For years, traditional endeavors of dissemination of nephrology concepts to a wider audience evolved in many\(^1\) but was often unidirectional, limiting the contributors to a select few and reached only a privileged few who could access content behind paywalls and the dissemination of information was restricted. However, social media (#SoMe) is revolutionizing medical education by using technical advancements and evolving pedagogies that emphasize on learners as co-producers of knowledge and bridge formal and informal learning through multidirectional participation of digital communities at a global level with considerable ease and little cost. Over the past decade, pushed by the end-users popularizing conference content in social media, many medical societies have taken to Twitter to popularize the content of their conferences as well as to spread the scientific content.\(^2\) After initial reluctance, medical societies have allowed unrestricted sharing of presentations and photos, further strengthening the contribution of the end-users in dissemination of knowledge. This has also led to development of various social media tools and resources in nephrology.\(^3\)

The International Society of Nephrology (ISN), as a global nephrology society, initiated a trial of social media–based dissemination of nephrology content at the World Congress of Nephrology (WCN) in March 2015 at Cape Town, when not only by general coverage of the conference with the Twitter handle @isnkidneycare and a hashtag of #ISNWCN2015 along with sharing of photographs of conference content, but also live-tweeting and live-streaming select sessions, using the hashtag #WCNLiveStream was conducted (Supplementary Figure S1). Bolstered by this experience, it formalized the ISN social media task force initiative in 2016 (including clear policies on sharing photographs of content presented) to cover WCN 2017 (April 2017) at Mexico City,\(^4\) forming the social media education team, @ISNeducation, and a comprehensive strategy to cover medical conferences like the WCN by the conference-specific @ISNWCN group, which includes members from within and outside the @ISNeducation team to encourage wider participation, inclusiveness, and community engagement. The @ISNeducation team has continued to develop and incorporate several social media education tools, such as visual abstracts, Twitter quizzes, and poster interviews in conference coverage. The overall reach and impact of the different tools adopted in social media of the World Congress of Nephrology in 2019 at Melbourne Australia (WCN 2019) are presented here to underline the global significance of this ISN initiative.

Details of Twitter-Based Coverage of ISN WCN2019

The WCN2019 held from April 11 to April 15, 2019, at Melbourne,
was covered in social media with Twitter as the predominant medium by a total of 39 dedicated educators of the ISN Social Media Team (ISNSoMe team) from across the world both from on-site (n = 17) and remote locations (n = 21). There were a total of 17,507 interacted tweets (# ISNWCN) during the conference by 1904 users from across the globe, at a rate of 123 tweets per hour (from April 11, 2019, 12:00 AM to April 17, 2019, 10:59 PM) (Figure 1), with an average of 9.66 tweets per account. Approximately 9% tweeted ≥10 tweets and >25 users tweeted >100 tweets. The data calculated were with the hashtag #ISNWCN. The hashtags #ISNeducation and #visualabstracts were also commonly used in the conference. After English (n = 13,071, 73.6%), Spanish (3445, 19.4%) was the most common language of tweets. Most tweets belonged to the penultimate (n≈8500) and the second day (n≈7000) of the conference. Reaching to 91 countries across all continents, Twitter engagement was robust, with 24.9 million potential impressions, 13,700 retweets, and 7.4% replies (Symplur data analysis).

The tweeted content had links to 2500 individual articles and a total of 18,500 visuals, with 66.8% of the total tweets (n = 11,864) carrying media links (66.8%). The highest trending content widely retweeted was the coverage of the late-breaking clinical trial presentation of the CREDENCE (Canagliflozin and Renal Outcomes in Type 2 Diabetes and Nephropathy) trial. The simultaneous publication on the last day of the conference had a potential impact on the number of tweets (Supplementary Figure S2). Overall, the educators’ emphasis was mostly on lectures and discussions on patient outcomes in clinical areas such as diabetic nephropathy, dialysis, glomerulonephritis, and polycystic kidney disease.

Although the Twitter activity and the global reach of the conference were significant (Supplementary Table S1), the quality of the content presented in the tweets were enriched by several strategies adopted by the ISNSoMe team.

**Visual Abstracts**

A visual abstract (VA), introduced in 2017, is a single concise, pictorial summary providing a snapshot of the central content of the paper/talk without clutter. The ISNSoMe team had adopted...
this to help disseminate conference content from WCN2019 in 2 ways: precreated and live-created VA.

First, VAs were precreated before the conference for preselected, accepted, preconsented oral and poster presentations on a standard WCN2019 themed template, by a subteam of the ISN SoMe team collaborating via e-mail, WhatsApp, and Slack, crosschecked, proofread, and tweeted out to the audience at a time of the presentation at the conference (Supplementary Figure S3). Second, for a few sessions chosen based on the content, interest, and suitability, a team of expert VA editors pioneered the creation of live VAs, constructing them in real time when sessions were in progress and shared across social media.

