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Academic Influencers on X (former Twitter) and Their Impact on Research Metrics: A Narrative Review and Correlation Analysis of Top 100 Altmetric Articles (2017–2021)

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Abstract

Background: Social media platforms, particularly X (former Twitter), are increasingly used by researchers to disseminate scientific knowledge. However, the extent to which X engagement influences traditional academic impact remains unclear. This study examines the association between X mentions, Altmetric Attention Scores (AAS), and citation counts for highly visible research outputs.

Methods: A narrative review of studies on academic influencers in medical fields was combined with a quantitative correlation analysis of the top 100 Altmetric articles (2017–2021). Data included AAS, X mentions, and citation counts from Dimensions. Pearson correlation coefficients were calculated to assess year-by-year relationships. A systematic search was conducted in PubMed and Google Scholar on August 3, 2024, using MeSH terms and Boolean operators.

Results: Strong positive correlations were found between X mentions and AAS (r = 0.673–0.944, $P < 0.05$). Correlations between AAS and citations were weaker and variable (r = 0.075–0.504, $P < 0.05$ in 2020 and 2021). The narrative review revealed mixed associations between social media influence and academic productivity across specialties.

Conclusion: X amplifies research visibility but has limited predictive power for long-term citation impact. These findings inform research evaluation by highlighting altmetrics as complementary tools. Future studies should explore multi-platform data and address global disparities in digital influence.

Keywords: Social Media, Research, Communication, Altmetrics, Academic Influence

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Introduction

Social media platforms, particularly X (formerly Twitter), have transformed scholarly communication by enabling rapid, global dissemination of research (1). The evolution of social media over the past two decades has shifted from simple networking tools to powerful channels for real-time interaction, allowing researchers to share findings, engage with peers, and reach non-academic audiences instantaneously. This transformation has democratized access to scientific knowledge, breaking down barriers imposed by traditional publishing models that often involve lengthy peer-review processes and paywalls. Platforms like X facilitate discussions through hashtags, threads, and retweets, fostering collaborative environments that can accelerate innovation and public understanding of complex topics (2). However, this shift also introduces challenges, such as the spread of misinformation and the potential for superficial engagement that prioritizes virality over depth.

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↑What is "already known" in this topic:
Social media platforms, especially X (formerly Twitter), have become powerful tools for rapidly disseminating scientific knowledge. Altmetrics, such as the Altmetric Attention Score (AAS), capture immediate online attention and complement traditional bibliometric indicators, though their predictive value for long-term citation impact remains inconsistent.

→What this article adds:
This article combines a narrative review and correlation analysis to clarify how academic influencers and X activity relate to research visibility. Findings highlight that X strongly amplifies AAS but has weaker associations with citation counts, emphasizing altmetrics as complementary—rather than substitutive—tools in academic evaluation.

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Unlike traditional metrics like citation counts, which accumulate slowly over years and primarily reflect academic uptake within scholarly circles, altmetrics, such as the Altmetric Attention Score (AAS), capture immediate online attention from diverse sources, including X, news outlets, blogs, and policy documents (3). For instance, an article generating significant buzz on X might influence public health behaviors or policy decisions long before it garners citations in peer-reviewed journals. Yet, the relationship between digital engagement and academic impact remains underexplored, with mixed findings across disciplines (4, 5). Studies in fields like cardiology show moderate positive correlations between social media activity and traditional metrics. In contrast, others in gynecology reveal weak or even negative associations, suggesting that online popularity does not always align with scholarly rigor (6). This inconsistency highlights a critical research gap: understanding how X activity by academic influencers, defined as researchers or clinicians with large followings and high engagement rates, translates into measurable academic outcomes like citations and h-index scores. Factors such as disciplinary norms, audience composition, and content type may moderate these relationships, warranting further investigation (7).

This study addresses this gap by examining: (1) correlations between X mentions, AAS, and citations for the top 100 Altmetric articles (2017–2021); (2) characteristics of academic influencers in medical fields; and (3) implications for research evaluation. We hypothesize that X engagement strongly correlates with AAS but has weaker associations with citations due to differing temporal and audience dynamics. By combining a narrative review with quantitative analysis, this study clarifies the role of altmetrics in assessing academic influence, providing insights for researchers, institutions, and funding agencies navigating the digital era. Furthermore, exploring geographic and gender disparities among influencers can shed light on equity issues in global scientific discourse, where voices from high-income countries often dominate (8). This comprehensive approach not only bridges existing literature but also proposes directions for integrating digital metrics into holistic evaluation frameworks.

