Qualitative Twitter analysis of participants, tweet strategies, and tweet content at a major urologic conference

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Abstract

Introduction: The microblogging social media platform Twitter is increasingly being adopted in the urologic field. We aimed to analyze participants, tweet strategies, and tweet content of the Twitter discussion at a urologic conference.

Methods: A comprehensive analysis of the Twitter activity at the European Association of Urology Congress 2013 (*#eau2013*) was performed, including characteristics of user profiles, engagement and popularity measurements, characteristics and timing of tweets, and content analysis.

Results: Of 218 Twitter contributors, doctors (45%) were the most frequent, ahead of associations (15%), companies (10%), and journals (3%). However, journals had the highest tweet/participant rate (22 tweets/participant), profile activity (median: 1177, total tweets, 1805 followers, 979 following), and profile popularity (follower/following ratio: 2.1; retweet rank percentile: 96%). Links in a profile were associated with higher engagement ($p<0.0001$) and popularity ($p<0.0001$). Of 1572 tweets, 57% were original tweets, 71% contained mentions, 20% contained links, and 25% included pictures. The majority of tweets (88%) were during conference hours, with an average of 24.7 tweets/hour and a peak activity of 71 tweets/hour. Overall, 59% of tweets were informative, led by the topics uro-oncology (21%), urologic research (21%), and urotechnology (12%). Limitations include the analysis of a single conference analysis, assessment of global profile and not domain-specific activity, and the rapid evolution in Twitter-using habits.

Conclusion: Results of this single conference qualitative analysis are promising for an enrichment of the scientific discussions at urologic conferences through the use of Twitter.

Introduction

The microblogging social media platform Twitter is increasingly being used in urology.[1-4] One of the major uses is advocacy and policy discussion. For example, following the U. S. Preventive Services Task Force recommendation, there was a robust Twitter reaction (5357 tweets).[5] Another major use of Twitter is the international urologic journal club, #iurojc, which included 189 unique participants around the globe contributing 2345 tweets to the scientific discussion during the initial 12-month period.[2] Numerous urologic journals, led by *British Journal of Urology International* (BJUI) and *European Urology* with the highest social media Klout scores, use Twitter to engage with their readers and authors.[1] The urologic Twitter discussion reaches its peak activity regularly during major urologic conferences. Over the last three years, Twitter has evolved as an important communication platform at conferences with steadily growing participation,[3] which led to the recent record of 12 857 tweets during the 2015 American Urological Association (AUA) conference.[6]

Numerous studies have reported increasing use of Twitter at urologic conferences[3,4,7-9] and urologists were the main contributors to the Twitter discussions.[4,7] A recent content analysis from a global endourology conference showed that 57% of tweets were related to the scientific content of the meeting.[9] The content of tweets was largely dominated by oncologic topics at the AUA and Canadian Urological Association (CUA) conferences.[4] However, qualitative data regarding the characteristics of contributing Twitter users, as well as the nature and informativeness of the content is limited. Profiles of urologic Twitter users have not been investigated for qualitative characteristics and popularity measurements yet. There is also limited data on the characteristics of urologic conference tweets, such as originality and/or use of links and pictures, nor on the content of tweets. To provide a more detailed qualitative analysis of the participants, tweet strategies, and tweet content, we examined Twitter content from the 2013 EAU congress.

Methods

A Tweet analysis was performed using data from *www.symplur.com*, a website providing social media assessment. Tweets containing the hashtag *#eau13* for the 2013 EAU

congress were selected within the conference period from 9:00 am on March 15, 2013 to 1:00 pm on March 19, 2013, and analyzed directly after the conference. The flowchart in Fig. 1 depicts how tweets and Twitter profiles were analyzed to assess who was tweeting how, and about what at this urologic conference.

