

# #Ophthalmology: Social Media Utilization and Impact in Ophthalmology Journals, Professional Societies, and Eye Health Organizations

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**Aim:** To evaluate and quantify social media presence of ophthalmology peer-reviewed journals, professional societies, and eye health organizations, and to determine if there is a correlation between social media utilization and Twitter engagement metrics or journal impact measures.

**Methods:** We searched for online profiles of 100 ophthalmology peer-reviewed journals, 333 professional ophthalmology societies, and 40 eye health organizations on Facebook, Twitter, and Instagram. Impact was quantified by recording the number of “likes” on Facebook and number of followers on Twitter and Instagram. We also used Twitonomy software to obtain advanced Twitter metrics for all journal accounts from 2018 to 2021, and compared to journal impact measured by SCImago Journal Rank (SJR) score, the h-index, and impact factor.

**Results:** Eye health organizations averaged significantly greater Facebooks “likes” and Twitter followers than both peer-reviewed journals and professional societies ( $p < 0.0001$ ). Of 100 journals studied, 30% were active on Twitter, 25% on Facebook, and 6% on Instagram. Slightly more than half of all journal-affiliated social media accounts were accessible from the journal website. Among journals with active Twitter accounts, total followers, total tweets, average retweets, and average “favorites” were all significantly positively correlated with academic metrics such as the SJR, h-index, and/or impact factor.

**Conclusion:** Greater social media engagement is associated with higher ophthalmology journal impact metrics; however, ophthalmology journals and professional societies lag behind eye health organizations in social media engagement. Although unable to demonstrate causality, social media may be an underutilized visibility, communication, and dissemination tool.

**Keywords:** social media, journal, ophthalmology, society, organization

## Introduction

Social media encompasses a wide array of websites and other internet-based communication platforms used for information sharing and social and professional contact.

The past decade has been marked by a rapid rise in popularity of many social media platforms, with more than 70% of Americans indicating that they have used at least one social media platform including Facebook, Twitter, and Instagram.<sup>1</sup> Increased social media use among the general public has coincided with rapid social media growth in the medical field for both patient education and physician networking.<sup>2,3</sup> At academic institutions, social media can be used to share accolades and honors as well as breakthroughs and human interest stories, each contributing to program reputation.<sup>4</sup> Eye health organizations may utilize social networking to build a network of supporters, fundraise, and plan advocacy efforts.<sup>5</sup> Medical professional societies may employ social media to relay updated guidelines and other important news to their members, allowing for widespread, rapid distribution of clinically relevant information.<sup>6</sup> For peer-reviewed journals, social media represents an opportunity to engage with readership, share published articles, and facilitate discussion on the latest medical research, with previous studies suggesting that an active social media presence may contribute to increased research impact.<sup>7</sup>

While several studies have recently reported on social media usage in medical specialties including dermatology, orthopaedics, urology, and neurosurgery, information on the current state of social media utilization by ophthalmology peer-reviewed journals, professional societies, and/or eye health organizations remains limited.<sup>6,8–10</sup> As recently as 2014, social media was infrequently utilized in medicine, limited in scope (platforms such as Instagram not yet widespread), and unpopular amongst older Americans.<sup>1,11,12</sup> Additionally, since 2014, there has been a concerted effort to improve academic ophthalmology's social media presence. For example, in the past 7 years, the American Academy of Ophthalmology (AAO), the world's largest association of eye physicians and surgeons, has promoted annual meeting hashtags (such as #AAO2015) on Twitter, created an Instagram account (2017), and posted a "Social Media Toolkit" on the American Academy of Ophthalmology official website (2020).<sup>13,14</sup>

In this study, we perform an updated assessment to evaluate and quantify social media utilization by ophthalmology peer-reviewed journals, professional societies, and eye health organizations on three popular social media platforms: Facebook, Twitter, and Instagram. We hypothesize that there will be increased social media utilization among journals, professional societies, and eye health organizations when compared with 2014 metrics, and that journal social media engagement will be correlated to journal impact.

## Materials and Methods

Data were obtained from publicly available social media profiles and activity. This study was deemed exempt by the Stanford University School of Medicine Institutional Review Board. All data were collected between August 1, 2021 and August 8, 2021.

### Ophthalmology Peer-Reviewed Journals: Selection Criteria and Social Media Metrics

We obtained a list of the top 100 ophthalmology peer-reviewed journals from the SCImago journal ranking database on August 1, 2021.<sup>15</sup> The following criteria were used when retrieving journals: medicine (subject), ophthalmology (subject category), all countries (region), 2021 (year), and journals (type). For each journal included in our study, we noted three impact performance metrics: SCImago Journal Rank (SJR) score, h-index, and impact factor. The SJR is a measure of academic influence that considers the number of citations received by a journal in addition to the influence of the citing journals.<sup>16</sup> The h-index measures productivity and citation impact of authors contributing to a journal.<sup>17</sup> The impact factor is a measure of the frequency with which the average article in a journal has been cited in a particular year.<sup>18</sup>

