



Impact of Tweeting Summaries by the Japanese Circulation Society Official Account on Article Viewership

— Pilot Trial —

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Background: The impact of promotional tweets from the official journal account (for *Circulation Journal* and *Circulation Reports*) on article viewership has not been thoroughly evaluated.

Methods and Results: We retrospectively collected journal viewership data for *Circulation Journal* and *Circulation Reports* from March 2021 to August 2021. We compared viewership between articles with ($n=15$) and without ($n=250$) tweets. After 1:4 propensity score matching (15 tweeted articles and 60 non-tweeted matched controls), journal viewership metrics within 7 days of the tweeting date (and the hypothetical tweeting date), was larger in tweeted articles than non-tweeted articles (median [interquartile range] Abstract page views 89 [60–104] vs. 18 [8–41]).

Conclusions: This pilot study suggests a positive relationship between journal-posted promotional tweets and article viewership.

Key Words: Journal article; Page view; Twitter

Many medical journals have implemented social media strategies, including Twitter, to disseminate their new publications, which can be easily shared by authors and readers.¹ Several randomized control trials have evaluated the effects of social media on journal readership through page views, Altmetric scores, and even article citations.^{2–5} However, because many social network interventions include comprehensive interventions involving multiple tweets and have been

implemented around the first online publication date, especially within the first week, which is the most active period of viewership for most articles,⁶ the direct effect of one-time-only tweeting on journal readership has not been fully elucidated.

The Japanese Circulation Society (JCS) manages 2 official journals: *Circulation Journal* and *Circulation Reports*. The Information and Communication Committee (ICC) of the JCS launched an official Twitter account in

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Table 1. Baseline Characteristics of the Journals							
Variable	Before matching			P value	After matching		
	n	Non-tweet group (n=250)	Tweet group (n=15)		Non-tweet group (n=60)	Tweet group (n=15)	P value
Journal	265			0.8			>0.9
CJ		192 (77)	11 (73)		41 (68)	11 (73)	
CR		58 (23)	4 (27)		19 (32)	4 (27)	
Page views							
Abstract	265	76 [59–100]	103 [58–366]	0.2	80 [46–120]	103 [58–366]	0.2
HTML	265	8 [5–13]	11 [6–30]	0.2	8 [4–15]	11 [6–30]	0.2
PDF	265	40 [30–54]	42 [31–113]	0.5	39 [28–60]	42 [31–113]	0.5
Early publication date	265	01:00:00 March 9, 2021 to 01:00:00 August 24, 2021	01:00:00 March 18, 2021 to 01:00:00 June 24, 2021	0.4	01:00:00 March 9, 2021 to 01:00:00 August 18, 2021	01:00:00 March 18, 2021 to 01:00:00 June 24, 2021	0.5
Article category	265			0.1			>0.9
AR		5 (2.0)	0 (0)				
CL		76 (30)	2 (13)		5 (8.3)	2 (13)	
CL-E		46 (18)	4 (27)		18 (30)	4 (27)	
ED		46 (18)	0 (0)				
EX		4 (1.6)	0 (0)				
EX-E		4 (1.6)	0 (0)				
GL		2 (0.8)	0 (0)				
GL-X		2 (0.8)	0 (0)				
ICM		46 (18)	5 (33)		22 (37)	5 (33)	
LE		4 (1.6)	1 (6.7)		4 (6.7)	1 (6.7)	
ME		2 (0.8)	0 (0)		5 (8.3)	1 (6.7)	
RA		6 (2.4)	1 (6.7)				
RA-N		1 (0.4)	0 (0)				
RC		6 (2.4)	2 (13)		6 (10)	2 (13)	

Unless indicated otherwise, data are given as the median [interquartile range] or n (%). Abstract, page view of title page; CJ, *Circulation Journal*; CL, Clinical; CL-E, Clinical (Editorial); CR, *Circulation Reports*; ED, Editorial; EX, Experimental; EX-E, Experimental (Editorial); GL, Guideline; GL-X, Statement and others; HTML, page view of HTML format; ICM, Image; LE, Letter; ME, Message; PDF, page view of PDF format; AR, Authors' Reply; RA, Review; RA-N, Review (Not Invited); RC, Rapid Communication.

without replacement nor caliper adjustment, we used the observed tweet date of the tweeted article as the hypothetical tweeting date for the matched controls (non-tweet group). Finally, we measured and compared article viewership metrics within 7 days of the tweeting date (and hypothetical tweeting date) between the 2 groups. All analyses were performed using R version 4.0.2 (R Foundation for Statistical Computing, Vienna, Austria).

