

# Blood & Stardom: Unraveling the Kardashian Index of Hematologists/ Oncologists

## ABSTRACT:

**Background:** Social media has transformed professional communication, including in medicine. The Kardashian Index (K-index) measures the disparity between a researcher's social media following and their academic citations, serving as a proxy for online influence versus scholarly impact. This study evaluates the K-index among hematologists/oncologists in the U.S. to assess their social media presence and its correlation with academic productivity.

**Methods:** We analyzed 1,500 hematologists/oncologists from the top 100 U.S. cancer hospitals (per U.S. News & World Report). Only 273 (18.2%) had a detectable presence on X (formerly Twitter). The K-index was calculated using Neil Hall's formula ( $K\text{-index} = F(a)/F$ , where  $F(a)$  = actual followers,  $F$  = expected followers based on citations). The h-index was used to gauge academic productivity.

**Results:** Most hematologists/oncologists ( $n = 175$ ) had a low K-index (0–2), indicating minimal social media influence. Only 30 had a K-index  $>5$  ("Science Kardashians"). No significant gender differences in K-index were observed ( $p = 0.138$ ). Subspecialty variation existed, with pediatric hematologists/oncologists more active. Spearman's test revealed no correlation between K-index and h-index ( $\rho = -0.068$ ,  $p = 0.277$ ), suggesting social media fame does not directly enhance academic impact.

**Conclusion:** While a minority of hematologists/oncologists achieve high online visibility, most maintain low social media engagement without compromising academic success. The K-index, though intriguing, lacks validity as a measure of scientific merit. Social media's role in disseminating research remains evolving, with tweets and citations capturing distinct dimensions of influence. Future studies should explore longitudinal trends as digital engagement grows in academia.

**KEYWORDS:** *Kardashian Index, h-index, social media, hematology, oncology, academic impact, Twitter/X*

## INTRODUCTION:

Social media has exploded over the past decade, affecting every aspect of life—from personal to the professional. One of the most effective ways for people to convey and get information has always been interacting in person [1]. Social media has revolutionized the manner in which we follow current affairs, learn about new developments in medical investigations, and communicate in both our private and professional lives because of its intrinsic capacity for personal engagement.

Social media usage and popularity have been rising quickly. According to statistics from the 2014 Pew Internet Project [2], social networking sites are used by 74% of online adults, including 49% of those under 65. Adults use Facebook, Twitter (now known as "X"), and Instagram in equal measure (71%, 23%, and 26%, respectively).

X's enormous user base and abundance of material make it a great place to find information on social media. Social media usage, particularly of "X", by doctors, pharmaceutical corporations, and patients has risen in

recent years [3]. Patients, business leaders, and journalists are able to listen to and connect with doctors who are active on “X”, helping to create intimate networks [4].

The number of doctors using “X” is rising, including more hematology-oncology specialists. An active “X” account offers chances for continuing medical education, patient interaction and education, personal advertising, and governance of reputation for cancer professionals. An intriguing study was conducted by Adilman et al., who polled 680 oncologists about their usage of social media, including how frequently they engage with it and which sites they prefer [5]. Intriguingly, the survey found that younger oncologists use social media sites more frequently (72%), whereas their older counterparts use them far less (39%). This demonstrates how younger generations are using “X” more and more as a social medium.

### **DISSEMINATION OF INFORMATION:**

“X”, which produced several billion Tweets [6] and is utilized by more than 300 million people, is a crucial source for the quick dissemination of information. To raise awareness of prostate, breast, and lung tumors during awareness months, Xu et al. looked into the usage of “X” (previously known as Twitter) [7]. The number of tweets about every tumor surged during its corresponding awareness month, during which free, helpful information on prevention, screening, and therapies was made available to the public. They managed to demonstrate that “X” was undoubtedly an effective technique for raising awareness of cancer. Similar to this, Lauren et al. discovered that data from “X” reflected changes in real-time disease conversation topics [8].