We evaluated "who" participated in the EAU discussion by direct analysis of the Twitter profiles. Participants were categorized by: physician, company, journal, association, or not classifiable. Physician profiles were also assessed for gender. The continent of origin was captured for each Twitter user profile when stated. All Twitter user profiles were examined for detailed information on specialty, presence of a picture, presence of a web link, and type of links (e.g., to an institution or publication list). Moreover, all Twitter participants were assessed for profile activity and popularity characteristics. The profile activity was measured by number of tweets, number of followers, and number of other users they follow. Popularity of Twitter user profiles was measured by the Twitter follower/following ratio and professional rank. The Twitter follower/following ratio is calculated by dividing the number of the followers of each profile by the number of accounts followed by the profile. Higher Twitter follower/following ratios reflect greater social popularity on Twitter.[10] Each profile was subsequently analysed at *www.RetweetRank.com*, a website containing a popularity measurement tool for Twitter. This platform evaluates all recent retweets, number of followers, and lists of a user. It then compares these data with those of other users to assign a rank and percentile score for the profile. Score ranges from 0–100 and is calculated as percentile =(total users on retweet rank – user rank)*100 /total users on retweet rank. A lower user rank and higher percentile score represent a higher popularity on Twitter.

After calculating these metrics for all participants, we examined whether any specific characteristics of Twitter profiles were associated with higher engagement and popularity measurements.

Assessment of how users were tweeting was performed by analysis of characteristics and timing of tweets. The following characteristics were examined: whether it was an original tweet or retweet and if it contained a mention and/or a picture and/or a web link. An original tweet contains a new message, while a retweet is created when a user disseminates an existing tweet to their followers by pressing the retweet button. A tweet contains a mention when a