We then searched for each ophthalmology journal on three different social media platforms (Facebook, Twitter, and Instagram) using both the name of the journal and the journal abbreviation using the search feature of each platform. If the journal account did not appear as a result of the direct search, we performed a Google search using the search term "[Journal name] Facebook", "[Journal name] Twitter", or "[Journal name] Instagram". If a social media account still could not be located, we visited the journal's website and searched for links to social media platforms. To evaluate social media accessibility, we calculated the percentage of journal-affiliated social media accounts that were linked to the website homepage. Journal popularity was quantified by recording the number of page "likes" on Facebook and account followers on both Twitter and Instagram. Only social media accounts dedicated specifically to disseminating journal information were included in our analysis. We excluded social media accounts of journal publishers from our analysis, as publisher social media accounts often post about their affiliated journals from a wide variety of topics and are not specific to ophthalmology.

### Professional Ophthalmology Societies: Selection Criteria and Social Media Metrics

We used the list of professional ophthalmology societies provided on the International Council of Ophthalmology (ICO) website.<sup>19</sup> We searched for the Facebook, Twitter, and Instagram profiles of 182 societies that are members of the ICO as well as 151 societies that are not members of the ICO but are listed on the ICO website. We subsequently recorded information about the number of Facebook "likes", Twitter followers, and Instagram followers for each society, respectively.

### Eye Health Organizations: Selection Criteria and Social Media Metrics

We obtained a list of 40 eye health organizations from the American Academy of Ophthalmology (AAO) website. Organizations were either listed as "International Eye Care Organizations" or "Eye Health Organizations" on the AAO

website.<sup>20,21</sup> We then recorded the number of Facebook “likes”, Twitter followers, and Instagram followers for each of the organizations, utilizing the same protocol implemented for peer-reviewed journals and professional ophthalmology societies.

## Twitter Activity Metrics

In August 2021, each Twitter profile affiliated with an ophthalmology journal was evaluated using Twitonomy analytics software (Twitonomy, Sydney, New South Wales, Australia). For each journal Twitter account analyzed, tweet data were collected for a 3-year time period: August 1, 2018 to August 1, 2021. A tweet is defined as a “public statement released by a Twitter profile that contains text, photographs, videos, or links to other websites”.<sup>22</sup> After a tweet is posted, other Twitter users can “retweet” or “favorite” the tweet. The more often a tweet is “retweeted” or “favorited”, the greater its visibility on the Twitter platform for other users. Twitonomy is a software program that provides metrics such as number of tweets, retweets, replies, and total user mentions after a user specifies a given Twitter account.<sup>23</sup> We used Twitonomy to collect information on total tweets, number of tweets per day, average retweets per tweet, and average favorites per tweet for the Twitter profiles affiliated with ophthalmology journals included in this study.

## Statistical Analysis

The statistical methods used for our analyses acknowledge that our data violated assumptions for parametric analysis, which is consistent with similar studies in other medical specialties examining social media metrics.<sup>24,25</sup> As such, Mann–Whitney *U*-tests and Kruskal–Wallis tests were used to compare popularity metrics (“likes” and/or followers) among the three groups of interest in this study (journals, professional societies, and eye health organizations) and also to compare academic metrics between journals with and without social media accounts. Among journals with Twitter accounts, the Spearman rank-order correlation test was used to evaluate correlation between Twitter engagement and academic metrics. The strength of the relationship was described by the correlation coefficient. *P* values are based on 2-sided tests, and values less than 0.05 were considered significant.

