

VIEWPOINT

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JACC: Case Reports



Reflections From 1 Year on Social Media

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“What we measure shapes what we collectively strive to pursue- and what we pursue determines what we measure”

—Commission on the Measurement of Economic Performance and Social Progress (1)

In the last decade, the rapid growth of SoMe has transformed the way that clinical knowledge is disseminated and accessed (2). An increasing amount of scientific discourse is happening virtually and in real-time, where new clinical and research output is being shared, learned, reviewed, and acclaimed by the social networks formed by cardiovascular professionals on various SoMe platforms. A novel approach to understanding the extent of this ongoing virtual dialogue on published data is to measure it with emerging metrics like the altmetric attention score (AAS), which assesses the immediate impact of new papers on the readership (3). Since its inception in June 2019, *JACC: Case Reports* has embraced the importance of increased educational

opportunities for the readership by harnessing the novel aspects of these SoMe platforms.

The purpose of this viewpoint is to describe the journey of *JACC: Case Reports* in the digital world with focus on readership and engagement through SoMe metrics.

ALTMETRIC ATTENTION SCORE

Altmetrics is a catch-all term for contemporary metrics that were developed to complement traditional citation metrics, such as impact factor (4). AAS (identified by a colorful “donut” with a central number on peer-reviewed journal papers) is derived from a weighted count of the amount of attention a paper receives in multiple sources with default weightings, including earned media/news outlets, blogs, policy documents, patents, Wikipedia, Twitter, peer review journals, Weibo, Google+, F1000, syllabi, LinkedIn, Facebook, Reddit, Pinterest, Q&A, and YouTube (5). In 2018, the AAS covered 64 million mentions of 9 million academic outputs. The highest attributable score comes from media/news outlets (especially those with the greatest distribution), and the lowest score is assigned to YouTube.

The burning question of the relationship of the AAS to citations has been raised before. Although previous studies did not show correlation of AAS with a higher number of citations, some developing evidence shows that promotion of a paper on SoMe may be linked to paper downloads and citations (6–9). For a case report journal, however, one may argue that the overall readership may be a stronger gauge of engagement, due to the fact that case reports may rarely get cited. One of the most effective ways to evaluate the overall readership impact is by measuring the paper downloads. Although downloads are dependent on many factors, such as clinical utility of the case report and interest of the reader,

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one of the ways to make the cases visible is via sharing it in academic social networks on SoMe (10). The easiest way to generate a higher AAS for a case report is to share it on Twitter or other SoMe platforms, as citing a case report in news, blogs, policy documents, patents, Wikipedia, and such other components of the AAS would be rare.

SoMe EFFORTS OF JACC: CASE REPORTS

JACC: Case Reports is an open access journal that launched in June 2019 under the leadership of Editor-in-Chief Dr. Julia Grapsa. The vision for this exclusively open access and online journal was to develop an interactive and engaging forum that serves to promote cardiovascular disease education, complement clinical guidelines, involve all members of cardiovascular care team, and serve as a publication vehicle and mentorship opportunity for early career and fellow-in-training cardiovascular professionals (11). *JACC: Case Reports* is not limited to clinical case reports, but also publishes the following paper types:

- Clinical Case Series
- Global Health Reports
- Heart Care Team/Multidisciplinary Team Live
- ECG Challenges
- Imaging Vignettes
- Voices in Cardiology, including a Fellow-in-Training corner
- A Continuing Medical Education Case of the Month

In addition, *JACC: Case Reports* has had multiple minifocus issues covering a wide variety of topics, including interventional complications and their management, valvular heart disease, women's cardiovascular disease, electrophysiology and pacing, cardiomyopathies and genetic counseling, and heart failure. In the unprecedented coronavirus disease 2019 pandemic era, *JACC: Case Reports* has expeditiously published timely and highly educational content, reacquainting cardiologists with critical care skills and highlighting the different presentations of a novel global disease.

JACC: Case Reports has placed significant emphasis on the role of SoMe in expanding readership and driving engagement by recruiting a multidisciplinary, highly accomplished, and enthusiastic SoMe team to its editorial board. Since its launch, *JACC: Case Reports* has had a globally expansive SoMe footprint. The main focus of the SoMe team is to create and share scientific journal-related content on SoMe platforms (mainly Twitter and Facebook) to promote medical education, encourage advocacy, and drive engagement. The virtual nature of the

SoMe platforms lends itself well with intellectually stimulating peer-reviewed high-quality case reports with predominantly pictorial content (8). These posts include high-quality illustrative figures and videos, interactive patient cases, quizzes, polls, video case presentations, and video interviews. The hashtag #JACCCaseReports is utilized to label all SoMe posts related to *JACC: Case Reports*. The content is shared by the *JACC* journals' formal SoMe accounts in addition to individual SoMe editors' accounts (Figure 1).