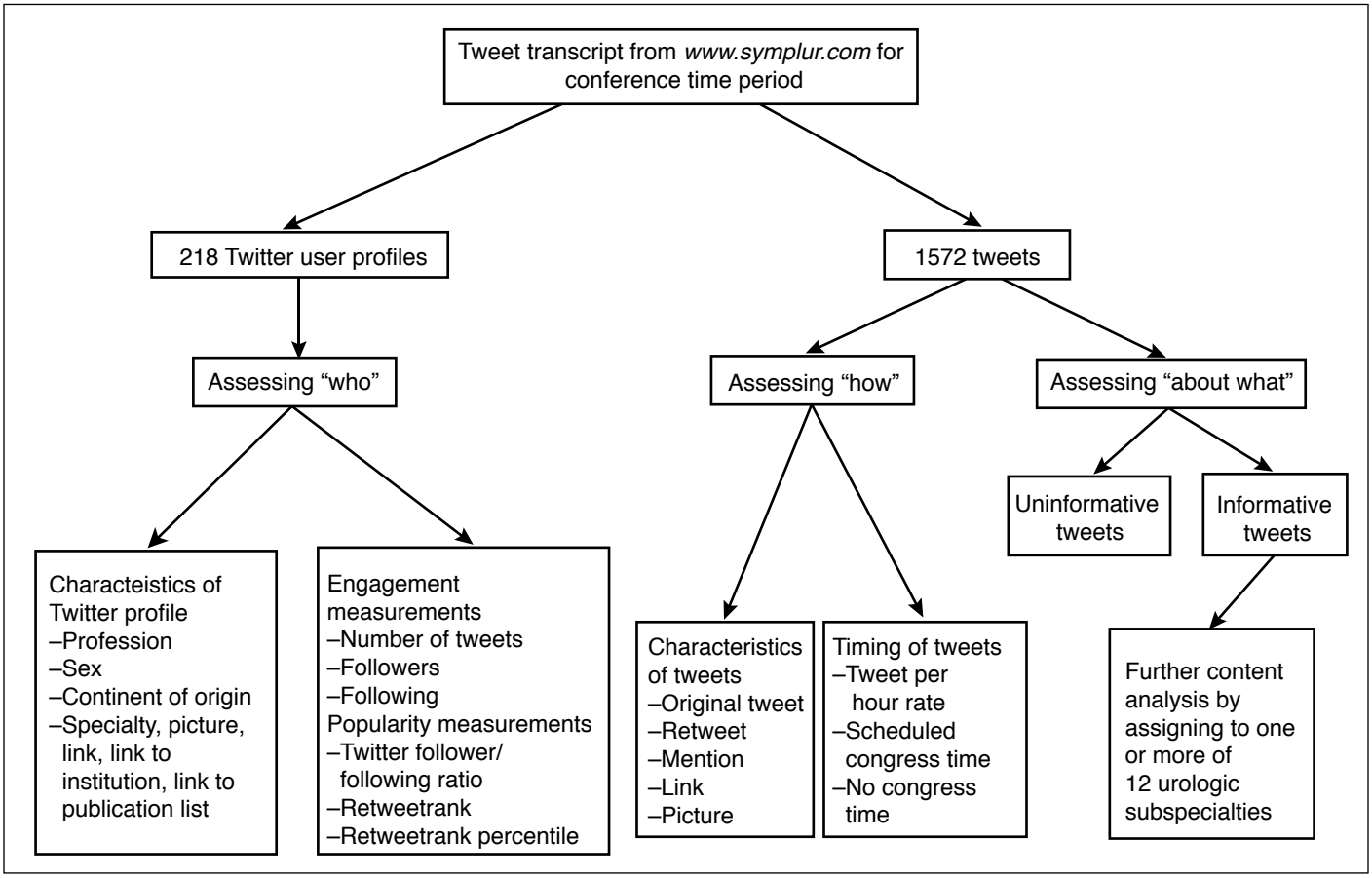

Fig. 1. Flowchart of the assessment process for the qualitative Twitter analysis.

Table 1. Demographics and activity metrics of the #eau13 Twitter users

	Number of participants	% of all participants	Number of tweets	% of all tweets	Tweets/participant
Profession					
Doctor	98	45	963	61	9.8
Male	74	76	859	89	11.6
Female	24	24	104	11	4.3
Company	21	10	59	4	2.8
Journal	6	3	129	8	22
Association	32	15	278	18	9.4
Not classified	61	28	143	9	2.5
Continent of origin					
Europe	110	51	816	52	7.4
North America	37	17	332	21	9
Australia	16	7	153	10	9.6
Asia	4	2	12	1	3
South America	15	7	38	2	2.5
Africa	3	1	10	1	3.3
Not classified	33	15	211	13	6.4
All users	218	100	1572	100	7.2

user has tagged another Twitter user by mentioning their @ *username* in a tweet. The number of tweets per hour during *#eau13* was obtained directly from *www.symplur.com*. For further distinction, the conference dates were divided into scheduled conference time and non-conference time.

We also performed a qualitative content analysis of what users were tweeting about during *#eau13*. First, tweets were classified as informative or uninformative using a previously reported classification scheme.[11] Informative tweets communicate data or discuss research presented at the conference. Uninformative tweets include status updates, advertisements, or opinions without information about presented data. Informative tweets were further subclassified into one or more of the 12 thematic sections designated by the EAU.[12]

Statistical analysis was performed with Statistical Package for the Social Sciences 22.0 software (SPSS Inc. Chicago. IL. USA). The Wilcoxon-rank-sum test was used for ordinal outcome parameters to assess differences between the groups. A p value <0.05 was considered statistically significant.

Results

A total of 218 unique users participated in the *#eau13* Twitter feed. As shown in Table 1, the largest group of contributors were doctors (45%), with much less contribution from industry (10%).

Table 2 shows profile activity and popularity measurements of *#eau13* Twitter user profiles. Journals (22 tweets/participant) had the highest profile activity and popularity. Companies (2.8 tweets/participant) and unclassified accounts (2.5 tweets/participant) had the lowest tweet/participant rate.

Most (90%) Twitter profiles had a picture of the user and in 48% a specialty was mentioned; 63% of profiles contained a link, directed to the institution in 15% and directed to the publication list in 10% of profiles. User profiles containing a picture ($p=0.003$) or link ($p<0.0001$) had higher engagement compared to users without these features in their profile. In addition, users with any link ($p<0.0001$) or link to an institution ($p=0.002$) in their profile had significantly higher popularity, reflected by a higher retweet rank percentile.

