive study to date on this topic, any international journals without English translation will be excluded, and thus foreign journals may be underrepresented in the study. Journal impact factor is a scientometric index calculated by Clarviate of the journals indexed on the Web of Science database. Some low impact and international journals may not be properly indexed on the Web of Science, and thus only a subset of the journals may have their impact factors available on Journal Citation Reports released by Clarivate. Furthermore, the investigators of this study will assign gender to each EiC or editor using the binary classification (men vs. women) based on data available publicly. It is possible that the assigned gender based on the photographs, first names and gender pronouns is different from the actual gender that the individual identifies with.

It is expected that Ophthalmology is not the only specialty that experiences significant gender disparity in leadership positions. The methodology outlined in the current protocol may be applicable to future studies investigating gender disparity in the editorial boards belonging to the journals of other specialties, which may allow comparisons of the findings across multiple fields within medicine.

ETHICS AND DISSEMINATION

Research ethics approval is not be necessary given the use of publicly available data and lack of human subjects. The study will be conducted in accordance with the Declaration of Helsinki. The results of this study will be disseminated through scientific conference presentations and research

publications. Overall, the findings from this study will identify any gender disparities and contribute to the knowledge on why such gaps exist as the first step to informing and addressing issues in diversity and inclusion.

AUTHORS' CONTRIBUTIONS

JP is the study lead and drafted the manuscript. YX and RX made significant contributions to the protocol development and data collection strategies. TF is the lead supervisor and contributed to the development of research question and its design. All authors read and approved the final manuscript.

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COMPETING INTERESTS

None declared.

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Primary Subject Heading:	Ophthalmology
Secondary Subject Heading:	Medical education and training
Keywords:	OPHTHALMOLOGY, Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, MEDICAL ETHICS

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ABSTRACT

Introduction

There is a notable underrepresentation of women in leadership positions in ophthalmology despite the increasing number of women as ophthalmologists. Gender inequality in editorial boards of ophthalmology journals has not been investigated on a global scale. This study will aim to evaluate the representation of women as editorial board members in ophthalmology journals across different regions, journal subspecialties and impact factors.

Methods and analysis

This will be a cross-sectional study describing the gender composition of editorial boards in ophthalmology journals globally. Ulrich's Periodicals Directory and SCImago Journal & Country Rank will be used to comprehensively identify journals indexed with the keyword, "ophthalmology." All journals with active websites and lists of editorial boards will be included. Journals will be categorized according to the World Bank's 2021 classification of countries by income and region, and classified into ophthalmology subspecialties based on publication scope. Impact factors will be obtained from Journal Citation Reports. The gender and academic degrees of each editorial board member will be determined based on journal profiles, institutional websites, or name query feature on an online interface. The research impact of each editorial board member will be ascertained from the author records on Web of Science. The gender proportion will be presented for all journals combined, and then for journals grouped by regions, subspecialties, and impact factors. Editorial board member characteristics including academic degrees and research productivity measures will be compared between men and women. These

1 comparisons will be made using the chi-square test for categorical variables and the independent

2 samples t-test for continuous variables.

3

4 Ethics and dissemination

5 This study did not require research ethics approval given the use of publicly available data and

6 lack of human subjects. The results will be presented at scientific meetings and published in

7 peer-reviewed journals. A preliminary version of the protocol is registered on Open Science

8 Framework (10.17605/OSF.IO/HGFR6).

1 **STRENGTHS AND LIMITATIONS OF THIS STUDY**

2 • This is the first study to investigate the representation of women in journal editorial

3 boards within the field of ophthalmology globally.

4 • The main strength of this study is the characterization of various journal characteristics

5 such as journal region, subspecialty focus and impact factor to understand their

6 associations with editorial board gender composition.

7 • The study relies on binary characterization of gender based on publicly available data,

8 and includes all English journals, which may have editorial board member that are not

9 indexed on databases.