As *JACC: Case Reports* recently completed its first year of publication in June 2020, a palpable requisite for the SoMe team along with the editorial board is to measure the impact of collaborative SoMe efforts on overall readership of the papers and further understand the interests of the readers. In this viewpoint, we have looked at these questions using the metrics for papers published in *JACC: Case Reports*. Given that the AAS gives a credible view of the SoMe impact on initial readership of a paper, we examined the top 100 papers ranked by AAS, obtained its components to see the role of SoMe in the AAS (retrieved on April 1, 2020), and evaluated paper downloads (PDF and HTML downloads) through May 2020. We further categorized the papers by paper type as described by *JACC: Case Reports*. Voices of cardiology with strong clinical viewpoint were given a separate category of "viewpoint."

When studying the impact of the SoMe team in disseminating the journal's content, AAS applies certain modifiers to offset potential bias set by active "sharing" of papers by the editorial board (12). These modifiers sometimes take into account the connection between the "tweeter"/author of SoMe post and the journal being promoted for a given paper. For example, a tweet by a member of an editorial board or a SoMe member of *JACC: Case Reports* may not be counted in terms of AAS as compared with a post shared by an independent "tweeter." This is an important consideration when analyzing the overall AAS associated with a published paper.

JACC: CASE REPORTS: Top AAS PAPERS

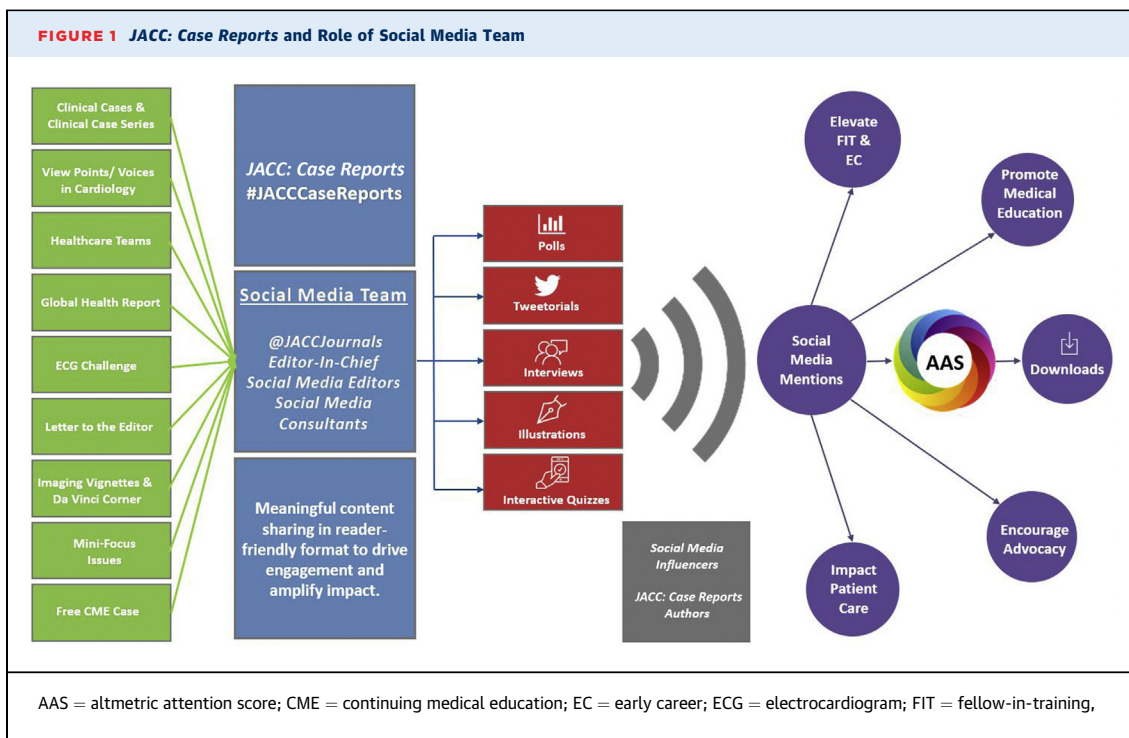
We analyzed the top 100 papers by AAS score published in *JACC: Case Reports* from June 2019 to May 2020. Median AAS score for these papers was 18 (interquartile range [IQR]: 13.0 to 43.5), while median for downloads was 1,136 (IQR: 759 to 2,807) (Table 1). Among the top 100 papers, 65% were case reports and 5% were clinical case series and editorial comments. In total, 16% of the papers were Voices in Cardiology