Methods

Study Design and Rationale

This study integrates a narrative review of literature on academic influencers with a quantitative correlation analysis of altmetric and bibliometric data. It is not a mixed-methods study but a dual approach combining systematic narrative synthesis and statistical evaluation.

Search Strategy

On August 3, 2024, we searched PubMed and Google Scholar for studies linking X activity to academic impact. PubMed queries used MeSH terms (e.g., "Social Media", "Bibliometrics") and Boolean operators (e.g., "Twitter OR X" AND "altmetrics" AND "academic impact"). Google Scholar searches used exact phrases (e.g., "academic influencers Twitter") and manually screened the first 10 pages of results. Inclusion criteria were English-language, peer-reviewed studies from 2010 onward reporting quantifiable metrics (e.g., correlations between X activity and h-index or citations). Excluded were grey literature, editorials, and non-transparent studies.

Data Extraction

For the quantitative analysis, we retrieved data on the top 100 Altmetric articles per year (2017–2021) from the Altmetric database, selected to capture highly visible research outputs, consistent with prior studies (9). Variables included AAS, X mentions (tweets, retweets, user mentions), and citation counts from Dimensions. Non-English articles and corrections were excluded, with replacements from the original Altmetric ranking. Data were cross-validated for accuracy.

Selection of Academic Influencers

Academic influencers were identified from studies ranking top users by topic-specific influence scores (e.g., Right Relevance, Cronycle), typically selecting the top 100 per specialty for consistency with prior literature (4, 10). These cutoff balances sample size with analytical feasibility.

Statistical Analysis

Pearson correlation coefficients were calculated annually (2017–2021) to assess relationships between AAS, X mentions, and citations. Two-tailed tests with $P < 0.05$ determined significance. AAS values were log-transformed if skewed, per standard practice (9).

Narrative Review

The narrative synthesis summarized studies on academic influencers, focusing on their demographic profiles, methods, and correlations between X influence and academic metrics (e.g., h-index). Findings were organized by medical specialty.

Results

Table 1 presents Pearson correlation coefficients for 2017–2021. Strong positive correlations existed between X mentions and AAS (r = 0.673–0.944, $P < 0.001$), indicating that X activity significantly drives online attention. Correlations between AAS and citations were weaker and variable, ranging from r = 0.075 (2018, P =0.280) to r = 0.504 (2020, $P < 0.001$). These results suggest that while X boosts immediate visibility, its impact on citations is inconsistent (Table 1).

Narrative Review

+In cardiology, Kesiena (4) found a moderate correlation ($r \approx 0.32$, $P = 0.002$) between X topic scores and h-index among top influencers, mostly U.S.-based cardiologists. These influencers, often board-certified and affiliated with academic institutions, use X to share clinical insights, conference highlights, and research summaries, thereby bridging professional networks and public education. In contrast, Ghaith (5) reported weak or inverse correlations in obstetrics and gynecology, with influencers primarily female physicians and societies focusing on advocacy for women's health issues. This discrepancy may stem from the field's

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Table 1. Pearson Correlation between Altmetric Attention Scores, X (former Twitter), Mentions, and Citations (2017–2021)

Year	Twitter Mentions	*P* value	Citations	*P* value
2017	0.673	< 0.001	-	-
2018	0.698	< 0.001	0.075	0.280
2019	0.728	< 0.001	0.214	0.032
2020	0.938	< 0.001	0.504	< 0.001
2021	0.944	< 0.001	0.453	< 0.001

emphasis on patient-centered communication rather than pure research output (11). Similar variability was noted in orthopedics, where Varady (10) observed high concordance between social media influence and h-index, with sports medicine specialists dominating the list due to the visual appeal of injury-related content.

In dermatology, Szeto et al. (12) highlighted risks of misinformation, as top influencers sometimes promote unverified treatments, despite moderate academic credentials. Their study analyzed content quality, finding that educational posts correlated positively with engagement but not always with citations. Radiation oncology influencers, as per Valle (13), are predominantly academic males from North America, with influence tied to discussion of treatment advancements and patient stories. In urology, Corsi (6) examined the top 100 influencers, noting no strong association between social media presence and academic impact, suggesting that entertainment value drives followers more than scholarly merit. Neurosurgery influencers, described by Riccio (14), include a mix of surgeons and neurologists, with X used for case sharing and professional development, showing weak citation correlations.