Analysis on how Twitter was used was performed by examining all 1572 tweets. Overall, 888 (57%) were original tweets, and the remaining 684 (43%) were retweets. The majority (71%) of tweets contained mentions, 20% contained a link, and 25% included a picture.

Figure 2 shows the timing of Twitter activity during the conference dates. The vast majority of conference-related Twitter activity (88%) was posted during scheduled conference hours. The average rate of tweets/hour was 15.6 (±12.9) for the full conference time, with 24.7 (±19.3) tweets/hour during scheduled conference hours and 6.0 (±5.3) tweets/hour during non- conference time. During the peak activity, more than one tweet was posted per minute (73 tweets/hour).

Analysis about what users were tweeting revealed that out of all 1 572 tweets, 59% were informative. The distribution of informative tweets to the respective urologic subspecialty is shown in Figure 3. Uro-oncology, urologic research, and urotechnology were the most popular topics in the Twitter discussion, with limited Twitter activity in the fields of reconstructive urology, transplantation urology, and female and functional urology.

Discussion

Although the increasing use of Twitter at urologic conferences has been well documented,[3,4,7-9] less is known about the

Table 2. Activity and popularity measurements of Twitter user profiles according to user category

	Activity measurements			Popularity measurements		
	Number of tweets	Followers	Following	Followers/ following ratio	Retweet rank	Retweet rank percentile
Doctor	671 (260; 1662)	210 (101; 408)	190 (104; 352)	1.25 (0.68; 2.0)	608,945 (496 378; 959 179)	90 (84; 92)
Male	634 (240; 1662)	208 (107; 371)	185 (102; 324)	1.25 (0.69; 2.0)	623 841 (483 352; 974 813)	90 (84; 92)
Female	738 (503; 2712)	237 (82; 942)	243 (99; 936)	1.32 (0.59; 1.98)	601 483 (475 094; 894 275)	90 (86; 92)
Company	468 (206; 1672)	266 (125; 850)	414 (220; 1269)	0.78 (0.27; 1.23)	569 884 (448 231; 1 062 820)	92 (84; 93)
Journal	1177 (1009; 2448)	1805 (947; 2463)	979 (471; 1580)	2.1 (1.39; 3.52)	295 775 (256 121; 379 553)	96 (94; 96)
Association	641 (304; 1552)	444 (139; 821)	366 (159; 1065)	1.01 (0.62; 1.81)	536,417 (349,875; 879 443)	92 (87; 94)
Not classified	461 (86; 1525)	91 (21; 278)	183 (69; 436)	0.51 (0.26; 0.94)	879,443 (515,126; 1,316,898)	87 (80; 92)
All Twitter users	579 (166; 1701)	208 (84; 495)	243 (101; 520)	0.92 (0.44; 1.72)	639 892 (463 108; 959 197)	90 (84; 93)

Profile activity is shown by number of tweets, number of followers, and number of other users they follow (following). The popularity of Twitter user profiles is shown by the Twitter follower/following ratio (higher ratios reflect greater social popularity on Twitter), and professional rank (lower retweet rank and higher retweet rank percentile represent a higher popularity on Twitter). Values are given as median, 25th, and 75th percentile.

qualitative aspects of the Twitter discussion. We performed a comprehensive qualitative assessment on who is tweeting how and about what at the 2013 EAU congress. Our assessment showed that doctors were the main contributors to the Twitter discussion. Journals had the highest profile activity and popularity measurements. Original tweet content was posted most frequently during conference hours, and more than one in five tweets were accompanied by a picture and/or link. The majority of tweets were informative, with uro-oncology, urologic research, and urotechnology as the most frequent subspecialty topics.

