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Association of Twitter Metrics and Cardiology and Heart Surgery National Hospital Rankings

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Abstract

Since 1990, the *U.S. News and World Report* (*USNWR*) has been publishing rankings of US adult and children's hospitals. The aim of this study was to analyze the association between hospital Twitter metrics and the 2020 *USNWR* hospital cardiology and heart surgery ranking. We collected data on the cardiology and heart surgery overall ranking score and expert opinion. Twitter metrics were obtained on October 20, 2020, and included time on Twitter, number of followers, accounts being followed, total tweets, reach score (difference between followers and followed), and annual tweet rate (total tweets divided by time on Twitter). The final cohort consisted of 463 hospitals (48 of which were top-ranking hospitals). A significant positive relation was observed with Twitter metrics and hospital ranking. On multivariable regression after adjusting for time on Twitter, the overall score was independently associated with annual tweet rate and reach score (β=12.45% and β=0.34% for each 1,000 tweets per year and 10,000 reach score accounts; $P<.001$). Similarly, expert opinion was independently associated with annual tweet rate and reach score (β=0.025% and β=0.002% for each 1000 tweets per year and 10,000 reach score accounts; $P<.001$). Our results emphasize how hospital leaders may leverage social media platforms as an important medium to disseminate accomplishments and increase their visibility and reputation, potentially translating to higher *USNWR* ranking.

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Since 1990, the *U.S. News and World Report* (*USNWR*) has been publishing rankings of US adult and children's hospitals. These reports serve an increasingly important role for patients, health care professionals, and administrators as a simplified measure of overall hospital performance. Indeed, many hospitals use their ranking in direct-to-patient advertising as studies have shown an increase in ranking translates to higher patient volumes.[1]

Hospital ranks are determined by a composite score of several traditional measures (such as patient volume, survival, and safety metrics), participation in national registries, and expert opinion (EO; the percentage of cardiologists and heart surgeons who named the hospitals among the best for very challenging patients). However, the digital age has transformed medical practice, evident by the increasing presence and engagement of health care professionals and hospitals on social media platforms.[2-4] The aim of this study was to analyze the association between hospital Twitter metrics and the 2020 *USNWR* hospital cardiology and heart surgery ranking.

METHODS

We collected data on the cardiology and heart surgery overall ranking score and EO. Hospital Twitter accounts were identified using Google and Twitter search. If a hospital account was unavailable, the account for the affiliated health care system was used. If a health care system had more than one hospital and one Twitter account, we only included the hospital with the highest

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ranking. Data on Twitter metrics were collected on October 20, 2020, and included age of the account, the number of followers, accounts being followed, and total tweets published.

The reach score was calculated as the difference between the number of account followers and the accounts the hospital follows. The annual tweet rate was calculated as the total number of tweets divided by the duration of the active account in years. Associations were explored using the Pearson correlation coefficient and further quantified with multivariable linear regression, adjusting for the total time on Twitter.

RESULTS

A total of 594 hospitals with heart and vascular services were included in the *USNWR* 2020-2021 report. No Twitter account could be found for 84 hospitals/health systems, and 47 hospitals were excluded because they shared Twitter handles with higher-ranking hospitals in the same health care system. The final cohort consisted of 463 hospitals (48 of which were included in the top-ranking hospitals list). Accounts had been active for a median of 10.9 years (interquartile range, 9.3 to 11.5 years), and the mean ± SD overall ranking score and EO were 35.1%±14.6% and 0.6%±2.8%, respectively.