In order to engage in conversation about research, clinical treatment, and education and to further scholarly endeavors and the dissemination of knowledge, clinicians are drawn to “X” the most frequently [9]. In fact, a consistent “X” presence can help a doctor build and manage his or her own personal brand in addition to improving their academic standing on a worldwide scale. To spread information more widely, doctors can share articles from pertinent journals on their personal social media pages and provide more context through "Tweeterials" or "Tweets."

On “X”, there are notable cancer, major surgical, and scientific journals, as well as the journals of the top professional organizations in cancer medicine. Users who follow these “X” handles get informed when new stories are published, frequently before the print version or mail notice. Numerous journals are using visual abstracts more frequently, and Ibrahim et al. discovered a high association between tweeting graphic abstracts and rising article readership and uptake [10]. A social media post with a large number of "likes" and comments is logically more enticing and increases the article's perceived relevance. Contrarily, “Circulation” did a randomized study over the course of a year to compare the number of visits to pages acquired by articles that were and weren't posted on social media [11]. The study's editors found no distinctions between the pages seen in the social media articles and those in the control groups.

Many organizations, professional associations, and patient education groups are active on social media, and they use these channels to teach patients and doctors about a variety of subjects, from meetings and research to policy and campaigning. The majority of hematologist-oncologists' important professional associations are present on social media, including the American Society of Clinical Oncology (@ASCO). They have active “X” accounts for their journals and publications, such as @BloodJournal, @BloodAdvances and @ASHClinicalNews.

### **CORRELATION BETWEEN SOCIAL MEDIA POPULARITY AND CITATIONS:**

Higher journal and Editor-in-Chief “X” activity may be connected to higher Altmetric attention scores, which are a gauge of immediate impact and reach, according to a study by Janet Han and Boback Ziaieian [12]. The number of tweets per year saw an impact factor increase, indicating a longer-term social media impact. Tweets have been found to accurately predict highly referenced publications within the first three days of publication, according to another study by Gunther Eysenbach [13]. Social media engagement either boosts citations or represents the article's fundamental traits, which also predict citations, in one of two ways. However, a 2018 “X” study discovered that many non-academics are sufficiently interested in research to tweet publications [14], suggesting that while tweets may boost the excitement surrounding an article, their relationship to increased citations is unclear.

## DEVELOPMENT OF K-INDEX AND H-INDEX:

Numerous indexes have since been constructed to examine the validity of the claim that tweet volume actually does boost citations in light of the previously cited contradicting findings. The "Kardashian index" (sometimes known as the "K-index") is one such indicator. Neil Hall made this suggestion in 2014 [15]. He suggested that the Kardashian Index (K-index) might be determined using the formula:

$$K\text{-index} = F(a)/F$$

where  $F(a)$  represents the real amount of “X” followers that the researcher has and  $F$  correlates to the follower count, a researcher should have according to their citations ( $C$ ).  $F = 43.3 (C)^{0.32}$  was used to further determine the  $F$  factor. He claimed that those with a K-index of more than 5 may be referred to as "Science Kardashians." Since then, the K-index has been widely employed by academics and medical professionals in various areas, as demonstrated by a recent study by Khan et al. [16] that determined the Kardashian Index of cardiologists.