With regard to the participants, our profile analysis revealed that doctors were the main contributors to the scientific discussion on Twitter. In line with our findings, the use of social media is constantly increasing among physicians[13] and uptake of all forms of social media by urolo-

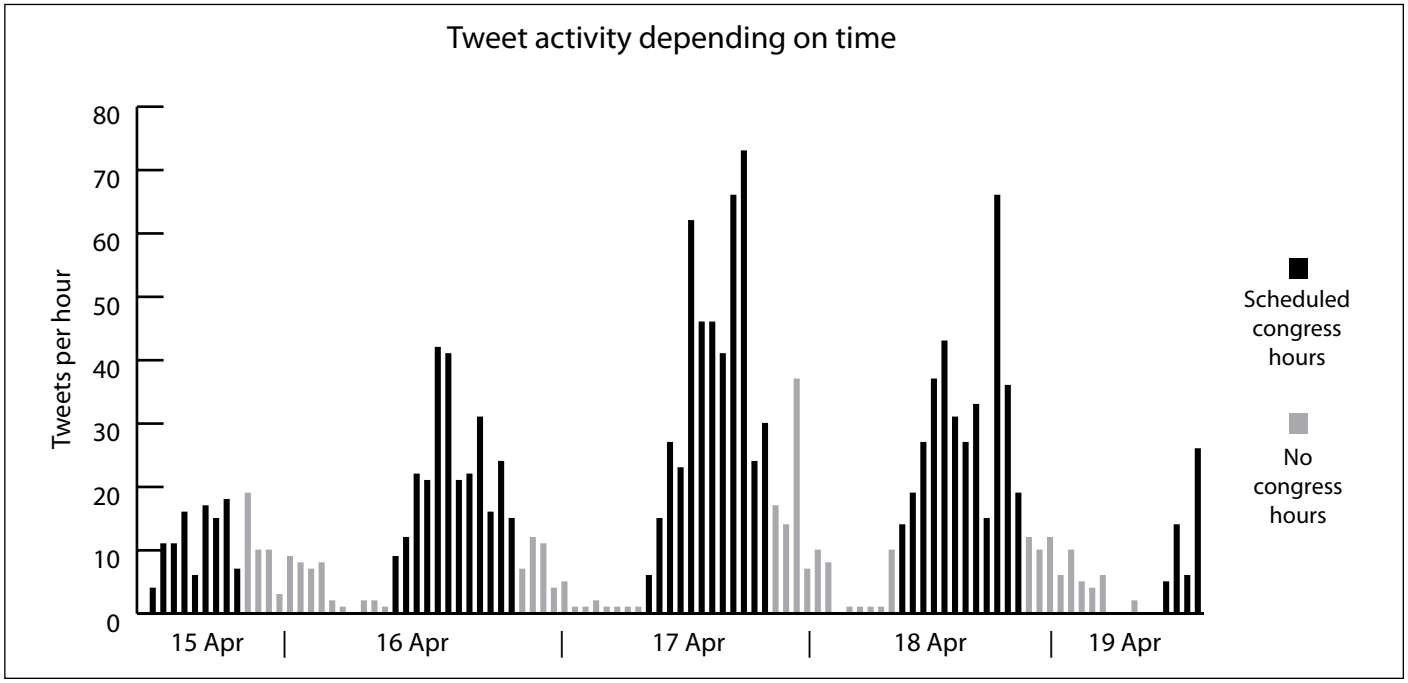

Fig. 2. Frequency of tweets per hour during 2013 EAU Congress.