1 **INTRODUCTION**

2 The editorial board of a scientific journals plays an important role as gatekeepers for the

3 advancement of academic surgeons and in shaping what published research and knowledge

4 become available to the public. Despite the steady increase in the number of women as

5 ophthalmologists and women authoring ophthalmic publications,[1,2] there appears to have been

6 only a marginal growth in the representation of women in leadership positions.[3] In 2011,

7 Amrein et al. identified a significant underrepresentation of women in editorial board

8 membership amongst the top 5 ophthalmic journals with no representation of women in the

9 editor-in-chief (EiC) position.[4] A decade later, a report by Camacci et al. demonstrated that

10 women continue to comprise a small proportion of the editorial board members in the 20 highest-

11 ranked journals.[5] However, these studies have only characterized the select top journals within

12 the field, majority of which were based in North America. The gender inequality may vary

13 across different countries and continents as demonstrated in a recent study by Holman et al. with

14 especially low proportion of women as authors publishing in STEMM (science, technology,

15 engineering, mathematics, and medicine) fields in certain countries like Japan, Germany, and

16 Switzerland.[6] As such, it is essential to evaluate the gender inequality in editorial boards of

17 ophthalmology journals across the globe, as the geographical origin of a journal may influence

18 participation of women in leadership positions. Furthermore, there are differences in ophthalmic

19 surgical subspeciality representation of women and no reports to date have characterized the

20 gender composition of editorial boards based on different subspecialties in ophthalmology. This

21 is important to consider as several subspecialties within ophthalmology including vitreoretinal

22 surgery, are traditionally considered to be specialties dominated by men.[7]

23

1   **Study Objectives**

2   The purpose of this study is to evaluate the representation of women in all ophthalmic journal

3   editorial boards globally. We will describe the proportion of women in editorial boards in

4   journals grouped by different ophthalmic subspecialties and journal impact factors. We will also

5   compare the publication productivity and demographic characteristics between men and women.

6

7   **METHODS AND ANALYSIS**

8   **Study Design**

9   This will be a cross-sectional study describing the gender composition of editorial board

10 members in ophthalmology journals globally from inception up to October 10, 2021, as well as

11 the productivity and demographic characteristics of board members based on gender. A

12 preliminary version of the protocol was registered on Open Science Framework (OSF)

13 (10.17605/OSF.IO/HGFR6).

14

15 **Databases Used**

16 The Ulrichsweb is an online version of Ulrich's Periodical Directory, which contains detailed

17 information on more than 300,000 periodicals of all types. The SCImago Journal & Country

18 Rank is a public portal that contains journals rank indicators developed from the Scopus

19 database. A comprehensive list of journals will be obtained through a sensitive search on the

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3   factors. Web of Science is a database that provides citation information and research impact

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11   periodicals containing the term "ophthalmology" in the subject classifications. Furthermore, the

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13   published as of October 10, 2021, and "journal" as the serial type. Additionally, in order to verify

14   that a comprehensive of journals has been selected, the SCImago Journal & Country Rank will

15   also be used to identify a list of ophthalmology journals. The lists from the two databases will be

16   merged and any duplicate journals identified will be removed. The list will be then manually

17   reviewed by the investigators to identify scholarly journals predominantly pertaining to

18   ophthalmology based on their title, affiliated societies, and target audience. Journals without a

19   valid journal website, and/or without a list of editorial board members will be excluded from the

20   analysis. Journals with websites in non-English languages will also be excluded if an automatic

21   English language conversion/equivalent is not provided by the website or Google (as translation

22   of names and designations may be inaccurate or incomplete).

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1 **Journal Data Characteristics**

2 For each included journal, the first publication year, years in publication, and gender

3 composition of editors-in-chief (EiC), editors, and advisory board members will be ascertained

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7 access from SCImago Journal & Country Rank will be obtained. The journal impact factor will

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13 World Bank's 2021 classification of countries by income (low vs. lower middle vs. upper middle

14 vs. high income) and geographical region.[8] The journal subspecialty will be determined from

15 the journal website by identifying terminology that classifies the journal into the following

16 subspecialty categories: general (comprehensive, ethics, and medical education, all subspecialties

17 combined), cataract and refractive surgery, cornea, glaucoma, retina and vitreoretinal surgery,

18 ocular oncology, ocular immunology/ocular inflammation/uveitis, strabismus and paediatrics,

19 neuro-ophthalmology, ocular histopathology, oculoplastics, and basic science.