A total of 25 precreated and 5 live VAs were tweeted during the conference. The VA-tweets gained (per VA) a median (minimum, maximum) of 1659 (747, 4214) impressions and 90 (21, 414) engagements (retweets, replies, comments, or profile visits), 12 (4, 43) likes and 8 (2, 25) retweets. Of note, live VA tweets had a trend toward higher impressions and engagement (Table 1).

Online Quizzes
As the on-site team extensively covered the WCN 2019 scientific content on Twitter, a select group of offsite members chose the most informative evidence-based tweets of the day and packaged them into an interactive online quiz with links to the original tweet. The interactive online quizzes were untimed, multiple-choice questions (with 4 choices) with links to the original tweet (Supplementary Table S2). They were prepared on the https://outgrow.co/ platform and shared across Twitter, Facebook, and select WhatsApp groups for wider dissemination. The responses were followed by an explanation of the correct answer with the link to evidence. Each participant got to know the score and global rank in real time at the end of each quiz.

Overall, 4 quizzes covering each day of WCN2019 received 545 page-views and 260 completed attempts by May 25, 2020 (Supplementary Table S3). Approximately 119 of the total 260 quiz attempts were made during the conference dates (April 11–15, 2019) and the rest thereafter. They garnered participation from across the globe (Asia: 51.3%, Europe: 18.5%, America: 11%, Oceania: 8.5%, Africa: 4.6%, and unknown: 6%). Most (63.9%) participants completed the quiz on mobile devices, underscoring the ease of accessibility.

Out of the 48 participants who completed a google form-based anonymous feedback survey (Supplementary Table S3) on the quizzes, 96% found the references helpful and affirmed that their knowledge improved and 92% supported this as an effective social media learning tool. There were 70.8% who completed the quiz in less than 15 minutes, 81.3% graded the difficulty level as optimum, and 71% preferred the 10-question format. Apart from the advantages of being free, repeatedly usable, unrestricted by time and location, and requiring minimum time, they also could be repeatedly attempted after the conference was over. They also facilitated more organic participation and active learning from the conference among the audience far and beyond.

Poster Interviews/Talks
On-site physical posters are the mainstay of original research presentations in scientific conferences but limited by time and access among the conference attendees with indeterminate reach. In WCN2019, the social media team introduced “poster talks,” where preselected posters were described with the accompanying visual of the poster as a video clip of ≤140 seconds’ duration and shared in social media during the conference. Recorded using handheld mobile phones and tablets with some use of accessory microphones, there were minimal issues in recording these talks. Despite short notice and no special

| Tweet activity | Live VA | Precreated VA | Total VA | Poster interviews | Poster talks |
|----------------|---------|--------------|----------|------------------|-------------|
|                | Mean (max, min) | Mean (max, min) | Mean (max, min) | Mean (max, min) | Mean (max, min) |
| Impressions    | 2132.4 (2760, 1457) | 1901.1 (3954, 733) | 1949.3 (3954, 733) | 1489 (3632, 370) | 1889.5 (3712, 962) |
| Total engagments | 255.6 (413, 146) | 78.6 (167, 21) | 115.5 (413, 21) | 63 (162, 17) | 56.6 (106, 28) |
| Media engagements | 173.4 (301, 84) | 44.8 (109, 9) | 71.6 (301, 9) | 38.5 (96, 1) | 20.9 (57, 8) |
| Likes          | 27.8 (42, 11) | 12.8 (25, 4) | 16 (42, 4) | 11.9 (23, 5) | 12.7 (24, 5) |
| Retweets       | 21.8 (34, 7) | 11 (43, 1) | 13.6 (43, 1) | 13.6 (35, 2) | 9.8 (44, 1) |
|                | 17.2 (25, 1) | 7.2 (14, 2) | 9.3 (25, 1) | 7.6 (23, 2) | 8.3 (16, 4) |

Source: Twitter analytics. Analysis done for the following time frame: April 11, 12:00 AM to April 17, 10:59 PM.

Table 1. World Congress of Nephrology 2019 VAs, poster talks, poster interview, Twitter engagement metrics (metrics per tweet)
“preparation,” most of the speakers were at ease during these talks, as it closely reflected the face-face poster presentation. In addition, periscope videos of “poster interviews” of participants presenting their research at the conference venue were shared as multimedia tweets. They enable the direct representation of researchers in the wider dissemination of research beyond the limits of the congress. These initiatives garnered widespread interest in social media (Table 1).