## Results

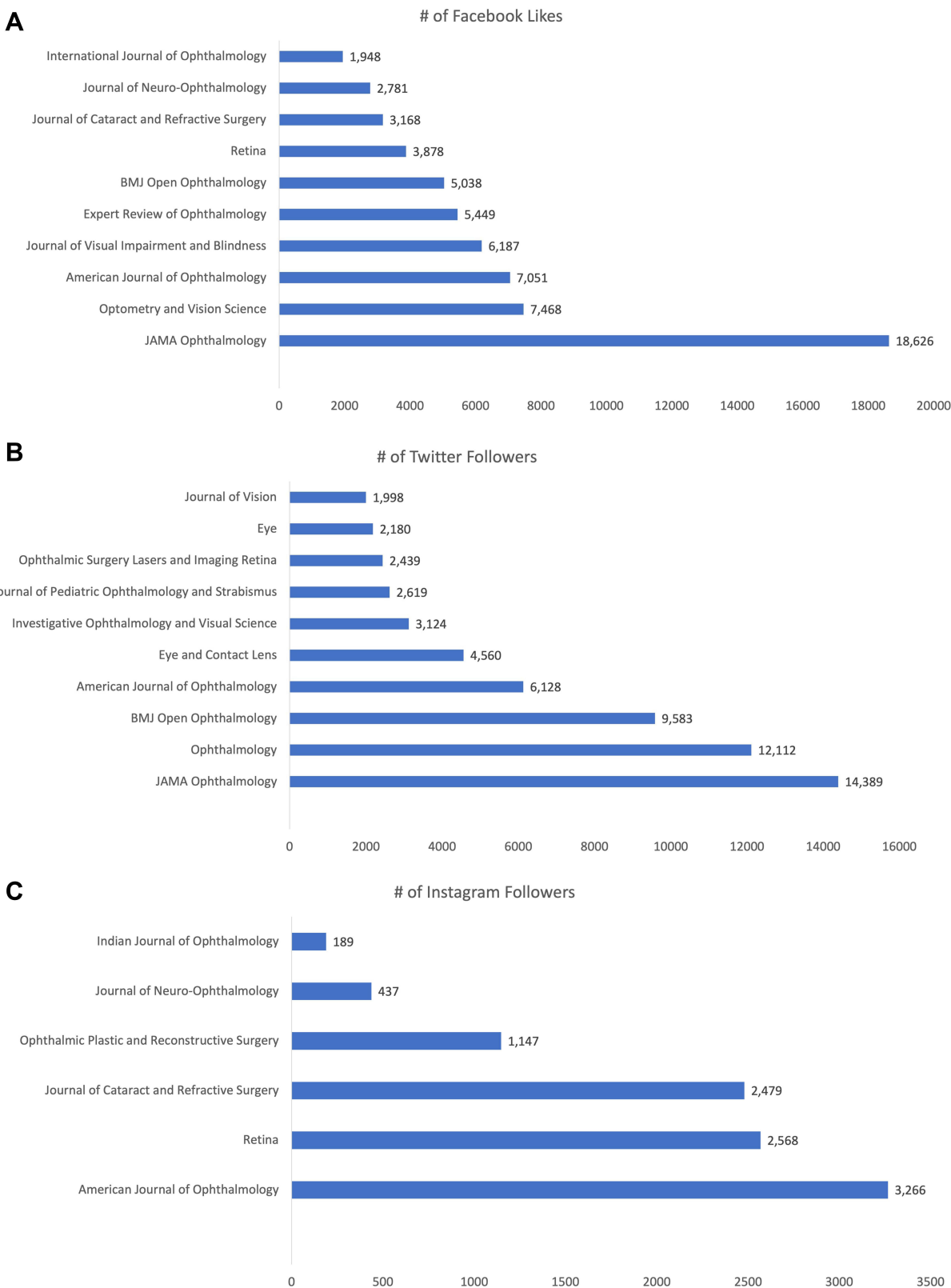
### Social Media Metrics - Ophthalmology Journals, Professional Societies, and Eye Health Organizations

Of the top 100 ophthalmology journals ranked by SCImago, 30/100 (30.0%) were active on Twitter, 25/100 (25.0%) were active on Facebook, and 6/100 (6%) active on Instagram. The median number of followers on each of the platforms varied greatly across each of the journals included in our analysis.

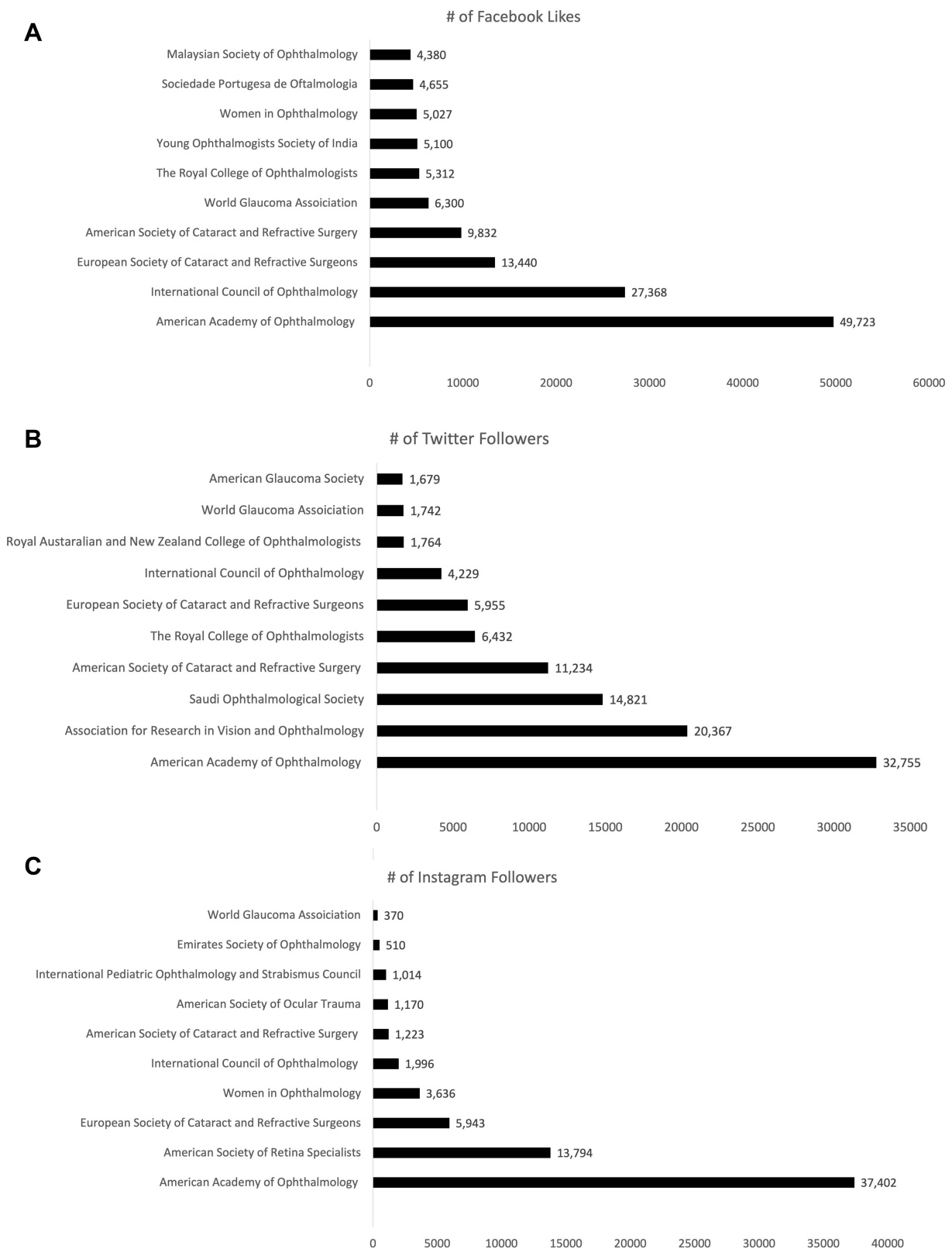
Among the 30 ophthalmology journals with active Twitter accounts, 19 (63.3%) provided a link to the appropriate Twitter feed on their journal homepage. Facebook links were listed on the journal homepage for 10 of the 25 journals with a Facebook presence (40.0%), and Instagram links were listed on the journal homepage for 3 of the 6 journals on Instagram (50.0%).

