

# Clicks, tweets, and likes

Social media use by medical journals.

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**ABSTRACT:** Medical literature is expanding at an astonishing rate and physicians are increasingly using social media professionally. Currently, we lack a comprehensive understanding about the use of social media by medical journals. We included the top 100 medical journals by H-index, and analyzed 88 journals after excluding nonmedical journals. We described the use of social media platforms and followers stratified by H-index and journal type (general versus specialty). We found a high

level of engagement with Twitter (100%), YouTube (94.3%), Facebook (64.5%), and Instagram (62.5%). General (versus specialty) medical journals had higher H-indices and a larger numbers of followers on Twitter and Facebook. Higher-impact journals were more likely to have social media accounts, although this finding was not observed when controlling for journal type. The use of social media to facilitate education and knowledge dissemination is increasingly common and requires further research to determine the effectiveness.

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*This article has been peer reviewed.*

## Background

Social media activity has been associated with increased visibility of published articles, including downloads and citations.<sup>1,2</sup> As a result of the perceived benefits to and engagement with readers, medical journals are increasingly using social media such as Twitter, Facebook, Instagram, and YouTube to share content. Many physicians are also engaging with journals in this context and increasingly using social media as an avenue for CME.<sup>3,4</sup> Despite an increase in activity over the past decade, little is known about the frequency of social media use by medical journals, including engagement with specific social media platforms, number of followers, and the relationship between these activities and objective measures of journal impact such as the H-index. The journal H-index is defined as the number of articles (H) that have received at least H citations and, therefore, combines an assessment of both quantity (number of papers) and quality (impact).

Our primary study objective was to describe the use of various social media platforms by high-impact medical journals. Our secondary objectives were to analyze the relationship between social media engagement and journal type (specialty versus general), the impact factor, and the H-index.

## Methods

This analysis did not require ethics approval as all information was publicly available. The ranking of medical journals was obtained through SCImago Journal and Country Rank database ([www.scimagojr.com](http://www.scimagojr.com)). We selected the most recent ranking (2019) of the top 100 journals by H-index. We excluded journals that were not primarily focused on clinical medicine.

We classified journals as having either a specialty or general medical focus by consensus and noted the most recent H-index and impact factors available. We collected information on social media engagement across four social media platforms: Twitter, Facebook, Instagram, and YouTube. To optimize fast and accurate data collection, we developed a program to web-scrape data using Selenium Webdriver 3.141.0 on Python. All data from Instagram and Facebook were gathered on 16 February 2020, while all Twitter and YouTube data were gathered on 2 March 2020. For each account, when available, we noted followers, likes, and number of posts.

Data were described using percentage and median (interquartile range [IQR]). Normal distribution of continuous variables was determined using the Shapiro-Wilk test for normality. Specialty and general medical journals were compared using a Wilcoxon rank sum and Fisher's exact test for continuous and categorical data, respectively. Multivariable linear regression was used to explore the relationship between H-index and the social media activity. *P* values less than .05 were considered significant. Statistical analysis was completed in R version 3.6.3 and STATA 12.1 (StataCorp, Texas, USA).

## Results

We identified the top 100 journals by H-index and excluded 12 journals that were found to not