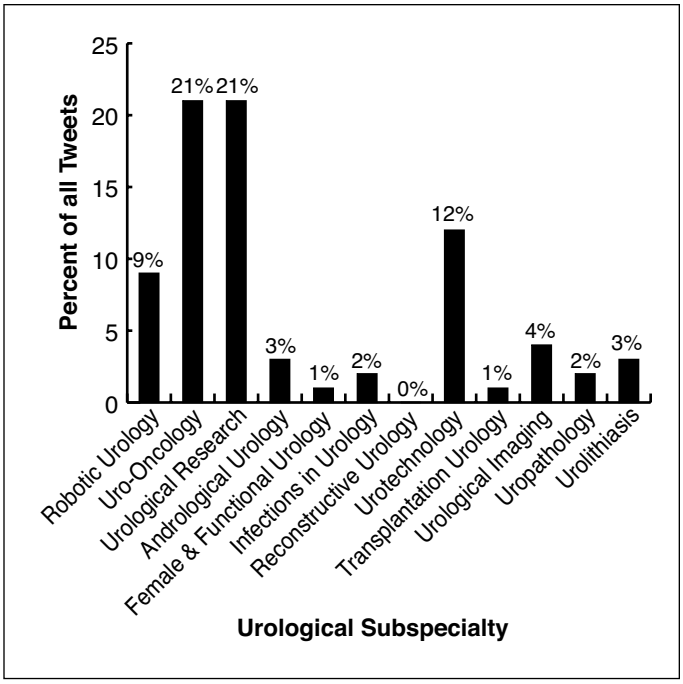

Fig. 3. Content of Tweets during 2013 EAU Congress.

gists has recently been reported to be 70% in Australia and New Zealand[14] and 74% in the U.S.A.[15] The social media usage rates for urologists outnumbered the usage rate of 52% reported for oncologists and primary care physicians.[16] A tweet analysis from a national conference in Ireland confirmed that 88% of tweets were from urologists.[7]

Profile activity and popularity were in total high for all Twitter user profiles, while journals scored best for both metrics. This data reflects the increasing use of Twitter by journals in the urologic field.[1]

Links in Twitter profiles were identified as being associated with both higher activity (measured by tweet number) and popularity (measured by retweet rank percentile). These results are in line with the findings of an analysis by Lulic et al,[17] in which American Emergency Physicians' accounts containing links to professional information had higher engagement measurements than accounts without such information.

Analysis on how Twitter was used showed that original tweets (57%) were more common than retweets (43%). This data is encouraging, since original tweets with health content from professional sources are accorded higher credibility.[18] Moreover, influential quality can be promoted by a link to further information, substantiating the expressed statement, which was used by 20% of Twitter users in our series. The concept "statement+proof" is a basic scientific principle and seems transferrable to the Twitter blogosphere in terms of "statement+link". Accordingly, a subgroup of top users, characterized as those with the most followers, inserted links in 92% of their tweets compared to all users with 77%, inserting links in an assessment of Twitter usage to share information about dementia.[19] The amount of links in our study (20%) was slightly lower than in a contemporary Tweet analysis of the AUA and CUA conferences (29%).[4]

The vast majority of tweets (88%) took place during scheduled conference hours, with a peak activity of 73 tweets/hour. In the same year, at the AUA conference a lower proportion of tweet activity (67%) took place during conference time, but the peak activity was higher (162 tweets/hour).[4]

Finally, we found that 59% of tweets were informative. Comparable results were reported for a global endourology conference (57%)[9] and a national Irish urology meeting (55%),[7] with a lower share of informative tweets (41%) at the AUA and CUA conferences.[4] This metric is among the most important in quantitative Twitters analyses since it assesses the actual contribution of Twitter to the scientific discussion. Among the informative tweets, uro-oncologic topics were the most common followed by urotechnology, which is in line with contemporary analyses of Twitter use at urologic conferences.[4, 7]

The present investigation has some limitations. First, this qualitative analysis was limited solely to the 2013 EAU meeting. Although comparison to assessments of different national and international urologic conferences revealed similar results, this assessment might not be generalizable to the Twitter discussion at all meetings. Second, this assessment was performed for a large urologic conference in 2013. A longitudinal analysis of a major radiologic conference showed that quantitative Twitter measurements increased over time, while qualitative assessments remained constant. However, further study is warranted to compare these data to subsequent meetings. Finally, the activity and popularity measurements presented in the current analysis represent a rate for global profile activity and are not domain-specific.

Conclusion

This comprehensive qualitative analysis of Twitter use at a large urologic conference shows that doctors are the main contributors, Twitter users post mostly original tweet content during conference hours, and the content is mostly informative, with the greatest contributions related to uro-oncology. These results are promising for an enrichment of the scientific discussions at urologic conferences through the use of Twitter.

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This paper has been peer-reviewed.

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