



Two-Year Experience in “Tweeting the Meeting” During the Scientific Sessions

— Rapid Report From the Japanese Circulation Society —

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Background: Twitter has become increasingly popular at annual medical congresses as a platform to communicate to attendees. The aim of this study is to reveal the twitter usage in the annual congress of the Japanese Circulation Society.

Methods and Results: We compared the total number of tweets during the Japanese Circulation Society's annual meetings in 2019 and 2020. The total number of tweets increased from 7,587 in 2019 to 23,867 in 2020. Most tweets were retweets (>70%), and approximately half of Twitter users tweeted only once.

Conclusions: Twitter usage during the Japanese Circulation Society's annual meeting increased from 2019 to 2020, and a large number of tweets were from Twitter ambassadors of the Japanese Circulation Society. However, further evaluation is needed, with future studies investigating the usefulness of this platform.

Key Words: Annual congress; Cardiology; Twitter

Highlights

- Twitter usage during annual congresses increased over 2 consecutive years
- Many tweets were from JCS Twitter ambassadors
- More than 70% of tweets were retweets

Recent attention paid to Twitter (Twitter Inc., San Francisco, CA, USA) activities at medical congresses concern many possible uses of the social media platform, such as promoting healthy behavior, disseminating medical knowledge, and facilitating professional networking.¹ The most popular use of Twitter at conferences is to disseminate raw presentation

materials, such as slides, photographs, videos, and related links to manuscripts. These activities have been reported as “tweeting the meeting”.¹ Usually these posts include a hashtag (e.g., #19JCS and #20JCS) for others to follow and that identifies the relationship between the Twitter account and the conference.²

The use of official conference hashtags by major cardiovascular scientific meetings of the American College of Cardiology, Heart Rhythm Society, and Transcatheter Cardiovascular Therapeutics (#ACC, #HRS, and #TCT, respectively) increased significantly from 12,018 in 2014 to 41,016 in 2016.³ Similarly, there was an increase in the number of Twitter users at these meetings increased from

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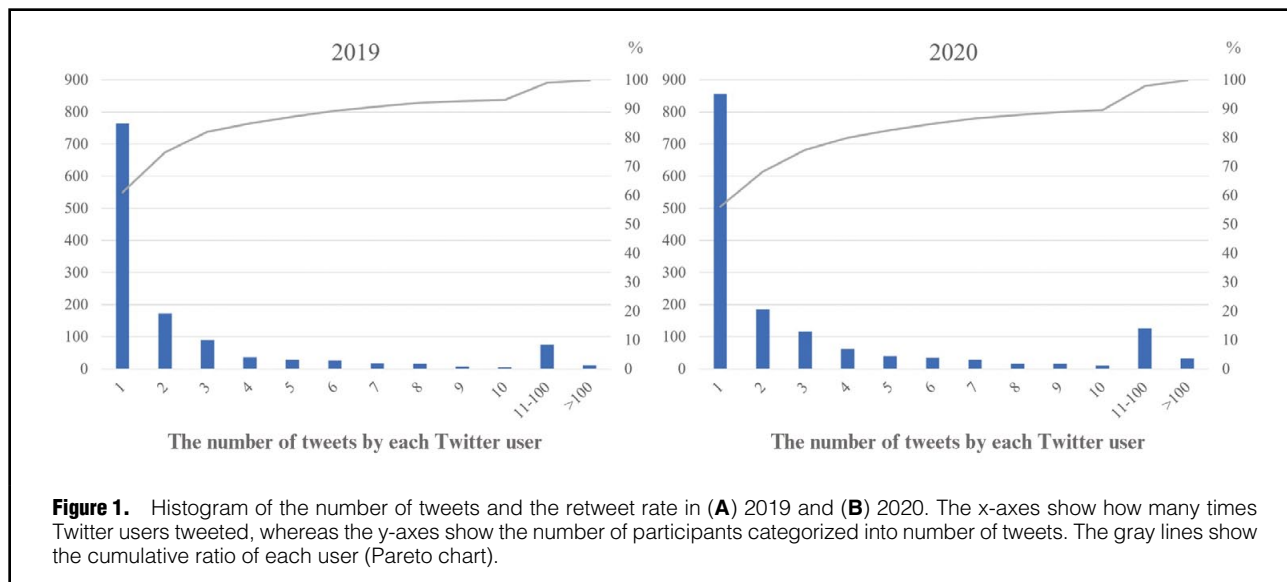


Figure 1. Histogram of the number of tweets and the retweet rate in (A) 2019 and (B) 2020. The x-axes show how many times Twitter users tweeted, whereas the y-axes show the number of participants categorized into number of tweets. The gray lines show the cumulative ratio of each user (Pareto chart).