Results

Of the 265 articles published as early publications from March 2021 to August 2021, only 15 articles (5.7%) were tweeted. **Table 1** presents the baseline characteristics of the published articles. Approximately three-quarters of the published articles were from the *Circulation Journal*. The baseline journal article viewership within 7 days from early publication was larger in the tweet than non-tweet group, but the difference did not reach statistical significance (Abstract, $P=0.20$; HTML, $P=0.20$; PDF, $P=0.50$). After PSM, journal viewership was significantly higher after the tweeting date (Abstract page, 18 [8–41] vs. 89 [60–104]; HTML, 2 [0–5] vs. 6 [2–14]; PDF, 6 [1–24] vs. 12 [12–60]) non-tweet group and tweet group, respectively. As shown in **Figure 2**, the impact of the tweets was primarily limited to within 1 day of tweeting.

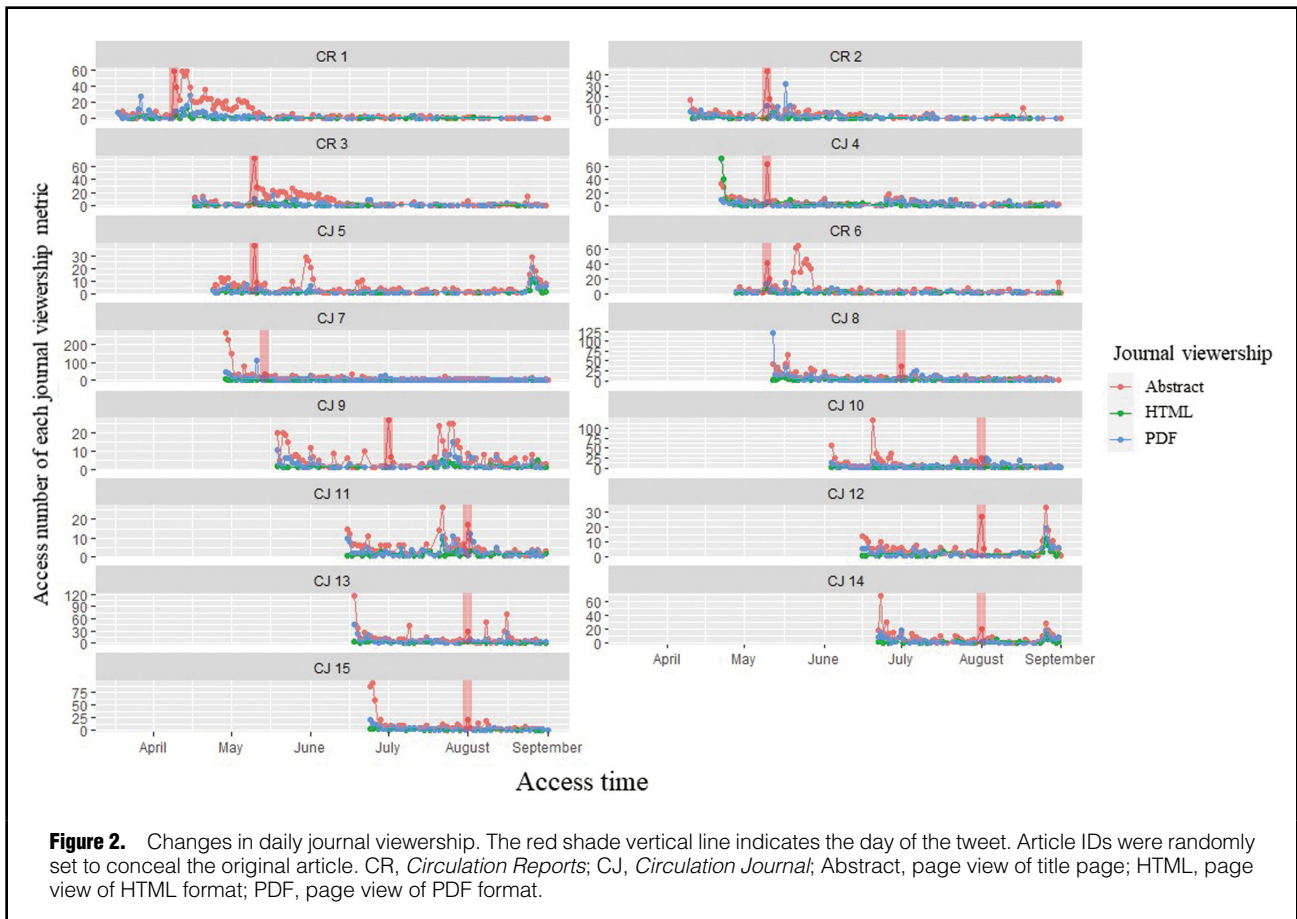
Discussion

This study evaluated the relationship between tweets posted by the JCS official Twitter account and journal viewership metrics within 7 days of the tweet. The tweeting effect was predominantly observed on the day of the tweet, as the journal Abstract page views increased among the 3 article viewership metrics (Abstract, HTML, and PDF).

Twitter and social network activity could improve journal viewership, as seen in previous studies (**Table 2**). Many journals have used Twitter campaigns around the publication date of an article. In the present study, our pilot test demonstrates an improvement in journal article viewership through a late “booster effect”¹⁰ several weeks after the early publication date. In addition, the official account only tweeted once only for each article, which is less frequent than reported in previous studies (up to 3 reposts).¹¹ In these ways, the present study highlights the effectiveness of a single tweet weeks after initial article publication.

Among the journal viewership metrics evaluated in this study, Abstract page views increased the most. Because the Twitter summary only included only the Abstract page URL, this finding can be easily understood as a “default option” mechanism: because the URL was presented as the default, users accessed articles in that manner unless explicitly seeking other methods to view the article.

The number of increased page views is smaller than