ABBREVIATIONS AND ACRONYMS

AAS = altmetric attention score

IQR = interquartile range

SoMe = social media



(Table 1). Median Twitter component (retweets) for top 100 was 35 (IQR: 26.5 to 78.0). Apart from Twitter, contributions of any other AAS components were minimal; hence, the median value for the composite of other components could not be calculated. Of the top 10 AAS papers, however, 4 were from the category “Voices in Cardiology,” whereas Clinical Cases, Viewpoint, and Editorial were represented equally (2 each) (Table 2). While examining the association

between AAS score and download, we found a moderate association between AAS score and Twitter component of AAS score, with downloads for top 100 papers categorized by highest altmetric until May 2020 (Figures 2A and 2B).

CARDIOTWITTER, SoMe ENGAGEMENT, AND ALTMETRIC

This analysis of top 100 AAS papers illustrates that for JACC: Case Reports, AAS is mostly dependent on sharing the content on Twitter with minimal contribution from other AAS components. Second, categories like Voices in Cardiology and Clinical Viewpoints, which are published infrequently, generate substantial interest on SoMe. Finally, AAS and Twitter mentions moderately predict downloads.

This analysis suggests that the concerted efforts of SoMe team has undoubtedly increased the visibility of JACC: Case Reports and amplified its impact on the educational and advocacy front along with possibly advancing the readership, as evident by a moderate correlation between AAS score and overall downloads (Figure 1). Based on this analysis, however, it would be difficult to ascertain how case reports generate interest in the virtual world. Similar to other research output, case report dissemination on SoMe may be dependent on sharing by SoMe influencers with large

TABLE 1 Analysis of Top 100 Papers Published in JACC: Case Reports by Paper Types and Median Downloads, AAS, and Twitter Mentions From June 2019 to May 2020

Paper Type	Total Numbers	Median Downloads	Median AAS	Median Twitter Retweets
Clinical Cases	65	929	17	30
Clinical Case Series	5	1,389	27	38
Global Health Reports	1	1,564	12	21
Heart Care Team	2	14,706	67	32
Voices in Cardiology	16	2,564	58.5	151.5
Viewpoint	4	997	41.5	69
Editorial Comment	5	984	71	133
Da Vinci Corner	2	664	40.5	73
All papers	100	1,136	18	35

Papers published in JACC: Case Reports were selected by Top 100 altmetric attention score (AAS) and further categorized by paper type. For each paper type, median downloads, AAS, and its components were collected by May 15, 2020.

TABLE 2 Analysis of Top 10 Papers by AAS From JACC: Case Reports June 2019 to May 2020

Paper Title	Publication Date	Paper Type	AAS	Downloads	Twitter (Retweets)	Other AAS Component (Total)
<i>Electrocardiographic Diagnosis of Life-Threatening STEMI Equivalents</i>	December 1, 2019	Editorial	301	31,159	452	17
<i>Learning From a Heart Transplant Patient</i>	August 1, 2019	Viewpoint	297	22,316	508	2
<i>Reacquainting Cardiology With Mechanical Ventilation in Response to the COVID-19 Pandemic</i>	March 1, 2020	Viewpoint	210	3,986	394	0
<i>The Kardashian Index of Cardiologists</i>	January 1, 2020	Voices in Cardiology	171	39,734	341	6
<i>First-in-Human Endo-Bentall Procedure for Simultaneous Treatment of the Ascending Aorta and Aortic Valve</i>	February 1, 2020	Case Report	163	24,644	233	2
<i>Vertebral Artery Stenting in a Patient With Bow Hunter's Syndrome</i>	June 1, 2019	Case Report	150	8,561	243	3
<i>My Voice</i>	June 1, 2019	Voices in Cardiology	103	41,531	183	2
<i>A Perspective on the K-Index</i>	February 1, 2020	Editorial	93	3,926	166	5
<i>Establishing and Expecting a Culture of Support for Breastfeeding Cardiology Fellows</i>	December 1, 2019	Voices in Cardiology	89	3,200	207	2
<i>Pregnancy During Cardiology Training</i>	August 1, 2019	Voices in Cardiology	86	1,439	194	4