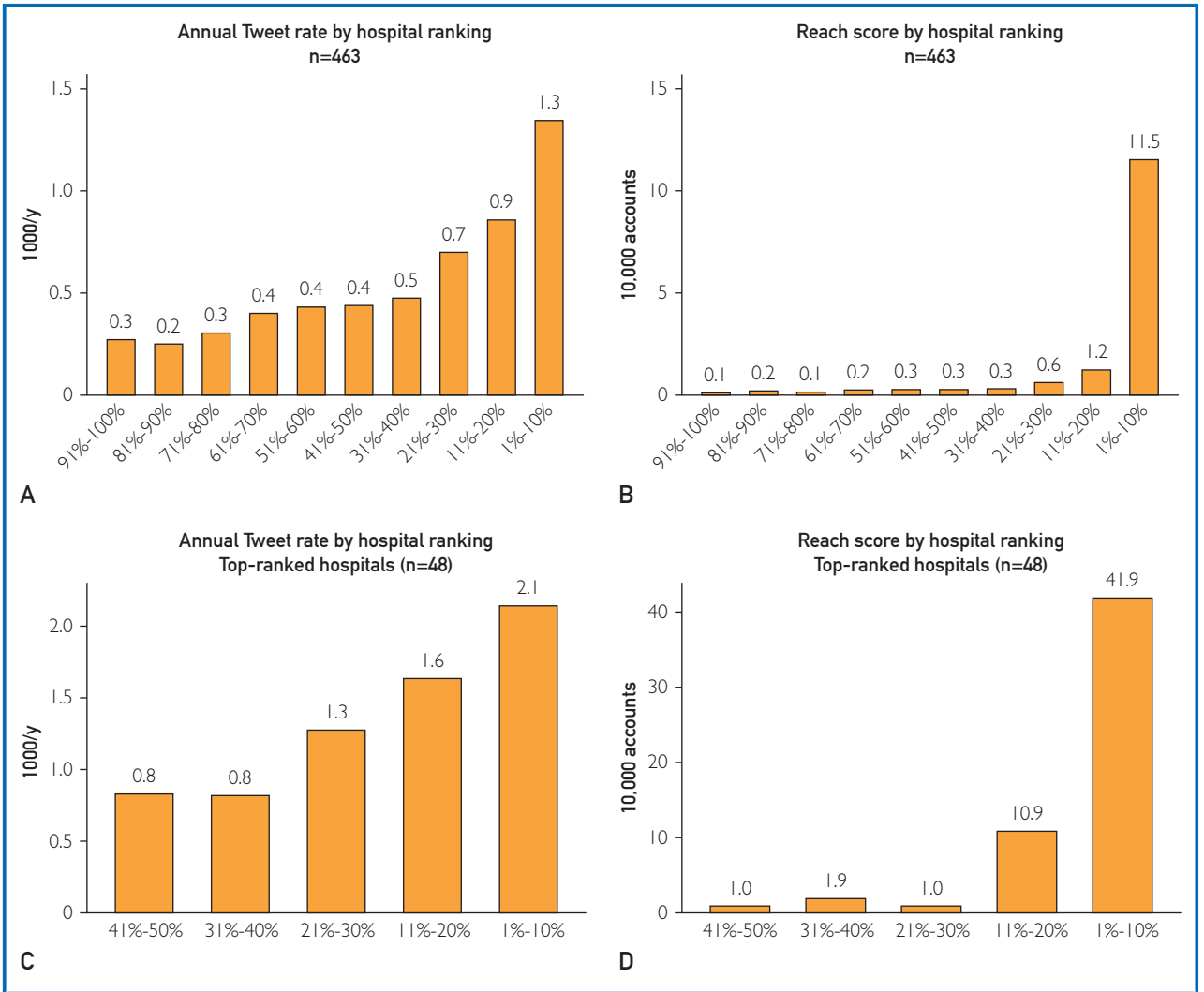

FIGURE. Twitter metrics by hospital ranking.

The median (interquartile range) annual tweet rate and reach score were 347 per year (198 to 662 per year) and 1,631 (645 to 5,205) accounts, respectively. A significant positive relationship was observed with various Twitter metric parameters and hospital ranking (Figure). The overall ranking score was significantly associated with annual tweet rate (r=0.55; P<.001) and reach score (r=0.86; P<.001). Results were similar for the correlation between Twitter metrics and EO (r=0.55 and r=0.86; P<.001) for annual tweet rate and reach score, respectively). A moderate but significant correlation was observed between overall hospital ranking and EO (r=0.54; P<.001). The degree of correlation increased in the top 50 ranked hospitals (r=0.58 and r=0.66 for overall score; r=0.59 and r=0.89 for EO with annual tweet rate and reach score, respectively; P<.001).

On multivariable linear regression, and after adjusting for time on Twitter, the overall score was independently associated with annual tweet rate and reach score (β=12.45% and β=0.34% for each 1000 tweets per year and 10,000 reach score accounts; P<.001). Similarly, EO was independently associated with annual tweet rate and reach score (β=0.025% and β=0.002% for each 1000 tweets per year and 10,000 reach score accounts; P<.001).

DISCUSSION

The current study is not without limitations. We used a single social media platform and used institutional accounts because there were too few cardiology division–specific accounts. Furthermore, adjustment for time on Twitter did not take into consideration recent changes in activity level. We did not assess the association of Twitter metrics with composite measures of overall ranking score such as patient volume, survival, and safety metrics. We also did not assess for the quality and content of tweets. Lastly, we cannot establish causality and rule out residual confounding or a bidirectional relationship: social media activity may enhance recognition of a health care system, and, conversely, high-ranking hospitals may attract more followers because of visibility.

Our results revealed a notable association between Twitter metrics and *USNWR* ranking. Our findings also document how the size of the audience (as measured by reach score) has a better correlation with hospital ranking than the volume of tweets. This factor emphasizes the importance of communication teams in leading hospitals and their efforts to highlight the high quality of clinical work done at these centers. Moreover, these findings also emphasize how hospital leaders may leverage social media platforms as an important medium to disseminate accomplishments and increase their visibility and reputation, potentially translating to higher *USNWR* ranking.

Abbreviations and Acronyms: **EO**, expert opinion; ***USNWR***, *U.S. News and World Report*

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