The median number of Twitter followers for the 30 ophthalmology journals on Twitter was 913 (Q1 = 250, Q3 = 2619). For the 25 ophthalmology journals with a Facebook presence, the median number of “likes” for the journal’s affiliated Facebook page was 1640 (Q1 = 207, Q3 = 4458). For the 6 ophthalmology journals with an active Instagram account, the median number of followers was 1813 (Q1 = 436, Q3 = 2568). **Figure 1A** and **B** show the number of Facebook “likes” and Twitter followers for the 10 ophthalmology journals with the greatest number of Facebook “likes” and Twitter followers, respectively. **Figure 1C** shows the number of followers for each journal with an active Instagram account.

Among professional ophthalmology societies, 92 of the 333 societies evaluated had an affiliated Facebook page (27.5%), while 22 (6.7%) maintained active Twitter accounts, and 15 (4.5%) maintained active Instagram accounts. Facebook pages associated with ophthalmology societies received a median of 1115 “likes” (Q1 = 343, Q3 = 3536), Twitter accounts had a median of 1056 followers (Q1 = 167, Q3 = 5955), and Instagram accounts had a median of 1170 followers (Q1 = 440, Q3 = 4790). **Figure 2A–C** shows the number of Facebook “likes”, Twitter followers, and Instagram followers for the 10 professional ophthalmology societies with the greatest number of Facebook “likes”, Twitter followers, and Instagram followers, respectively.



**Figure 1** Facebook “Likes”, Twitter followers, and Instagram followers for the Most Active Ophthalmology Peer-Reviewed Journals on Facebook, Twitter, and Instagram. **(A)** Number of Facebook “Likes” for the top 10 ophthalmology peer-reviewed journals with the most “Likes” on their Facebook page. **(B)** Number of Twitter followers for the 10 ophthalmology peer-reviewed journals with the greatest number of Twitter followers. **(C)** Number of Instagram followers for the 6 ophthalmology peer-reviewed journals with the greatest number of Instagram followers.



**Figure 2** Facebook “Likes”, Twitter followers, and Instagram followers for the Most Active Ophthalmology Professional Societies on Facebook, Twitter, and Instagram. **(A)** Number of Facebook “Likes” for the 10 ophthalmology professional societies with the most “Likes” on their Facebook page. **(B)** Number of Twitter followers for the 10 ophthalmology professional societies with the greatest number of Twitter followers. **(C)** Number of Instagram followers for the 10 ophthalmology professional societies with the greatest number of Instagram followers.

Of the 40 eye health organizations studied, 32/40 (80.0%) were active on Facebook, while 28/40 (70.0%) maintained Twitter accounts and 23/40 (57.5%) maintained active Instagram accounts. Eye health organization Facebook pages received a median of 13,686 “likes” (Q1 = 1901, Q3 = 43,244), while eye health organization Twitter accounts had a median of 6512 followers (Q1 = 1647, Q3 = 11,294) and eye health organization Instagram accounts had a median of 1913 followers (Q1 = 611, Q3 = 5337). **Figure 3A–C** shows the number of Facebook “likes”, Twitter followers, and Instagram followers for the 10 eye health organizations with the greatest number of Facebook “likes”, Twitter followers, and Instagram followers, respectively. **Table 1** summarizes the popularity measures for the five ophthalmology journals, professional societies, and eye health organizations with the greatest number of Facebook “likes”, Twitter followers and Instagram followers.