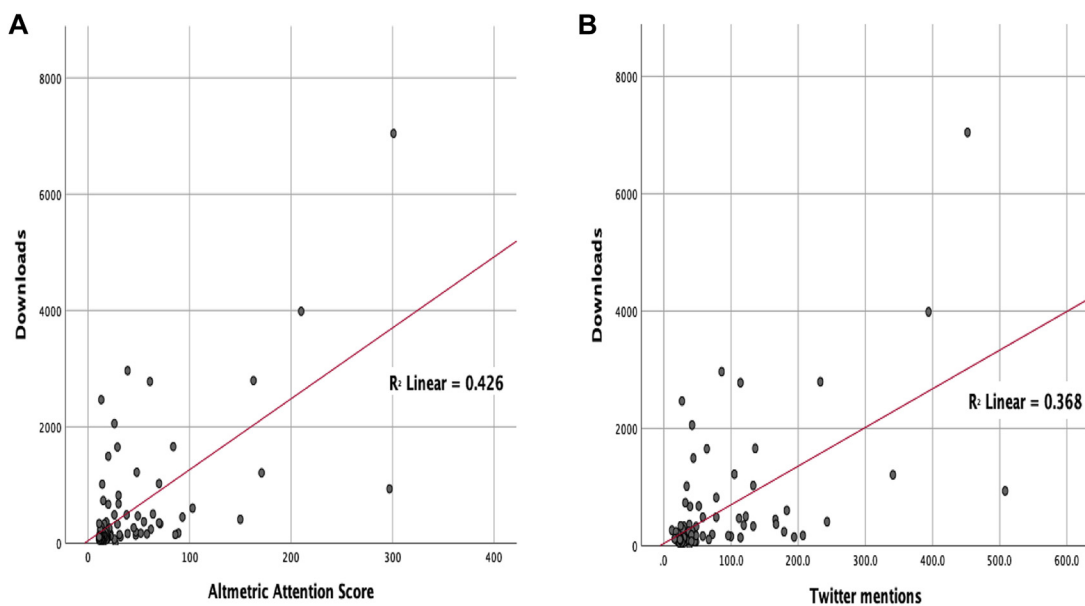
Papers published in JACC: Case Reports were selected by Top 10 altmetric attention score (AAS). For each paper, downloads, AAS, and its components were collected by May 15, 2020. COVID-19 = coronavirus disease-2019; STEMI = ST-segment elevation myocardial infarction.

follower base, use of images, central illustrations, and other engagement tools like polls or quizzes or podcasts (3,8).

The cardiovascular community on Twitter has grown substantially in the last few years and is comprised of thought leaders, academicians,

practicing cardiologists, as well as fellows-in-training. With exponential growth in the number of scientific journals, we live in an information paradox where we have access to excessive amounts of information. SoMe acts as a prism that sheds new light to clinically relevant and essential topics (3). SoMe

FIGURE 2 Correlations Between Top 100 Altmetric Attention Score Papers, Twitter Mentions, and Paper Downloads (PDF)



(A) Correlations between top 100 altmetric attention score papers and paper downloads. (B) Correlations between Twitter mentions and paper downloads for papers with top 100 altmetric attention score.

used strategically allows for bite-sized discussions facilitated by content dissemination that may allow for the generation of future hypotheses and increase overall scientific collaborations and, ultimately, scientific output (13,14). Although case reports are seldom cited, educational discussion around high-quality peer-reviewed case reports are exceedingly engaging on SoMe, particularly among fellows-in-training and early career professionals. The cardiovascular professional often takes advantage of a virtually integrated yet worldwide network to showcase their clinical work and research output with an additional (intentional or unintentional) benefit of enhancing the AAS. Although acknowledgment of published work by colleagues (via retweet) in virtual communities may be instant and easy, its causation remains complex to fully understand (15). SoMe communities, including Cardiotwitter, depend on social connection and generation of overall social capital by gaining trust of colleagues. Amplification of the content by SoMe users (via like and retweet) may reflect their true learning interest within the subject and their expertise, but it may also be a result of the secondary motivation of boosting the social bond with the posting individual. Paper downloads, however, are largely free of such biases, and moderate correlation of AAS score with paper downloads, as shown for these top 100 AAS papers, may indicate organic paper “traffic” generated via SoMe dissemination.

There are several limitations to the AAS score. Although sharing of the paper by the journal or by editorial board gets less attention than someone unrelated to the journal or editorial board, a fundamental concern with AAS is the process of data collection, management, and update of SoMe impact to generate this score. Also, AAS does not provide information about the quality of the paper; on the

contrary, criticism/negative attention is also counted as “attention” (16).

