Twitter

Twitter is a piece of information network made up of 140-character messages called "tweets". The brevity of the messages is key to its success: it takes very little time to scan a large amount of information. The tweets contain either a piece of concise information (a message, a question, a thought) or a weblink to more information elsewhere (a website, an image). Scanning recent tweets may be compared with scanning headlines in a newspaper, but with one major difference – you determine what kind of headlines you want to see [1].

The increasing popularity of social media platforms, such as Twitter, have also allowed for the ability to quickly and effectively advertise and promote educational programs to a wide audience [2] [3].

There is a significant difference between social media and reality even within the 'MedTwitter' sphere, which is likely due to strong publication bias in Twitter-reported cases. Content on 'MedTwitter', as with most social media, should be accepted cautiously [4].

Twitter has demonstrated an expanding role in scientific discussion, surgical news, and conferences.

Twitter has been used to supplement surgical conferences [5].

The Atlas Twitter account, established in August 2012, has more than 12,000 followers, primarily hailing from the United States, the United Kingdom, Canada, and Saudi Arabia. The Atlas Facebook account, established in 2013, has just over 13,000 followers, primarily from India, Egypt, and Mexico. The Atlas Instagram account (established most recently, in December 2018) has more than 16,000 followers and the highest percentage (31%) of younger users (aged 18-24 years). The Atlas app was officially launched in May 2019, largely via promotion on the Atlas social media platforms, and has since recorded more than 60,000 viewing sessions, 80% of which were from users outside the United States.

The Neurosurgical Atlas has attempted to leverage the many e-learning resources at its disposal to assist in spreading neurosurgical best practice on an international scale in a novel and comprehensive way. By incorporating multiple social media platforms into its repertoire, the Atlas is able to ensure awareness of and access to these resources regardless of the user's location or platform of preference. In so doing, the Atlas represents a novel way of advancing access to neurosurgical educational resources in the digital age [6].

The Virtual Global Spine Conference (VGSC) was created in April 2020 by a multi-institutional team of spinal neurosurgeons and a neuroradiologist. Biweekly virtual meetings were established wherein invited national and international spine care providers would deliver case-based presentations on spine and spine surgery-related conditions via teleconferencing. The promotion was coordinated through social media platforms such as Twitter [7].

The influence of social media and Twitter in general surgery research, mentorship, networking, and education is growing. Limited data exist regarding individuals who control the dialogue [8].

The Brain Tumor Social Media (#BTSM) Twitter hashtag was founded in February 2012 as a disease-specific hashtag for patients with a brain tumor.

To understand #BTSM's role as a patient support system, Feliciano et al. described user descriptors, growth, interaction, and content sharing.

They analyzed all tweets containing #BTSM from 2012 to 2018 using the Symplur Signals platform to obtain data and to describe Symplur-defined user categories, tweet content, and trends in use over time. They created a network plot with all publicly available retweets involving #BTSM in 2018 to visualize key stakeholders and their connections to other users.

From 2012 to 2018, 59,764 unique users participated in #BTSM, amassing 298,904 tweets. The yearly volume of #BTSM tweets increased by 264.57% from 16,394 in 2012 to 43,373 in 2018 with #BTSM constantly trending in the top 15 list of disease hashtags, as well the top 15 list of tweet chats. Patient advocates generated the most #BTSM tweets (33.13%), while advocacy groups, caregivers, doctors, and researchers generated 7.01%, 4.63%, 3.86%, and 3.37%, respectively. Physician use, although still low, has increased over time. The 2018 network plot of retweets including #BTSM identifies a number of key stakeholders from the patient advocate, patient organization, and medical researcher domains and reveals the extent of their reach to other users.

From its start in 2012, #BTSM has grown exponentially over time. They believe its growth suggests its potential as a global source of brain tumor information on Twitter for patients, advocates, patient organizations as well as health care professionals and researchers [9].

Workewych et al. hypothesized that Twitter data might be useful for understanding public perceptions and misperceptions of sport-related traumatic brain injuries. We performed a content and sentiment analysis of 7483 Twitter® tweets related to traumatic brain injuries in sports collected during June and July 2013.

They identified five major themes. Users tweeted about personal traumatic brain injuries experiences, reported traumatic brain injuries in professional athletes, shared research about sport-related concussions, and discussed policy and safety in injury prevention, such as helmet use. We identified mixed perceptions of and sentiment toward traumatic brain injuries in sports: both an understanding that brain injuries are serious and disregard for activities that might reduce the public burden of traumatic brain injuries were prevalent in our Twitter analysis.

While the scientific and medical community considers a concussion a form of traumatic brain injuries, our study demonstrates a misunderstanding of this fact among the public. In our current digital age, social media can provide useful insight into the culture around a health issue, facilitating implementation of prevention and treatment strategies [10].

Meng et al. searched two major social media platforms (Facebook and Twitter) for public accounts dedicated to epilepsy. Results were analyzed using qualitative and quantitative methodologies. The former involved thematic and word count analysis for online posts and tweets on these platforms, while the latter employed descriptive statistics and non-parametric tests.

Results: Facebook had a higher number of pages (840 accounts) and users (3 million) compared to Twitter (137 accounts and 274,663 users). Foundation and support groups comprised most of the accounts and users on both Facebook and Twitter. The number of accounts increased by 100% from 2012 to 2016. Among the 403 posts and tweets analyzed, "providing information" on medications or correcting common misconceptions in epilepsy was the most common theme (48%). Surgical interventions for epilepsy were only mentioned in 1% of all posts and tweets.

Conclusions: The current study provides a comprehensive reference on the usage of social media in epilepsy. The number of online users interested in epilepsy is likely the highest among all neurological conditions. Surgery, as a method of treating refractory epilepsy, however, could be underrepresented on social media [11].

A pilot application of the system in a hospital showed successful information transfer, allowing medical staff to discuss patients' diagnosis and management using a Twitter system.

The system (i-Stroke) may become a useful tool for acute patient management in the field of neurology and neurosurgery [12].

Conflicts of interest

Despite extensive study on financial conflicts of interest (FCOI) influencing medical research, little is known about the function of conflicts of interest on social media and the influence they may have.

Powell et al. sought to evaluate the FCOI of physicians followed on Twitter by the top three neurosurgical journals.

They analysed the FCOI of United States (US) physicians followed by the top three neurosurgical journals (Journal of Neurosurgery, World Neurosurgery, Neurosurgery) on Twitter. They determined the FCOIs of each physician using the Open Payments Search Tool located at https://openpaymentsdata.cms.gov and summed the data between 2014 and 2021.

They examined 2651 Twitter accounts followed by the top three neurosurgical journals on Twitter and determined 705 (26.6%) belonged to US physicians. Of the 705 US physicians, 577 (81.8%) received general payments between 2014 and 2021. After excluding US physicians currently in residency or fellowship (n = 157), this percentage increased to 93.2% (n = 511/548). In total, nearly $70 million in general payments were made between 2014 and 2021.

These findings raise questions regarding the interaction between neurosurgical journals and the medical community on Twitter. This study may serve as the basis for future work on best practices for medical journals navigating their affiliations on Twitter [13].

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