Comparing the number of Facebook “likes”, Twitter followers, and Instagram followers among ophthalmology journals, professional societies, and eye health organizations studied, eye health organizations received more Facebooks “likes” and maintained more Twitter followers than both ophthalmology journals ( $p < 0.0001$  for Facebook and Twitter, respectively) and professional societies ( $p < 0.0001$  for Facebook and  $p = 0.0108$  for Twitter). There was not a significant difference in the number of Instagram followers when comparing ophthalmology journals, professional societies, and eye health organizations ( $p = 0.6189$ ).

## Social Media Activity and Journal Impact

All 100 journals studied had SJR, h-index, and impact factor records available. The average SJR score was  $0.99 \pm 1.00$  (range 0.171–7.198). The journal with the highest SJR score was *Progress in Retinal and Eye Research*. The average H-index for all journals studied was  $55.6 \pm 48.9$  (range 4–244). The journal with the highest h-index was *Ophthalmology*. The average impact factor for all journals studied was 2.58 (range 0.22–21.20). *Progress in Retinal and Eye Research* had the highest impact factor (21.20).

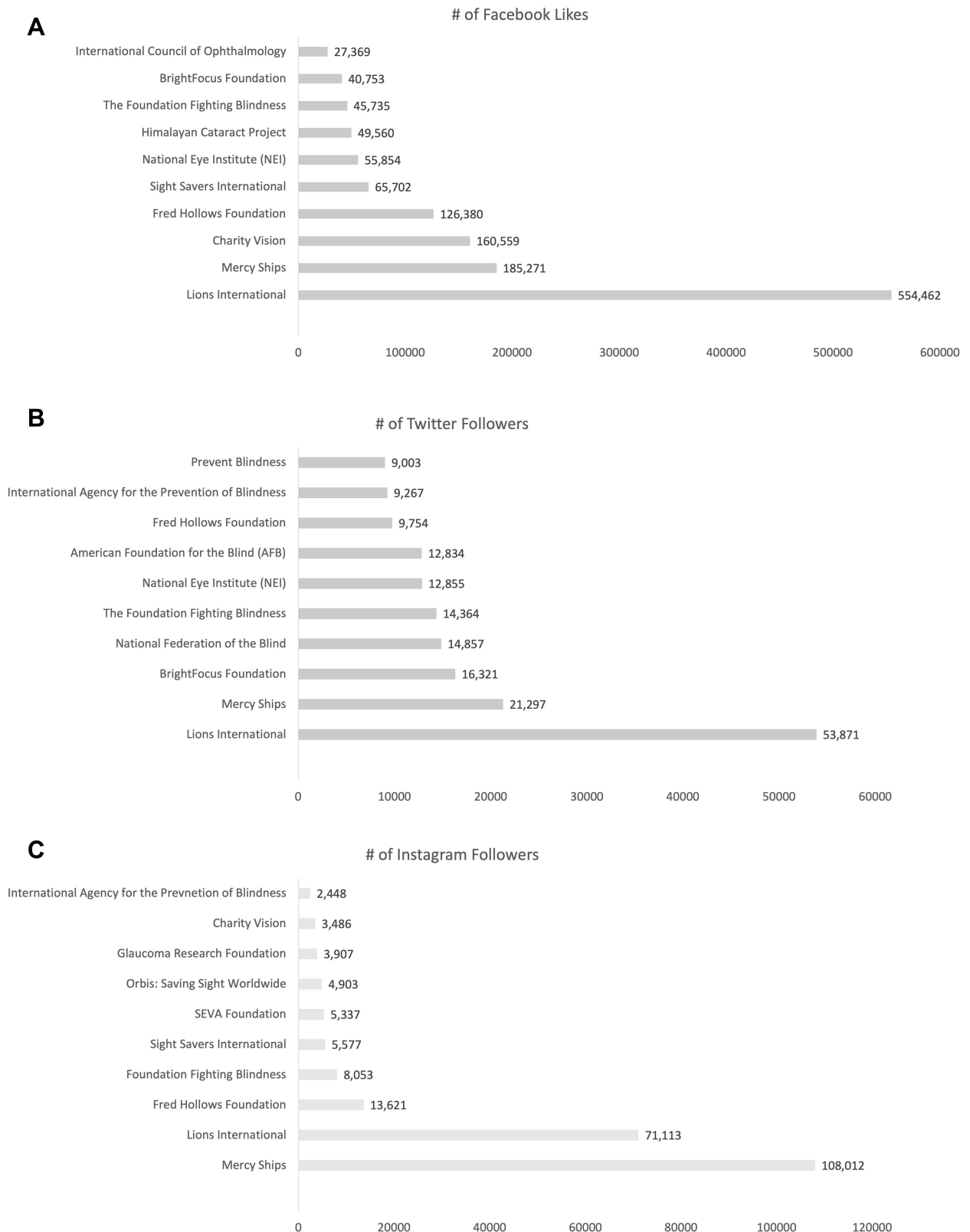
Average SJR score, h-index, and impact factor were similar for journals with and without Facebook pages and Instagram accounts; however, journals with active Twitter accounts had a higher average h-index ( $p = 0.036$ ) and impact factor ( $p = 0.012$ ) than journals without Twitter accounts (**Table 2**).