Nonetheless, the infinite potential of SoMe for dissemination of scientific knowledge is undeniable with free, around-the-clock, immediate communication that happens without boundaries of academic hierarchies, with democratization of voices and unmoderated communication. AAS is a mere reflection of this ongoing dialogue. Its prospective to become a potential quality metric from an attention metric keeps scientific journals interested in exploring the ways to make the content easily readable and accessible to the SoMe users. No doubt the techniques for sharing and using clinical cases on SoMe have changed the local trends in clinical practice in United States (#radialfirst, #dontdisthehis) (8). Yet, the true clinical impact of sharing relevant peer-reviewed cases online on betterment of patient care or on scientific progress by hypotheses-generation within virtual academic communities will be difficult to gauge.

CONCLUSIONS

This is the first analysis from a case report journal that details the spectrum of AAS and its high impact on the cardiovascular community. As SoMe evolves from vanguard to bedrock of medical publishing, peer-reviewed high-quality papers from *JACC: Case Reports* will continue to aim to engage the readership through novel means to advance cardiovascular care.

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REFERENCES

1. Stiglitz JE, Sen AK, Fitoussi J-P. Report by the Commission on the Measurement of Economic Performance and Social Progress. Paris, France: Commission on the Measurement of Economic Performance and Social Progress, 2009.
2. Parwani P, Choi AD, Lopez-Mattei J, et al. Understanding social media: opportunities for cardiovascular medicine. *J Am Coll Cardiol* 2019;73:1089-93.
3. Choi AD, Geske JB, Lopez-Mattei JC, et al. Cardiovascular imaging through the prism of modern metrics. *J Am Coll Cardiol Img* 2020;13:1256-69.
4. Hirsch JE. An index to quantify an individual's scientific research output. *PNAS* 2005;102:16569-72.
5. Trueger NS, Thoma B, Hsu CH, Sullivan D, Peters L, Lin M. The altmetric score: a new measure for article-level dissemination and impact. *Ann Emerg Med* 2015;66:549-53.
6. Barakat AF, Nimri N, Shokr M, et al. Correlation of Altmetric Attention Score with article citations in cardiovascular research. *J Am Coll Cardiol* 2018;72:952-3.
7. Ladeiras-Lopes R, Clarke S, Vidal-Perez R, Alexander M, Lüscher TF, for the ESC (European Society of Cardiology) Media Committee and European Heart Journal. Twitter promotion predicts citation rates of cardiovascular articles: a preliminary analysis from the ESC Journals Randomized Study. *Eur Heart J* 2020 Apr 19 [E-pub ahead of print].
8. Parwani P, Martin GP, Mohamed MO, et al. Relationship of altmetric attention score to overall citations and downloads for papers published in *JACC*. *J Am Coll Cardiol* 2020;76:757-9.
9. Widmer RJ, Mandrekar J, Ward A, et al. Effect of promotion via social media on access of articles in an academic medical journal: a randomized controlled trial. *Acad Med* 2019;94:1546-53.
10. Parwani P, Choi AD, Swamy P, Chamsi-Pasha M, Vidal-Perez R, Mamas MA. Social media: the new paradigm for cardiovascular case reports. *J Am Coll Cardiol Case Rep* 2019;1:452-6.

- 11.** Grapsa J. Vision for JACC: Case Reports: building an educational platform to bridge guidelines with clinical cases. *J Am Coll Cardiol Case Rep* 2019;1:75-6.
- 12.** Altmetric. How is the Altmetric Attention Score calculated? Available at: <https://help.altmetric.com/support/solutions/articles/6000060969-how-is-the-altmetric-attention-score-calculated->. Accessed June 6, 2020.
- 13.** Choi AD, Parwani P, Michos ED, et al. The global social media response to the 14th annual Society of Cardiovascular Computed Tomography scientific sessions. *J Cardiovasc Comput Tomogr* 2020;14:124-30.
- 14.** Choi AD, Feuchtner GM, Weir-McCall J, Shaw LJ, Min JK, Villines TC. Accelerating the future of cardiac CT: social media as sine qua non? *J Cardiovasc Comput Tomogr* 2020 Jan 31 [E-pub ahead of print].
- 15.** Chandrashekhar Y, Shaw L. Journal editors and altmetrics: moth to the flame? *J Am Coll Cardiol Img* 2019;12:1899-902.
- 16.** Bornmann L, Haunschild R. Do altmetrics correlate with the quality of papers? A large-scale empirical study based on F1000Prime data. *PLoS One* 2018;13:e0197133.

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