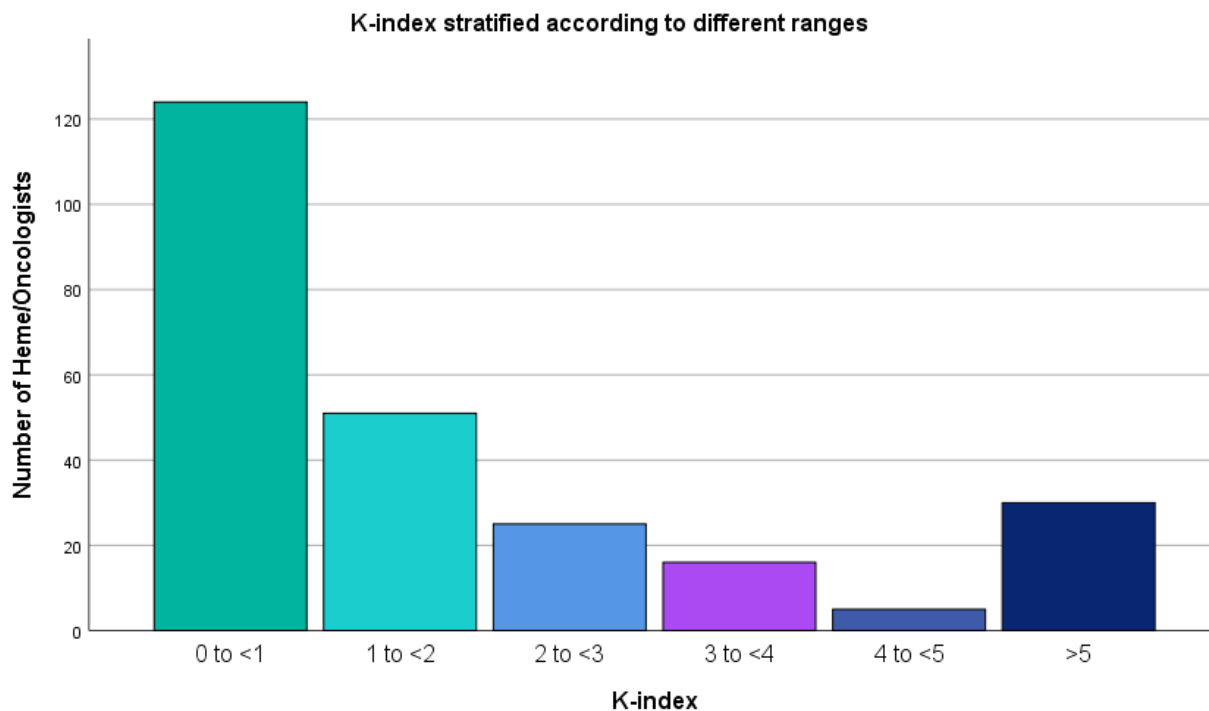
The h-index is another popular bibliometric statistic for determining the productivity of a single clinical investigator. In 2005, Jorge Eduardo Hirsch put up the idea of the h-index as a broad indicator of the significance of a researcher's scientific achievements and as a potentially objective approach to contrast researchers vying for the same funding [17]. For instance, if a single author published seven papers, and each of those works had more than seven citations from other writers, that author would have been awarded an h-index of 7.

## KARDASHIAN STATUS OF HEMATOLOGISTS/ONCOLOGISTS IN THE USA:

We searched for top 100 cancer hospitals in the USA according to U.S. News & World Report's most recent issue. From these top 100 prestigious hospitals, 1,500 hematologists/oncologists were chosen at random. Only 273 (18.2%) of the estimated 1,500 hematologists/oncologists were found to be on “X”, highlighting the fact that despite the substantial increase in physician “X” usage, only a small portion of practicing hematologists/oncologists use the social media platform.

The majority of hematologists/oncologists ( $n = 175$ ) had a low K-index of 0 to 2 (**Figure 1**), which suggests that most hematologists/oncologists are not "social media stars" and that variables beyond just the number of followers may also affect their citations and the related success. This is consistent with research by Khan MS et al. [16] in which the majority of the physicians had low K-indices. A relatively low K-Index, for example, may also imply that a renowned scientist just joined “X” or doesn't use it at all. The idea behind the K-index is that fame is decided by an individual's total number of followers and that more followers result in increased success, which in turn generates more fame.

As a result, the low K-index suggests that the questioned researcher may not be sufficiently engaged on the platform to draw an audience sizable enough to achieve a "Kardashian" status.