## Twitter Engagement and Journal Impact

We completed an in-depth analysis of Twitter activity for all 30 ophthalmology journals that had affiliated Twitter accounts. We recorded 15,406 tweets from the 30 journals included in our study throughout the study period. Ophthalmology journal accounts averaged 0.67 tweets per day, with a wide range, from 0 to 6.34 tweets per day. Significant correlations were observed between Facebook “likes” and impact factor ( $p = 0.0012$ ), Twitter follower count and SJR rank ( $p = 0.0002$ ), and Twitter follower count and impact factor ( $p = 0.0001$ ). Additionally, significant correlations between total tweets and SJR rank ( $p = 0.0009$ ), h-Index ( $p = 0.0020$ ), and impact factor ( $p < 0.0001$ ) were observed. Significant correlations were also noted between average number of retweets and SJR rank ( $p = 0.0101$ ) and average number of retweets and impact factor ( $p = 0.0028$ ). Significant correlations between average number of favorites and SJR rank ( $p = 0.0045$ ), h-index ( $p = 0.0250$ ), and impact factor ( $p = 0.0032$ ) were noted. Finally, significant correlations between Instagram follower count and SJR rank ( $p = 0.0416$ ), h-Index ( $p = 0.0048$ ), and impact factor ( $p = 0.0416$ ) were also observed (**Table 3**).

## Discussion

Social media platforms such as Facebook, Twitter, and Instagram enable dissemination of information widely and rapidly. However, we find that social media activity among both ophthalmology peer-reviewed journals and ophthalmology professional societies is low, lagging far behind eye health organizations in account engagement. Twitter (30%) was the most common social media platform utilized by ophthalmology journals, followed by Facebook (25%) and Instagram (6%). Journals with Twitter accounts had significantly higher h-index values and impact factors when compared to journals without Twitter accounts. Additionally, among journals with Twitter accounts, strong positive correlations were observed between Twitter metrics (such as total number of followers, total tweets, average number of retweets, and average number of favorites) and journal academic metrics such as SJR rank, h-index, and impact factor. Finally, our



**Figure 3** Facebook “Likes”, Twitter followers, and Instagram followers for the most active eye health organizations on Facebook, Twitter, and Instagram. **(A)** Number of Facebook “Likes” for the 10 eye health organizations with the most “Likes” on their Facebook page. **(B)** Number of Twitter followers for the 10 eye health organizations with the greatest number of Twitter followers. **(C)** Number of Instagram fFollowers for the 10 eye health organizations with the greatest number of Instagram followers.

**Table 1** Ophthalmology Journals, Professional Societies, and Eye Health Organizations with the Greatest Number of Facebook “Likes”, Twitter Followers, and Instagram Followers

<b>Peer-Reviewed Journals</b>					
<b>Journal</b>	<b>Facebook “Likes”</b>	<b>Journal</b>	<b>Twitter Followers</b>	<b>Journal</b>	<b>Instagram Followers</b>
<i>JAMA Ophthalmology</i>	18,626	<i>JAMA Ophthalmology</i>	14,389	<i>American Journal of Ophthalmology</i>	3226
<i>Optometry and Vision Science</i>	7468	<i>Ophthalmology</i>	12,112	<i>Retina</i>	2568
<i>American Journal of Ophthalmology</i>	7051	<i>BMJ Open Ophthalmology</i>	9583	<i>Journal of Cataract and Refractive Surgery</i>	2479
<i>Journal of Visual Impairment and Blindness</i>	6187	<i>American Journal of Ophthalmology</i>	6128	<i>Ophthalmic Plastic and Reconstructive Surgery</i>	1147
<i>Expert Review of Ophthalmology</i>	5449	<i>Eye and Contact Lens</i>	4560	<i>Indian Journal of Ophthalmology</i>	189
<b>Professional Societies</b>					
<b>Society</b>	<b>Facebook “Likes”</b>	<b>Society</b>	<b>Twitter Followers</b>	<b>Society</b>	<b>Instagram Followers</b>
American Academy of Ophthalmology	49,723	American Academy of Ophthalmology	32,755	American Academy of Ophthalmology	37,402
International Council of Ophthalmology	27,368	Association for Research in Vision and Ophthalmology	20,367	American Society of Retina Specialists	13,794
European Society of Cataract and Refractive Surgeons	13,440	Saudi Ophthalmological Society	14,821	European Society of Cataract and Refractive Surgeons	5943
American Society of Cataract and Refractive Surgery	9832	American Society of Cataract and Refractive Surgery	11,234	Women in Ophthalmology	3636
World Glaucoma Association	6300	The Royal College of Ophthalmologists	6432	International Council of Ophthalmology	1996
<b>Eye Health Organization</b>					
<b>Organization</b>	<b>Facebook “Likes”</b>	<b>Organization</b>	<b>Twitter Followers</b>	<b>Organization</b>	<b>Instagram Followers</b>
Lions International	554,462	Lions International	53,871	Mercy Ships	108,012
Mercy Ships	185,271	Mercy Ships	21,297	Lions International	71,113
Charity Vision	160,559	BrightFocus Foundation	16,321	Fred Hollows Foundation	13,621
Fred Hollows Foundation	126,380	National Federation of the Blind	14,857	Foundation Fighting Blindness	8053
Sight Savers International	65,702	The Foundation Fighting Blindness	14,364	Sight Savers International	5577