reported in a previous study for articles published in *Circulation* (463 vs. 362 views in the intervention and control groups, respectively),¹² but much larger in other journals, like the *Journal of the American College of Radiology* (9.4 vs. 7.6 page visits in the intervention and control groups, respectively).² The former study used most timely articles for tweets, whereas the latter used articles published up to 2 years prior; therefore, the present pilot trial is in the middle of these (Table 2).^{2,4,11–13} The increased number of PDF and HTML views implies that the Twitter summary posts could increase readers' interest in each article.

The limitations of this study need to be considered. In particular, this pilot study included only 5.7% of journal articles tweeted, which resulted in large variance among the articles sampled. Although we used propensity score adjustment and implemented a dummy Twitter date variable to improve the quality of analysis, we cannot ignore the unmeasured selection bias. First, we could not eliminate the possibility of a potential relationship between the authors and manuscript viewership. For example, an author with a potentially high impact article could be more likely to create a twitter summary. Second, we could not systematically adjust for article type, such as such as heart failure and ischemic heart disease. Because different fields have different viewership populations, any differences here could have biased our results. Approximately one-third of articles with Twitter summaries were image articles. The impact of journal article type on journal viewership should be further

evaluated in a larger trial. As next steps, we will consider the following strategies: increasing author engagement in crafting a Twitter summary; exploring the optimal timing and frequency of tweeting to maximize article viewership; and, finally, the relationship between article viewership and citations for articles published in *Circulation Journal* and *Circulation Reports*.

Conclusions

This paper reports a positive relationship between Twitter summary posts from the journals' official account and journal viewership. The causal effect must be further investigated by using a larger study to confirm whether this association is replicable.