Besides poster interviews, some interesting videos, such as speaker interviews, were uploaded onto the ISN YouTube account and shared on Twitter, Facebook, and select WhatsApp groups. There were 8 such videos that garnered a total watch time of 1650 minutes with 5780 impressions and 960 unique views.

Other Platforms
There is quite limited coverage of conference content in alternative #SoMe platforms, such as Facebook, Instagram, and YouTube. The popularity of these alternative SoMe platforms vary globally, with Facebook being more commonly used in regions such as Asia (personal communication, Dr. Sanjay Srinivas, Convenor Nephrology Association of Karnataka, Bangalore, India). The ISNSoMe team also used Facebook and YouTube for coverage of WCN2019. The ISN has an active Facebook profile with free content, in addition to a private Facebook ISN Education group that had 1089 professional members from more than 100 countries at the time of the WCN2019. According to Facebook (and its subsidiary Instagram) analytics, a total of 180 posts from WCN2019 featured with #ISNWCN were accessed by 509 members from 45 countries with 357 reactions. Gathering 340,000 unique impressions and 50 mentions (Facebook: 13; Instagram: 37), the posts generated 1786 interactions (1720 likes, 36 comments, and 30 shares) and had overall positive engagement (87% sentiment analysis). Similarly, videos such as speaker interviews were uploaded onto the ISN YouTube account and shared on Twitter, Facebook, and WhatsApp. The 8 videos by @ISNWCN garnered a total watch time of 1650 minutes with 5780 impressions and 960 unique views. These data suggest that it is possible to reach a wider global audience with use of variably relevant social media platforms.

Potential Impact of an Organized Social Media Team for Conference Coverage
A comparison of social media coverage metrics of WCN2019 with WCN2017 and other contemporary international nephrology conferences preceding WCN 2019 showed not only an increased social media activity in terms of percentage of retweets, evidence-based tweets, video recordings, and active participants (Supplementary Table S1), but also extensive dissemination that reached out to a large number of participants all over the world. The interesting strategies, many afresh in nephrology conference coverage, add to the popular content (such as the CREDENCE trial presentation coverage) to help improve the reach of WCN2019 social media coverage.

Social media–based strategy limits time, travel, expenditure incurred with physical attendance of conferences, and enables a wider global audience, including those who may not be in a position to attend such conferences for various reasons. Our results demonstrate the successful use of social media strategies like VAs (prepared and live-created), online quizzes, poster talks, and poster interviews providing a synopsis of the vast information presented in the conference in an easily comprehensible form that is instantly accessible at minimal cost, enhanced the extensive global reach of WCN2019 social media coverage. Using multiple platforms like Twitter, YouTube, Facebook, and Instagram not only boosted social media participation of nephrologists but also promoted wider global interaction on the conference content.

Despite the several advantages, virtual coverage cannot replicate the unique advantage of having in-person interactions and face-to-face networking. In addition, despite the academic content and natural peer review, social media–based education has not yet gained widespread acceptance among traditional academia as a form of scientific communication.

The members of the social media team can help cohesively disseminate scientific conference content worldwide early on. There is, however, a small risk of potential alienation from conference attendees who are not part of this initiative or of a competing initiative with another society or group. Care must be taken by all such groups to democratize the use of social media to make it more inclusive.

The novel strategies have some limitations: (i) The skills required for creating them required a flair for both the scientific content as well as the content-processing and social media tools not shared by everyone; and (ii) the act of real-time creation of social media content such as live visual abstracts, could divide the attention of the creator and potentially impact its clarity.

Although many interesting strategies have contributed to the improvement in quantity and quality of engagement with social media–based conference coverage, it is not possible that there is some underlying impact of the popularity of content over the strategy, as well as the impact of temporal rise in
social media uptake by the global academic community contributing to the increasing numbers. Finally, the current measures of numerical engagement metrics are less illustrative of the actual academic impact of the content and call for novel indices of the impact of social media–based education and the ensuing collaborations to provide due academic credit.

Conclusion

The ISN, with an international team of nephrology social media professionals actively promotes social media coverage, networking and worldwide dissemination of content from the WCN, across Twitter, Facebook, and YouTube to promote nephrology education across the global nephrology community, enhancing this initiative by strategies such as “poster talks,” “poster interviews,” online quizzes, and live visual abstracts.

DISCLOSURE

All the authors declared no competing interests.

SUPPLEMENTARY MATERIAL

Supplementary File (Word)

Table S1. A comparison of educational Twitter activity of WCN 2019 with similar nephrology conferences in the preceding year. Table S2. Data of the 4 quizzes during WCN 2019. Table S3. The google survey questionnaire on the online quizzes. Figure S1. ISN WCN 2015 Twitter coverage activity snapshot. Figure S2. WCN2019 Twitter activity #ISNWCN. Figure S3. A live visual abstract created at ISNWCN 2019.

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