20

21 **Editorial Board Data Characteristics**

22 EiCs from all included journals while editors and advisory board members from the journals with

23 impact factors listed on Journal Citation Reports will be considered for the analysis of editorial

1 board characteristics. An editor will be defined as anyone that is not EiC holding positions with

2 decisive functions regarding manuscript acceptance. This definition will include positions such

3 as senior editors, associate editors, and section editors. Advisory board members will be included

4 as a separate group from EiCs and editors. Administrative staffs such as managing, copy,

5 illustration, video and technical editors will not be included. For each editorial board member,

6 gender (man vs. woman) will be identified through profiles (biography and/or photograph within

7 the past 10 years) on institutional affiliation websites. If no profiles are available, gender will be

8 defined using an application programming interface (https://gender-api.com) which generates a

9 percentage value indicating the certainty of the gender determined by the first name. A cut-off of

10 90% certainty will be used, and any individual whose gender cannot be determined with

11 certainty equal to or greater than 90% will have their gender verified via an exhaustive Google

12 search.[9] If the gender cannot be determined after the above-mentioned steps, the editorial

13 member will be denoted to have an unknown gender. The designation of ophthalmologist versus

14 non-ophthalmologist, as well as any academic degrees including Doctor of Medicine (MD),

15 Doctor of Philosophy (PhD), and any non-MD or PhD degrees will be collected via the journal

16 website profiles or institutional affiliation profiles. If this information is not readily available

17 from the website and institutional profile, the editorial board member will be determined to be an

18 ophthalmologist if they were either listed on the websites of the physician governing bodies (e.g.,

19 American Board of Ophthalmology, Canadian Ophthalmological Society American Society of

20 Retina Specialists) or had professional profiles indicating ophthalmology residency training or

21 their position as ophthalmologists.[10] Board members not meeting any of the criteria above will

22 be designated as non-ophthalmologists (or unknown if no information can be identified).

1 Information on academic degrees will be obtained from the editorial board member's most recent

2 two publications.

3   The Web of Science will be accessed to determine each member's country of origin, total

4 number of publications, number of publications in the recent five years, number of citations by

5 other documents, and h-index (defined as the number of publications (h) that have received at

6 least h citations). Lastly, the m-quotient, which is a metric that facilitates comparisons of

7 research productivity amongst authors with varying lengths of academic careers, will be

8 calculated by dividing the h-index by the number of years since the first published paper. If the

9 data on research impact is not available on Web of Science, the Scopus database will be used to

10 collect the above-mentioned variables for each editorial member included in the study.

11

12 **Study Outcomes**

13 The overall gender proportion of EiCs, editors and advisory board members will be presented

14 separately. Additionally, the gender proportions based on specific journal characteristics

15 including, journal impact factor, impact factor quartiles, geographical region category, and

16 journal subspecialty category will be characterized and compared.

17   The study will also compare the composition of ophthalmologists vs. non-

18 ophthalmologists, degrees (medical, PhD, and non-medical or non-PhD degrees), country of

19 origin, as well as productivity measures (total number of publications, number of publications in

20 the recent 5 years, number of citations, h-index, and m-quotient) between men and women.

21

22 **Data Collection**

1 A standardized data collection sheet (Table 1) will be used for the study. All study variables will

2 be collected by four separate investigators. As a part of a quality check, three investigators will

3 independently dually extract data for a random selection of 5 journals (representing

4 approximately 10% of the data set), in order to assess interrater reliability of the data collection.

5 The kappa statistic and percent agreement will be reviewed and reported.

6

7 **Table 1: Overview of journal and editorial board parameters**

8

Journal data	Editorial Board data
Journal Title	Name
First publication year	Position
Total years in publication	Gender
Country of origin	Source used to determine gender
World Bank country income	Ophthalmology training
World Bank country region	Doctor of Medicine
Journal subspecialty	Doctor of Philosophy
Journal network	Other academic degrees
Impact factor	Editorial member country of origin
Impact factor source	Total publications
Impact factor quartile	Publications within 5 years
SCImago indicator	Total citations
Total number of editors-in-chief	Year of first publication
Number of women as editors-in-chief	H-index
Number of men as editors-in-chief	M-quotient
Total number of editors	
Number of women as editors	
Number of men as editors	
Number of women as advisory board members	
Number of men as advisory board members	

9

10 **Missing Data**

11 If any of the variable of interest is unavailable or unclear from the above-mentioned resources,

12 investigators will directly contact the journal based on the contact email information provided for

13 the editorial office and/or EiC. Attempts to contact will be made over a two-week period. If no

14 response is obtained, the data will be coded as missing for all analyses.