Highlights

- Tweeting by an official Twitter account increased article viewership
- Spillover effects for PDF and HTML pages were also observed
- The Twitter effect was mainly observed within a day after the tweet

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Study	Year	Journal	Study design	No. target articles (intervention vs. control)	Social media impact
Fox et al ¹²	2015	<i>Circulation</i>	RCT	243 (121 vs. 122)	Facebook: 16,215 followers; Twitter: 2,219 followers
Fox et al ¹¹	2016	<i>Circulation</i>	RCT	152 (74 vs. 78)	Facebook: 46,431 likes; Twitter: 6,746 followers
Luc et al ¹³	2021	TSSMN	RCT	112 (56 vs. 56)	Combined followership: 52,893
Hawkins et al ²	2017	<i>Journal of the American College of Radiology</i>	RCT	178 enhanced twitter vs. 126 basic twitter vs. 124 control	Team member average followers: 1,355–4,074
Ladeiras-Lopes et al ⁴	2020	ESC journal family (12 of 15 journals)	RCT	534 (264 vs. 270): interim analysis	–
Present study	2021	<i>Circulation Journal</i> and <i>Circulation Reports</i>	Pilot trial (not RCT)	15 vs. 250 (matched 60)	Twitter: >11,000 followers

Study	Intervention	Outcome metrics	Measurement	Results (intervention vs. control)
Fox et al ¹²	3 Associated Editors post Monday–Thursday to be contemporaneous with the formal publication of each article	30-day page views	Google analytics	409 vs. 392 (P=0.80)
Fox et al ¹¹	2–7 separate posts on Facebook and Twitter on a daily basis; all posts reposted the next day at 11 am and 3 pm using “ICYMI” moniker, up to a total of 3 posts	30- and 7-day page views	Google analytics	30-day page views, 499.5 vs. 450.5, (P=0.38); 7-day page views, 330.5 vs. 268 (P=0.17)
Luc et al ¹³	4 articles prospectively tweeted per day by a designated TSSMN delegate (JL) and retweeted by all other TSSMN delegates (n=11) with a combined followership of 52,893 individuals and @TSSMN for 14 days from June 4 to June 17, 2018	Citations and Altmetric score at 1 year	–	Citations, 3.1 vs. 0.7 (P<0.001); Altmetric score, 9.4 vs. 1.0 (P<0.001)
Hawkins et al ²	Basic twitter arm: A single member of the editorial staff posted each tweet on the @JACRJournal account Enhanced twitter arm: 4 teams were assigned 1 article/day Tweet date between September 14, 2015 and October 28, 2015 Target articles: June 2013–July 2015	Weekly page visits	Journal’s Elsevier (Amsterdam, Netherlands) website and Bitly analytics	18.2 vs. 9.4 vs. 7.6
Ladeiras-Lopes et al ⁴	Articles randomized to the intervention arm were posted on the Twitter @ESC_journals feed; the @ESC_journals Twitter handle (https://twitter.com/ESC_Journals) usually posts 1–2 papers/day that are highlighted due to their relevance to the cardiovascular medicine field. Recently available papers were selected for randomization according to their relevance and potential interest for the cardiovascular community (final decision made by @ESC_journals Twitter Editor)	No. citations, Altmetric score (https://www.altmetric.com)	Web of Science, Scopus (if not indexed in the previous one), or Google Scholar (if not indexed in the first 2)	Median citation, 2 vs. 1; median Altmetric score 24 vs. 4
Present study	Tweet summary a few months after online publication	7-day page views	J-STAGE data usage	Title page, 89 vs. 18; HTML, 6 vs. 2; PDF, 12 vs. 6

HTML, HyperText Markup Language; ICYMI, in case you missed it; J-STAGE, The Japan Science and Technology Information Aggregator, Electronic; PDF, Portable Document Format; RCT, randomized control trial; TSSMN, Thoracic Surgery Social Media Network (*Annals of Thoracic Surgery* and *The Journal of Thoracic and Cardiovascular Surgery*).

Disclosures

K.N. and T.A. are members of *Circulation Journal's* Editorial Team. The remaining authors have no conflicts of interest to disclose.

IRB Information

This study was exempted from ethics approval by the Ethics Committee of St. Luke's International Hospital (21-R130) because this study was a retrospective observational study.

Data Availability

The de-identified data of participants will not be shared.

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