3,212 in 2014 to 10,362 in 2016. Twitter users at the annual congress of European Society of Cardiology (ESC) increased from 1,131 in 2018 to 1,548 in 2019, whereas the number of tweets increased from 11,252 tweets (39,350 retweets) using #ESCCongress2018 to 12,743 (42,755 retweets) using #ESCCongress2019.² In addition, they reported that there was a total of 1,511 tweeters at the American College of Cardiology meeting in 2019.²

The Information and Communication Committee of the Japanese Circulation Society launched official Twitter activity in 2019 and published 10 rules to follow for effective and safe social networking.⁴ In contrast with annual congresses in other countries, in Japan the Information and Communication Committee of the Japanese Circulation Society has restricted the direct sharing of photographs (i.e., screenshots from virtual conferences) of presentations with prior consent to designated official Twitter users of the Japanese Circulation Society's annual meetings ("JCS Twitter ambassadors"; **Supplementary Table 1**) taking into consideration risks such as handling unpublished data, obtaining presenters' consent, propagation of potential misinformation, misrepresentation of complex topics as "sound bites", violation of intellectual property, and lack of informed consent from patients. This restriction was not applied by organizers of previous annual congresses in other countries.

Because the Japanese Circulation Society is the first society to proceed with official Twitter activities in Japan, there are no data regarding Twitter use in annual congresses. In this rapid report, we describe changes in the total number of tweets between the 2019 and 2020 annual congresses and discuss future applications.

Methods

Tweets were extracted using 2 tools, the Twitter Archiving Google Sheet (TAGS) and NodeXL (<http://nodexl.codeplex.com/>). TAGS is a Google spreadsheet and NodeXL is a Microsoft (Bellevue, WA, USA) Excel extension. Both tools access the Twitter application programming interface (API) and record information about tweets and retweets in

the previous 7–10 days, to a maximum of 18,000 tweets and retweets.⁵

Data were extracted for each day of the congress and combined for each congress. All tweets were evaluated using TAGS and the results were compared with those obtained using NodeXL only for the 2020 congress. The extraction was defined using the specific hashtag #19JCS for the 2019 congress and #20JCS for the 2020 congress. NodeXL was used to calculate the total number of tweets, retweets, and tweeters (Twitter users). In addition to providing the number of tweets and Twitter users' profiles, NodeXL provided a visualization of the relationships between users, based on tweets, retweets, and mentions. NodeXL was used to visualize the relationships for #20JCS, and the graph's vertices were grouped by cluster using the Clauset-Newman-Moore cluster algorithm.⁶

The 2019 congress was held from March 29, 2019 to March 31, 2019 (3 days), whereas the virtual 2020 congress was held from July 27, 2020 to August 2, 2020 (7 days). During the congress week in 2020, 3 days (from July 31, 2020 to August 2, 2020) were fully open from morning to evening. There were 14,721 registrations for the 2019 congress and 15,680 for the virtual 2020 congress.

Results

The total number of tweets during the 2019 and 2020 congresses was 7,587 and 23,867, respectively. Even limiting the results to the last 3 days (full days) of the 2020 congress, the total number of tweets was 14,870, which is double that in 2019. Of all the tweets, 5,519 of 7,587 (72.7%) in 2019 and 18,915 of 23,867 (79.3%) in 2020 were retweets. NodeXL detected 23,802 tweets in the 7 days chosen from 2020; 15,434 (64.8%) were regarded as retweets.