General surgery influencers, as defined by Elson (15), are characterized by high engagement in procedural discussions, but geographic biases limit diversity. Plastic surgery, as explored by Chandawarkar (16), features influencers promoting aesthetic innovations, with influence often linked to practice visibility rather than research. Critical care medicine during COVID-19 saw influencers like Munoz-Acuna (17) dominate discussions on ventilator management and protocols, amplifying real-time knowledge but with variable academic ties. Sports medicine influencers on X, according to Howard (18), include trainers and physicians sharing injury prevention tips, with stronger correlations in visual content. Japanese physician influencers, studied by Suzuki(19), focused on fact-checking COVID-19 drug information, demonstrating high accuracy but limited global reach. PCOS influencers, as in Elhariry (8), are mostly from high-income countries, raising equity concerns in endocrine health discourse. Overall, influencers are skewed toward males in academia (78-88% across studies), with content patterns emphasizing education (60%), advocacy (25%), and updates (15%), though misinformation persists in 10-20% of cases in consumer-facing fields (20).

Discussion

This study confirms that X significantly enhances research visibility, as evidenced by strong correlations between X mentions and AAS. These findings underscore the platform's role in generating immediate "buzz" around publications, often through shares by influential accounts that leverage networks for amplification (21). However, the weak and variable correlation with citations aligns with prior findings that altmetrics capture immediate, public-facing impact, while citations reflect long-term scholarly uptake (7). For example, high-AAS articles on timely topics like COVID-19 may garner thousands of X mentions within days but take years to influence citation-heavy reviews (17). Disciplinary differences (e.g., stronger correlations in cardiology than obstetrics) may reflect varying audience engagement or topic appeal; cardiology's focus on evidence-based guidelines lends itself to shareable infographics, whereas gynecology's sensitive topics may prioritize confidential discussions (5).

Geographic disparities, with influencers concentrated in North America and Europe (85% in reviewed studies), highlight inequities in global discourse, potentially marginalizing perspectives from low- and middle-income countries where access to X is uneven (8). This bias can skew altmetric scores, as content from Western influencers receives more amplification due to language and algorithm preferences (22). Gender imbalances, with males dominating 70-80% of top lists, further exacerbate representation issues, particularly in female-majority fields like obstetrics (11). Content analysis reveals that while educational posts drive engagement, the risk of misinformation, documented in dermatology and COVID-related tweets, necessitates verification mechanisms, such as fact-checking bots or institutional guidelines (12, 19).

Pearson's correlation, while sensitive, risks overstating small associations, especially with skewed data; log-transformation mitigated this, but non-linear relationships may exist (9). Proprietary algorithms (e.g., Right Relevance) may bias influencer rankings by favoring interconnected networks, overlooking emerging voices from underrepresented regions (14). The focus on the top 100 articles limits generalizability, as high AAS may reflect news coverage or viral events rather than author-driven X activity; for instance, public health crises like pandemics inflate scores independently of influencer efforts (20).

Implications: Institutions may use altmetrics for branding and societal impact assessment in tenure reviews, recognizing non-traditional outputs like policy influence (22). However, altmetrics' susceptibility to manipulation, through bot amplification or paid promotions, and bias necessitate cautious integration into evaluation frameworks, perhaps via hybrid indices that blend metrics (3). To promote equity, platforms could algorithmically boost diverse voices, and training programs could encourage inclusive engagement (8).

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Limitations

The study focused on X, excluding other platforms (e.g., LinkedIn, ResearchGate) where professional networking may yield different correlations (21). Citation counts from Dimensions may undercount interdisciplinary or non-English sources, underestimating global impact. The top-100 sample may not represent niche fields, and self-selection bias in influencer studies favors active users (6). Evolving platform dynamics (e.g., X's ownership changes post-2022) may affect results, as algorithm shifts influence visibility (18).

Future Research

Multi-platform analyses, incorporating TikTok or Mastodon, could reveal cross-media effects on metrics (1). Longitudinal studies tracking articles over 10+ years would clarify the causal relationship between early X engagement and citations (9). Qualitative content assessments, using AI for sentiment analysis, are needed to evaluate misinformation and equity, addressing global inequities through targeted interventions (19,20). Experimental designs, like randomized promotion of articles, could test influencer effects on impact (23).

Conclusion

This study highlights the complementary role of social media in shaping academic influence. X significantly enhances visibility through strong associations with altmetric indicators, yet its translation into long-term scholarly impact remains limited. A balanced approach, integrating both traditional metrics and altmetrics, is essential for capturing the full spectrum of academic influence. Future studies should expand analyses to multiple platforms, address geographic disparities, and investigate strategies for ethical and effective digital engagement.

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Conflict of Interests

The authors declare that they have no competing interests.

Authors' Contributions

M. T.: Conceptualization
H. K. and F. H.: Data collection and Formal analysis
Investigation: H. K, F. H., M.T and M.G.
M.T. and M. G.: Supervision
F.H. : Writing – original draft
M.G. : Manuscript editing
All authors have read and approved the final version of the manuscript.

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