**Figure 1:** K-index of hematologists/oncologists stratified according to different ranges

Only 30 of the hematologists/oncologists in our sample had a K-index >5, indicating that while the "Kardashian" status does exist, only a small number of doctors have it. Additional variations were observed in terms of specialty and sex. Neil Hall's earlier survey [15] revealed that there were relatively few female scientists using "X". In contrast, of the 273 hematologists/oncologists using "X" in the current study, 103 (38.1%) were female. Additionally, no significant difference in K-index across male and female doctors was found on an independent sample t-test ( $t_{200} = 1.490$ ,  $p = 0.138$ ). This runs opposite to the findings of the studies mentioned above, which revealed that men typically played the bulk of "Kardashian" roles. According to our findings, where 33% ( $n=494$ ) of the doctors were pediatric hematologists/oncologists whereas just 3.8% ( $n=57$ ) were general hematologists, social media use may also vary by specialty.

We also compared and correlated the K-Index with the H-Index. The entire productive research produced by a scientist is gauged by the h-index [17]. Due to its presence in author profiles on numerous internet databases, its use has increased significantly in recent years. One benefit is that it is not influenced by the popularity of a single article [18], Another is that peer-reviewed judgment supports its convergent validity [19], and a third is that it has been shown to be an accurate predictor of future success [20]. Even though these are fewer studied areas, this can be used to evaluate the impact and productivity of a department, university, or country of scientists [21].

However, our Spearman's test ( $= -0.068$ ,  $p = 0.277$ ) did not find any evidence of a significant correlation between the H- and K-indices. This might be because the K-index considers social following and popularity,

whereas the H-index just counts publications, associating it with the scientific significance of the specific physician.

The key insight is that the most well-known hematologists and oncologists do not have a social media presence, but this has not in any way diminished the quality of their work or put them at a competitive disadvantage versus those who do. This demonstrates that a big audience is not the primary factor in acquiring additional citations and that a scientist's achievements are decided by a range of factors, among which a high K-index may be a minor one. As a result, the K-index fails to hold out as a valid indicator of a doctor's scientific value.

### **FUTURE IMPLICATIONS:**

The use of social media by hematologists and oncologists is still relatively new, even though the evidence for its impact on the number of citations a publication receives is hazy. It is intriguing to observe the evolving role of 'X' as a platform for the exchange of clinical and scholarly insights. It should be emphasized once more that one should not look for or anticipate perfect correlation. Tweets should be considered as a metric for social influence, knowledge translation, and the public's interest in a particular topic while citations are primarily a measure of scholarly impact. Citations and tweets measure different concepts as well as audience attention or adoption. In reality, only a tiny subset of physicians with extraordinarily high K-indices are "Twitteratis", consistently contributing to the dynamic evolution of the research landscape. Only time will tell in this situation if we will eventually see a flood of online hematology/oncology specialists or mere social media celebrities.

### **LIMITATIONS:**

It should be highlighted that the authors only counted the scientific and social influence of the hematologists/oncologists which were present on 'X'. It will be interesting to see how these impact indices alter when technology advances faster than our capacity to produce evidence of its advantages and disadvantages.

### **REFERENCES:**

1. Cialdini RB, Demaine LJ, Sagarin BJ, Barrett DW, Rhoads K, Winter PL. Managing social norms for persuasive impact. *Soc Influ.* 2006;1(1):3–15. doi:10.1080/15534510500181459. [Google Scholar]
2. Social networking fact sheet. Washington, DC: Pew Research Center. <http://www.pewinternet.org/fact-sheets/social-networking-fact-sheet/> Accessed August 13, 2015.
3. Thompson MA, Majhail NS, Wood WA, Perales MA, Chaboissier M. Social Media and the Practicing Hematologist: Twitter 101 for the Busy Healthcare Provider. *Curr Hematol Malig Rep.* 2015 Dec;10(4):405-12.
4. Choo EK, Ranney ML, Chan TM, Trueger NS, Walsh AE, Tegtmeier K et al. Twitter as a tool for communication and knowledge exchange in academic medicine: A guide for skeptics and novices. *Medical Teacher.* 2015;37(5):411-6. doi:10.3109/0142159X.2014.993371
5. Adilman R, Rajmohan Y, Brooks E, Uργοiti, G, Chung C, Hammad N, Simmons C. ReCAP: Social Media Use Among Physicians and Trainees: Results of a National Medical Oncology Physician Survey. *Journal of Oncology Practice,* 12(1), 79-80. 2016.
6. Company @ About.Twitter.Com. <https://about.twitter.com/company>.