Among 1,250 Twitter users in 2019 and 1,526 in 2020, 61.1% and 56.1%, respectively, tweeted only once with the congress hashtag (**Figure 1**). The top 4 tweeters were responsible for 33.1% of all tweets in 2019 and for 45.0% of all tweets in 2020 (**Supplementary Table 2**). Furthermore, 4,670 of 7,587 (61.6%) tweets in 2019 and 6,962 of 23,867 (29.2%) tweets in 2020 were from non-JCS Twitter

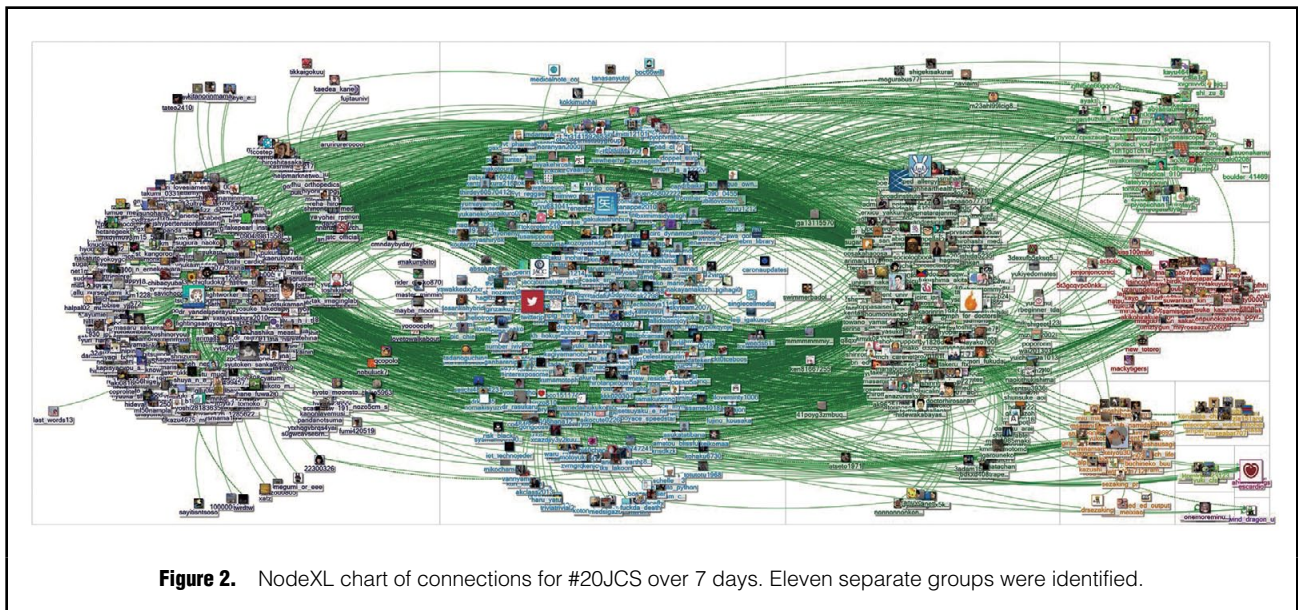


Table. Groups Identified by NodeXL								
Group	No. vertices	No. unique edges	No. edges with duplicates	No. self-loops	Reciprocated vertex pair ratio	Reciprocated edge ratio	Mean geodesic distance	Graph density
1	419	782	2,101	368	0.05	0.10	2.22	0.01
2	356	1,082	5,474	1,921	0.10	0.19	2.73	0.01
3	282	398	1,210	419	0.03	0.06	2.24	0.01
4	80	79	63	56	0	0	2.93	0.01
5	71	52	136	43	0	0	2.13	0.01
6	35	36	0	2	0	0	2.03	0.03
7	13	12	3	3	0	0	1.70	0.08
8	6	6	0	1	0	0	1.39	0.17
9	4	4	0	0	0	0	1.00	0.33
10	4	4	0	4	NA	NA	0.00	0.00
11	2	1	2	2	0	0	0.50	0.50

NA, not applicable.

ambassadors of the Japanese Circulation Society.

The interactions and relationships between Twitter users are shown in **Figure 2**. Eleven groups were created according to the relationships, with 3 large groups: Group 1 had the largest number of vertices (users), Group 2 (G2) was chiefly comprised of JCS Twitter ambassadors and had the largest number of edges (connections), and Group 3 had the third largest number of users and fewer connections than Group 2 (**Table**).

Discussion

The Japanese Circulation Society is the first society to implement official Twitter activities in Japan, which has interested many other medical societies and associations. This is the first report to quantitatively explore Twitter usage (“tweeting the meeting”) in an annual medical congress. The results revealed actual Twitter usage data using hashtags and demonstrated a significant increase in the number of tweets between 2019 and 2020, as well as a large number of tweets that derived from JCS Twitter

ambassadors of the Japanese Circulation Society.