**Table 2** Ophthalmology Peer-Reviewed Journal Impact with and without Social Media Presence

	n	Average SJR Score	Average h-Index	Average Impact Factor
<b>Facebook</b>				
Facebook	25	0.98	68.4	2.30
No Facebook	75	0.99	51.2	2.92
<i>p-value</i>		0.418	0.101	0.36
<b>Twitter</b>				
Twitter	30	1.15	78.1	2.88
No Twitter	70	0.95	47.3	2.13
<i>p-value</i>		0.136	<b>0.036</b>	<b>0.012</b>
<b>Instagram</b>				
Instagram	5	1.15	84.8	3.13
No Instagram	95	0.99	54.3	2.64
<i>p-value</i>		0.589	0.067	0.089

**Note:** Bold: Statistically significant at level of 0.05.

**Table 3** Correlation ( $r_s$ ) Between Social Media and Academic Metrics for Ophthalmology Journals

	SJR	h-Index	Impact Factor
Facebook “likes”	0.357	0.356	0.467**
Twitter followers	0.623**	0.341	0.616**
Total tweets	0.582**	0.550**	0.645**
Average no. of retweets	0.470**	0.335	0.471**
Average no. of favorites	0.512**	0.415**	0.511**
Instagram followers	0.828**	0.942**	0.828**

**Note:** \*\*Statistically significant at level of 0.05.

**Abbreviation:** SJR, SCImago Journal Rank.

study revealed room for growth in journal social media account accessibility, with only 60% of journal-affiliated Twitter accounts, 50% of journal-affiliated Instagram accounts, and 40% of journal-affiliated Facebook accounts linked to the journal’s website. Providing a link to active social media accounts on the journal website may increase account visibility and engagement.

Compared to social media presence of ophthalmology journals and professional societies, Facebook and Twitter profiles of eye health organizations received significantly more “likes” and followers than those of journals and professional societies. This may reflect that one of the goals of eye health organizations is often to inform and interact with the general public, whereas journal and professional society social media profiles may have more focused outreach to their target audience of ophthalmologists. However, with growing use of social media across many settings and contexts, its role, need, and value for both journals and professional societies is likely to grow. Furthermore, cross-platform partnerships such as between ophthalmology professional societies and eye health organizations offer an opportunity to disseminate information to wider audiences than either can achieve alone. For example, during the COVID-19 pandemic, questions surfaced in the public regarding excess eye strain that could result from extended screen time due to work from home/virtual school restrictions implemented in the United States.<sup>26</sup> As a result, many people purchased blue-blocking lenses in an attempt to reduce digital eye strain.<sup>27</sup> In February 2021, the *American Journal of Ophthalmology* published an article indicating that blue-blocking lenses did not alter signs or symptoms of eye strain that may occur from extended computer use.<sup>28</sup> The journal tweeted the article on its official Twitter account (@AJOphthalmology) and it was the most “retweeted” and “favorited” tweet in the journal’s account history (created in 2014), with 481 retweets and 1024 favorites. Partnering with a well-developed eye health organization with a strong social media presence could exponentially expand the distribution of the message, as eye health organizations included in

this study averaged approximately three times the number of Twitter followers and nearly 16 times the number of Facebook “likes” as ophthalmology peer-reviewed journals.

Utilizing eye health organizations as a distribution channel would also help to relay of accurate information to patients and could make it easier for patients to sift through the tremendous amount of medical misinformation that often circulate through social media platforms.<sup>29,30</sup> The strong social media following for several eye health organizations suggests that patients are turning to social media to learn more about their eye health. It is incumbent upon the entities with the most accurate, up-to-date information to utilize broad distribution channels; partnerships between eye health organizations and other eye health organizations offer another potential opportunity through social media, to ensure that patients seeking eye-related education online are receiving accurate information.