be primarily medical after further review, leaving 88 journals for the analysis. Missing data were minimal and included only the YouTube channel subscribers and views from three journals. We classified 84% (n = 74) of journals as specialty and 16% (n = 14) as general. Characteristics of included medical journals are summarized in Table 1. Included journals (n = 88) had a median H-index of 278 (IQR 245, 332) and a median journal impact factor of 9.6 (IQR 6.1, 19.1). All journals had associated Twitter accounts, while 94.3%, 64.8%, and 62.5% of journals had associated YouTube, Facebook, and Instagram accounts, respectively. Followers were the highest on Facebook, followed by Twitter, Instagram, and YouTube. General medical journals had higher H-indices and impact factors than specialty journals. Both types of journals used social media platforms at similar frequency, although general medical journals had more Twitter and Facebook followers, and specialty journals had more Instagram followers. Figure 1 and Figure 2 display a general increase in the frequency of available social media accounts for medical journals from the lowest to highest H-index and impact factor quartile. From left to right, the bars under each category in Figure 1 signify quartile 1 to 4: Q1 (< 244.5), Q2 (244.5 < < 278), Q3 (278 < < 332), Q4 (> 332), while those in Figure 2 signify quartile 1 to 4: Q1 (< 6.08), Q2 (6.08 < < 9.5765), Q3 (9.5765 < < 19.1305), Q4 (> 19.1305). Presence of an Instagram account predicted H-index (coefficient 56.8, 95% CI 9.5 to 104.1, P = 0.019) but not Facebook (coefficient 39.9, 95% CI -8.89 to 88.6, P = 0.108) or YouTube (coefficient 60.1, 95% CI -41.2 to 161.5, P = 0.241). When controlling for journal type, the presence of social media accounts did not predict H-index [Table 2]. Since all journals had associated Twitter accounts, the presence of this account was not included in the model.

### Discussion

Our analysis provides a contemporary snapshot and formal analysis of social media use by high-impact medical journals in 2020. We found that all journals included in our study used some form of social media, with universal use of Twitter and frequent use of YouTube. Facebook and Instagram were used by

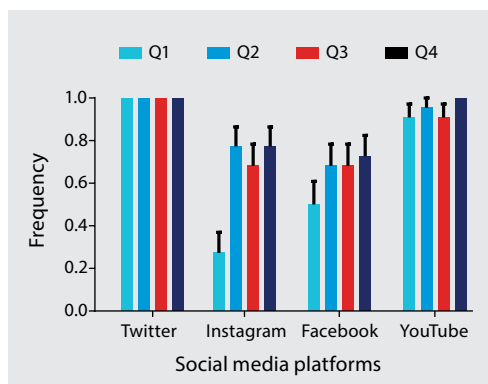


FIGURE 1. Frequency of social media platforms used by medical journals, stratified by H-index quartiles.

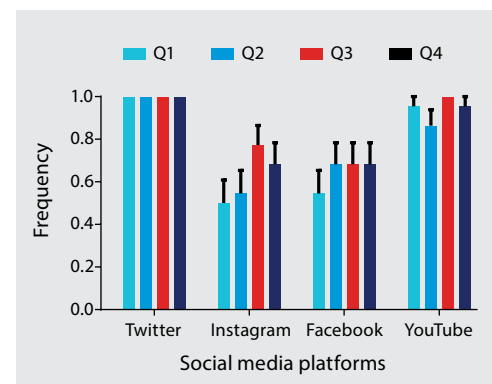


FIGURE 2: Frequency of social media platforms used by medical journals, stratified by impact factor quartiles.

TABLE 1: Characteristics of included medical journals.

	Overall (N = 88)	Specialty (N = 74)	General (N = 14)	P value
H-index	278 (245, 332)	270 (238, 326)	353 (289, 497)	0.0016
Impact factor	9.6 (6.1, 19.1)	9.0 (6.1, 16.6)	22.5 (7.8, 51.3)	0.0277
Twitter (N, %)	88 (100)	74 (100)	14 (100)	—
Twitter followers	10 776 (3529, 29 689)	9006 (3212, 25 898)	82 956 (12 486, 331 681)	0.0054
Total tweets	3900 (2023, 7819)	3650 (1744, 7198)	12 134 (3531, 20 624)	0.0188
YouTube (N, %)	83 (94.3)	69 (93.2)	14 (100)	0.411
YouTube subscribers	3705 (549, 12 000)	2950 (527, 11 600)	6845 (1960, 20 500)	0.1506
YouTube videos	265 (77, 527)	265 (74, 527)	316 (88, 516)	0.8593
Facebook (N, %)	57 (64.8)	46 (62.2)	11 (78.6)	0.193
Facebook followers	27 858 (8359, 99 880)	24 260 (4480, 74 045)	99 880 (46 489, 498 408)	0.0223
Facebook likes	26 853 (8012, 98 452)	23 500 (4402, 71 431)	98 452 (45 753, 492 594)	0.0223
Instagram (N, %)	55 (62.5)	44 (59.5)	11 (78.6)	0.146
Instagram followers	5893 (1695, 87 979)	8483 (2478, 87 980)	2021 (162, 13 796)	0.0626
Instagram posts	276 (110, 771)	343 (158, 753)	114 (18, 925)	0.1779

All values are median (interquartile range) unless otherwise indicated.