The data revealed an increasing number of total tweets and Twitter users over 2 consecutive years. Compared with the number of total tweets, the change in the number of Twitter users seems modest, which is compatible with ESC data. Pemmaraju et al reported that Twitter authors at the meeting of the American Society of Clinical Oncology, which is one of the largest societies, only increased from 1,429 in 2011 to 1,863 in 2012.⁷ However, this was followed by exponential growth in the number of Twitter authors after 2013.⁷ Considering the total number of registrations for the annual congress of the Japanese Circulation Society, Twitter usage could increase in the future. However, we should consider that this relatively low increase in the number of users is due, in part, to the rules restricting the taking of photographs and capturing presentations to JCS Twitter ambassadors only. Considering the greater number of Twitter ambassadors (n=52) in 2020 than in 2019 (n=33), this engagement has largely contributed to a significant increase in the total number of tweets. The figures and data revealed the largest users were in Group 2, which

included Twitter ambassadors. This largest cluster implied a large contribution of ambassadors and strong connections between the official ambassadors. This Twitter ambassadors model could be useful for many medical associations that want to increase engagement for tweeting activity in annual medical congresses. Combined with the modest increase in Twitter users, we should pay attention not only to changes in the total number of tweets, but also to trends in the number of Twitter users.

We had implemented several statistical measures and clustering strategies to understand the features of Twitter activities. Measures such as the number of tweets and retweets are the most basic components used to evaluate the effects of tweeting the meeting.¹ In our experience, NodeXL and TAGS provided similar values for the total number of tweets and retweets, but did not strictly match (2.7% difference), which is similar to the 4% difference between TAGS and SympLur reported in a previous study.⁵ The timing of obtaining the Twitter data could have affected the results because Twitter API restricts the maximum retrieval to 18,000 tweets or 7 days, which could affect the results, especially in cases where the number of tweets is quite large. Taking into account that the absolute number of tweets could differ between each application we use, we should use the same modality when we compare the results. The network graphs clearly show the relationship between each Twitter user. In this study, we used the Clauset-Newman-Moore cluster algorithm, which divides the cluster structure of complex networks and decides the “granularity” of a partition.⁸ Although there are many options to find clusters, this algorithm when using NodeXL is most popular when analyzing “tweeting the meeting”.^{2,5} Because there are no studies validating clustering of Twitter users, we need to wait for further data to conclude which strategy will be best for visualizing and clustering “tweeting the meeting”.

Study Limitations

This study has several limitations. First, if a Twitter user refused to provide their data regarding Twitter usage and locked their account, we could not obtain the data, which could result in an underestimation of the total number of tweets and retweets. Although other metrics, such as impressions, could be used to evaluate the effect of tweeting the meeting, we do not have these values currently. However, impressions were calculated by multiplying the number of followers of the users who sent tweets and the number of tweets they sent, which could be inferred by our data.⁹ Finally, in 2020, the 84th Annual Scientific Meeting of the Japanese Circulation Society was held totally online, which could have some positive effects on Twitter usage. We could not estimate how much of an effect the virtual congress had on Twitter usage because this is the first report about quantitative analysis of Twitter usage for an annual medical congress in Japan. Theoretically, a total virtual situation could enhance the use of Twitter or other social media.¹⁰ In the near future, the ESC congress will be held virtually, which, combined with our results, will provide us with a useful understanding of the effect of virtual congresses on Twitter usage.

Conclusions

This is the first report about the temporal trends in Twitter

usage during the annual congress in Japan. Twitter usage has increased, and a large number of tweets derived from JCS Twitter ambassadors of the Japanese Circulation Society; however, further evaluation is required and future studies should investigate the potential impact and usefulness of the Twitter usage at the annual congress.

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Disclosures

S.S., K.N. are members of *Circulation Reports*' Editorial Team. The other authors report no conflicts of interest.

IRB Information

This study was granted an exemption from requiring ethics approval by the Ethics Committee of St. Luke's International Hospital because it was a retrospective observational study.

Data Availability

The deidentified participant data will not be shared.

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Supplementary Files

Please find supplementary file(s);
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