7. Xu S, Markson C, Costello K, Xing C, Demissie K, Llanos A. Leveraging Social Media to Promote Public Health Knowledge: Example of Cancer Awareness via Twitter. *JMIR Public Health and Surveillance*, 2(1). doi:10.2196/publichealth.5205. 2016.
8. Sinnenberg, L., DiSilvestro, C. L., Mancheno, C., Dailey, K., Tufts, C., Bottenheim, A. M., ... & Merchant, R. M. (2016). Twitter as a potential data source for cardiovascular disease research. *JAMA cardiology*, 1(9), 1032-1036.
9. Pemmaraju N, Thompson MA, Mesa RA, Desai T. Analysis of the use and impact of Twitter during the American Society of Clinical Oncology Annual Meetings From 2011 to 2016: Focus on advanced metrics and user trends. *J Oncol Pract*. 2017 Jul;13(7):e623-e631. doi: 10.1200/JOP.2017.021634. Epub 2017 May 17.
10. Ibrahim AM, Lillemoe KD, Klingensmith ME, Dimick JB. Visual abstracts to disseminate research on social media: A prospective, case-control crossover study. *Ann Surg*. 2017 Apr 26 doi: 10.1097/SLA.0000000000002277. [Epub ahead of print].
11. Fox C.S., Bonaca M.A., Ryan J.J., Massaro J.M., Barry K., Loscalzo J. A randomized trial of social media from *Circulation*. *Circulation*. 2015;131:28–33. [PubMed] [Google Scholar]
12. Han, J., & Ziaecian, B. (2019). Social media usage, impact factor, and mean altmetric attention scores: characteristics and correlates in major cardiology journals. *Journal of the American College of Cardiology*, 73(9S1), 3027-3027.
13. Eysenbach, G. (2011). Can tweets predict citations? Metrics of social impact based on Twitter and correlation with traditional metrics of scientific impact. *Journal of medical Internet research*, 13(4), e2012.
14. Mohammadi, E., Thelwall, M., Kwasny, M., & Holmes, K. L. (2018). Academic information on Twitter: A user survey. *PloS one*, 13(5), e0197265.
15. Hall, N. (2014). The Kardashian index: a measure of discrepant social media profile for scientists. *Genome biology*, 15(7), 1-3.
16. Khan, M. S., Shahadat, A., Khan, S. U., Ahmed, S., Doukky, R., Michos, E. D., & Kalra, A. (2020). The Kardashian index of cardiologists: celebrities or experts?. *Case Reports*, 2(2), 330-332.
17. Hirsch JE. An index to quantify an individual's scientific research output. *Proc Natl Acad Sci U S A*. 2005;102(46):16569–16572. doi:10.1073/pnas.0507655102. [Crossref], [PubMed], [Web of Science ®], [Google Scholar]
18. Lando, T., & Bertoli-Barsotti, L. (2014). A new bibliometric index based on the shape of the citation distribution. *PLoS One*, 9(12), e115962.
19. Bornmann L, Wallon G, Ledin A. Is the h index related to (standard) bibliometric measures and to the assessments by peers? An investigation of the h index by using molecular life sciences data. *Res Evaluation* 2008; 17: 149-56
20. Agarwal A, Durairajanayagam D, Tatagari S, et al. Bibliometrics: Tracking research impact by selecting the appropriate metrics. *Asian J Androl* 2016; 18: 296-309
21. Jones T, Huggett S, Kamalski J. Finding a way through the scientific literature: Indexes and measures. *World Neurosurg* 2011; 76: 36-8

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