TABLE 2. Linear regression model to predict journal H-index.

	Coefficient	95% CI	P value
Facebook	20.9	-24.0 to 65.7	0.358
Instagram	36.6	-7.8 to 81.0	0.105
YouTube	33.3	-57.7 to 124.2	0.469
General (vs specialty)	127.6	69.8 to 185.4	< 0.001

R<sup>2</sup> = 0.2613 P < 0.001

a majority of journals but less frequently than other platforms. General medical journals had higher H-indices, impact factors, followers, and higher engagement with social media compared to specialty journals. Of the four platforms analyzed, journals had the greatest number of interactions on Facebook (such as followers and likes). Our data offer a unique perspective that quantifies the use of social media by high-impact medical journals, and describes a high level of engagement, particularly by general medical journals.

The use of social media in medical publishing to disseminate research and information has evolved relatively rapidly over the last decade. Social media itself has been introduced relatively recently (Facebook was founded in 2004, YouTube in 2005, Twitter in 2006, and Instagram in 2010). The adoption of social media is uneven, and its use varies among different generations of medical professionals.<sup>5</sup> Uptake is high among medical students; as many as 90% of medical students are active on social networking sites.<sup>6</sup> Many journals now formally appoint a social media editor, a role which encompasses a range of responsibilities from disseminating new publications via social media, summarizing articles, and managing social media accounts.<sup>7,8</sup> Sharing visual abstracts (visual summaries of an article's content) on social media is increasing and may improve an article's visibility and engagement compared to sharing citations only.<sup>9</sup> Twitter is increasingly embraced as a CME tool, encompassing activities such as online journal clubs and virtual networking. These formats offer several advantages such as lower cost, accessibility, and innovative methods of engagement.<sup>3,10,11</sup> An open label randomized trial found that CME practice tips provided by Twitter and Facebook can improve clinical knowledge and promote behavior change,<sup>12</sup> and another study found Facebook more effective than email at delivering medical education.<sup>13</sup> Our study results suggest that the majority of medical journals perceive these benefits and have now embraced these platforms.

Social media may offer several benefits to journals in promoting knowledge dissemination and article engagement, although the evidence supporting an effect on citation is mixed. There is some evidence to suggest that use of

social media platforms may drive traffic toward CME initiatives,<sup>14</sup> and that social media coverage predicts citations of articles,<sup>2,15</sup> although greater social media attention may simply reflect higher-quality articles that are more likely to be cited. Two randomized trials have found that tweeting articles increased Altmetric scores and citations over time compared to those that were not shared on Twitter.<sup>16,17</sup> In contrast, another randomized study did not find that social media exposure increased article citations or downloads.<sup>18</sup> A recent systematic review found "suggestive yet inconclusive" evidence that the use of social media increases article citations, with notable limitations and inconsistent findings in the literature.<sup>1</sup>

Our analysis has several limitations. Although we described the use of social media and the relationship with journal impact (H-index), we cannot establish a causative effect of social media engagement on the journal's performance or research. Furthermore, our results represent a snapshot in time that will continue to evolve, and further research to establish trends over time would be valuable. Finally, we included only the top 100 medical journals by H-index; the use of social media by lower-impact journals may vary.

Our study findings clarify the current state of social media use by high-impact medical journals and indicate these journals are highly engaged with these platforms. General medical journals have a greater impact and reach on social media compared to specialty journals, as measured by followers and subscribers. The use of social media to facilitate medical education and knowledge dissemination is increasingly common and future research should address questions about whether social media can increase article citation, improve CME, and efficiently disseminate knowledge. ■

#### Competing interests

Dr Flexman is an associate editor of the *Canadian Journal of Anesthesia* and the *Journal of Neurosurgical Anesthesiology*.

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