Statistical Analysis

The interrater reliability will be assessed using Kappa statistic, and a cut-off of 0.8 will be used to determine if the investigators are in good agreement with regards to the data collection for a random selection of 5 journals. If the Kappa value is less than 0.8, the investigators will re-establish standard grading criteria and repeat quality check until Kappa value of 0.8 is achieved. Data will be reported descriptively for the proportion of women in EiC, editor and advisory board positions in all ophthalmology journals, as well as in each journal category by region and subspecialty. For continuous variables such as journal impact factor, publishing years, number of publications, publications in the last 5 years, number of citations, h-index and m-quotient, normality will be tested using histograms of data spread, Q-Q plots, and the Kolmogorov-Smirnov tests. Normally distributed variables will be presented as mean and standard deviation and compared using the independent samples t-test. Non-parametrically distributed variables will be reported using median with interquartile range and compared using the Mann-Whitney U test. For categorial variables such as journal subspecialty, categories of country of origin and degree type, proportions will be reported, and the chi-squared test will be used to compare frequencies between men and women in the editorial boards. Linear regression analysis will be conducted with journal impact factor as the independent variable and proportion of women as the dependent variable. A p-value of 0.05 will be considered for statistical significance. Data will be analyzed using SPSS version 27 (SPSS Inc., Chicago, IL).

Patient and Public Involvement

The development and design of the protocol involved consultation with academic ophthalmologists and members of the scientific community that consume literature in the field of

1 ophthalmology. The opinions and documented experiences that illustrate the challenges of

2 women as ophthalmologists during their training and career shaped the research question.

3 Furthermore, the outcome measures were developed to provide explanations for why such

4 gender disparity exists in ophthalmology leadership positions. The results from this study will be

5 disseminated to local and national ophthalmology communities including professional societies

6 and journals.

7

8 **DISCUSSION**

9 Women are underrepresented in medical leadership positions, especially in surgical specialties

10 such as ophthalmology. This will serve as the first study to identify all ophthalmology journals

11 including the non-English journals, and to investigate the underrepresentation of women in

12 editorial roles within the field of ophthalmology globally. It is anticipated that the gender

13 inequality of ophthalmic editorial board members may vary across different regions as the

14 culture and political structure of a country may influence participation of women in leadership

15 positions. Furthermore, several subspecialties within ophthalmology including vitreoretinal

16 surgery, are traditionally considered to be specialties dominated by men, and similar trend may

17 be observed amongst the editorial board members of journals with greater emphasis on surgery.

18 This study will also characterize impact factors, and the investigators hypothesize that there will

19 be a lower representation of women in editorial boards of higher impact journals, and this gender

20 disparity may be even more apparent in the EiC position based on a previous study evaluating

21 gender composition of the 20 highest-ranked ophthalmology journals.[5]

22   It is important to acknowledge the potential limitations of this study. Although we will be

23 the largest and most comprehensive study to date on this topic, any international journals without

1 English translation will be excluded, and thus foreign journals may be underrepresented in the

2 study. Journal impact factor is a scientometric index calculated by Clarivate of the journals

3 indexed on the Web of Science database. Some low impact and international journals may not be

4 properly indexed on the Web of Science, and thus only a subset of the journals may have their

5 impact factors available on Journal Citation Reports released by Clarivate. Furthermore, the

6 investigators of this study will assign gender to each editorial board member using the binary

7 classification (men vs. women) based on data available publicly. It is possible that the assigned

8 gender based on the photographs, first names and gender pronouns is different from the actual

9 gender that the individual identifies with.

10 It is expected that Ophthalmology is not the only specialty that experiences significant

11 gender disparity in leadership positions. The methodology outlined in the current protocol may

12 be applicable to future studies investigating gender disparity in the editorial boards belonging to

13 the journals of other specialties, which may allow comparisons of the findings across multiple

14 fields within medicine.

15

16 **ETHICS AND DISSEMINATION**

17 Research ethics approval will not be necessary given the use of publicly available data and lack

18 of human subjects. The study will be conducted in accordance with the Declaration of Helsinki.

19 The results of this study will be disseminated through scientific conference presentations and

20 research publications. Overall, the findings from this study will identify any gender disparities

21 and contribute to the knowledge on why such gaps exist as the first step to informing and

22 addressing issues in diversity and inclusion.

23

1 **AUTHORS' CONTRIBUTIONS**

2 JP is the study lead and drafted the manuscript. YX and RX made significant contributions to the

3 protocol development and data collection strategies. TF is the lead supervisor and contributed to

4 the development of research question and its design. All authors read and approved the final

5 manuscript.

6

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8 This research received no specific grant from any funding agency in the public, commercial or

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10

11 **COMPETING INTERESTS**

12 None declared.

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