Twitter was the most common social media platform utilized by ophthalmology journals, but Twitter use among journals remains low relative to journals in many other medical specialties. For example, recent studies reveal that 36% of otolaryngology journals, 44% of trauma and orthopaedic surgery journals, and 50% of plastic surgery journals maintained active Twitter profiles.<sup>25,31,32</sup> In addition, although the presence of social media in medicine has increased dramatically in the past decade, the proportion of ophthalmology journals with an active social media presence has not.<sup>3,33,34</sup> The percentage of peer-reviewed ophthalmology journals with active Twitter and Facebook accounts increased by 11.3% and 3.5% respectively since 2014 to current utilization rates that remain lower than many other medical specialties.<sup>11,25,31,32</sup> The larger relative increase in the number of ophthalmology journals with active Twitter accounts is especially notable given the rise of #MedTwitter in the past decade, with medical professionals using the medium to network with other providers, disseminate research findings, and engage in patient education and outreach. Furthermore, our results indicate that only 6% of ophthalmology journals maintain active Instagram accounts. In a recent survey of ophthalmology residency applicants, Instagram was the most commonly used social media platform used by applicants, and journals that adopt Instagram accounts to share information may find interested readers on the platform in the next generation of ophthalmologists, current ophthalmology residency applicants.<sup>35</sup>

While the results of our study indicate similarities in academic metrics such as SJR rank, h-index, and impact factor among journals with and without Facebook profiles, journals with Twitter accounts did have significantly greater h-index scores and impact factors than those without Twitter accounts. While unable to demonstrate causality (and journal impact is inherently complex and multifactorial), it is possible that a strong online presence could improve the visibility of journal publications, potentially resulting in a beneficial cycle in which greater visibility online leads to a greater number of citations and ultimately a stronger impact rank for the journal. Previous studies have shown that journal articles with greater social media visibility have been associated with increased citation rates and readership numbers.<sup>36–38</sup> Additionally, when examining the correlation between social media metrics and academic metrics for ophthalmology journals with active Twitter accounts, total number of tweets, average number of retweets, and average number of favorites were all significantly positively correlated with academic metrics such as the SJR, h-index and impact factor.

For ophthalmology journals, investing in a strong social media presence may facilitate increased citations and a higher SJR, h-index ranking, and/or impact factor; however, the clinical and educational implications of a connected, diverse online community discussing the latest ophthalmology research also should not be understated. Consumers of medical research on social media are not limited to physicians and scientists. Reporters, policy writers, public influencers, and students as well as patients—who may not ordinarily be exposed to medical research—may receive medical information through social media platforms, and more widespread availability of high-quality information may help lead to a more accurately informed public regarding eye health.<sup>39–41</sup>

Several recent studies have documented the benefits of virtual “Twitter Journal Clubs”, which could be hosted by either peer-reviewed ophthalmology journals or by the professional ophthalmology societies included in our study.<sup>42,43</sup> Online social media gatherings can defy geographical boundaries imposed by traditional in-person journal clubs and invite alternative perspectives from scientists all over the world, without geographic limitations. Additionally, social media journal clubs can consider the patient perspective when discussing the latest medical research by inviting patients and, when applicable, listening to patient input regarding the best way to convey complex research findings to the public using patient-friendly terminology. A stronger social media presence by ophthalmology journals may help to enhance patient health literacy by creating an inclusive and effective forum for discussion of new research.

There are several limitations to our study. First, our social media analysis of ophthalmology journals, professional societies, and eye health organizations was limited to Facebook, Twitter, and Instagram. We chose these three platforms based on prior studies examining social media use in other medical specialties.<sup>24,25,31,32</sup> However, there are other social networking platforms utilized now or in the future that were not included in our study (eg, TikTok and other platforms). Next, due to the limited social media presence for many of the journals, professional societies, and eye health organizations studied, our statistical analysis was limited because of small sample sizes, which required the use of nonparametric statistical tests. Timing since social media adoption may also have influenced findings. For example, a journal which was early to develop a Facebook page may accumulate more Facebook page “likes” than a journal which developed a Facebook page only recently. Additionally, although our results indicate that certain social media metrics are associated with a journal’s academic influence, casual inferences cannot be drawn due to the observational nature of the study design. We suspect that the relationship may be bidirectional; social media presence and activity may increase awareness and impact of journals, societies, and eye health organizations, and larger, more influential entities may be more likely to have an active social media presence. However, evidence of an association is itself informative. Finally, as with all studies of current social media accounts, account metrics are dynamic and can change rapidly. As such, changes to Facebook page “likes”, Twitter follower count, or Instagram follower count that have occurred since data collection would not be captured in this cross-sectional study.

## Conclusions

In summary, for ophthalmology journals, professional societies, and eye health organizations, social media can play an integral role in disseminating research findings and promoting patient education with regards to common eye conditions and symptoms. In our study, we discovered that social media activity for both journals and professional societies was significantly lower than that of eye health organizations. We also found that for journals active on social media, positive correlations were observed between social media engagement and journal productivity metrics, suggesting that social media may represent an opportunity to improve the visibility of published articles. Further studies may help to elucidate potential causal relationships between the variables analyzed in our study.

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## Disclosure

The authors report no conflicts of interest in this work.

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