ELSEVIER

Highly visible sepsis publications from 2012 to 2017: Analysis and comparison of altmetrics and bibliometrics

Craig S. Jabaley, MD, Assistant Professor of Anesthesiology [a,b,*],
Robert F. Groff IV, MD, Assistant Professor of Anesthesiology [a,b],
Michael J. Stentz, MD, MS, Assistant Professor of Anesthesiology [a],
Vanessa Moll, PhD, DESA, Assistant Professor of Anesthesiology [a],
Grant C. Lynde, MD, MBA, Associate Professor of Anesthesiology [a],
James M. Blum, MD, FCCM, Assistant Professor of Anesthesiology [a,b,c],
Vikas N. O'Reilly-Shah, MD, PhD, Assistant Professor of Anesthesiology [a,d]

[a] Department of Anesthesiology, Emory University, 1750 Gambrell Dr, Atlanta, GA 30322, USA
[b] Anesthesiology Service Line, Division of Critical Care Medicine, Atlanta Veterans Affairs Medical Center, 1670 Clairmont Rd, Decatur, GA 30033, USA
[c] Department of Biomedical Informatics, Emory University School of Medicine, 201 Bowman Dr, Atlanta, GA 30322, USA
[d] Department of Anesthesiology, Children's Healthcare of Atlanta, 1405 Clifton Rd, Atlanta, GA 30329, USA

ARTICLE INFO

ABSTRACT

Purpose: We sought to delineate highly visible publications related to sepsis. Within these subsets, elements of altmetrics performance, including mentions on Twitter, and the correlation between altmetrics and conventional citation counts were ascertained.

Materials and Methods: Three subsets of sepsis publications from 2012 to 2017 were synthesized by the overall Altmetric.com attention score, number of mentions by unique Twitter users, and conventional citation counts. For these subsets, geolocated Twitter activity was plotted on a choropleth, the lag between publication date and altmetrics mentions was characterized, and correlations were examined between altmetrics performance and normalized conventional citation counts.

Results: Of 57,152 PubMed query results, Altmetric.com data was available for 28,344 (49.6%). The top 50 publications by Altmetric.com attention score and Twitter attention represented a mix of original research and other types of work, garnering attention from Twitter users in 143 countries that was highly contemporaneous with publication. Altmetrics performance and conventional citation counts were poorly correlated.

Conclusions: While unreliable to gauge impact or future citation potential, altmetrics may be valuable for parties who wish to detect and drive public awareness of research findings and may enable researchers to dynamically explore the reach of their work in novel dimensions.

Published by Elsevier Inc.

1. Introduction

Sepsis is a prevalent disease with significant morbidity and mortality that has accordingly been named a global health priority by the World Health Organization [1-3]. Prompt intervention is critical to mitigate shock resulting from the pathophysiologic immune response to infection and preserve end-organ function [4-10]. Efforts within the medical community to hasten the diagnosis and standardize the treatment of sepsis have improved mortality over time in high-income countries; however, available evidence suggests a disproportionate degree of mortality among low and middle-income countries [1,11-18]. Awareness campaigns, such as World Sepsis Day and the Surviving Sepsis Campaign, have similarly aimed to improve the historically poor public awareness of sepsis [18-22]. Examining the dissemination of editorials, guidelines, research findings, and other publications is integral to improving the reach and impact of all such efforts in driving advancements in clinical care and sepsis awareness.

Measuring the dissemination and broader visibility of publications geared toward clinicians and researchers presents numerous challenges.

* Corresponding author at: Emory University, Department of Anesthesiology, 1750 Gambrell Dr, T5L27, Atlanta, GA 30322.

E-mail addresses: csjabaley@emory.edu (C.S. Jabaley), robert.groff@emoryhealthcare.org (R.F. Groff), michael.stentz@emory.edu (M.J. Stentz), vanessa.moll@emory.edu (V. Moll), glynde@emory.edu (G.C. Lynde), jmblum@emory.edu (J.M. Blum), vikas.oreilly-shah@emory.edu (V.N. O'Reilly-Shah).

The burgeoning field of altmetrics has sought to develop nontraditional means of assessing publication visibility and discussion, such as citations by the lay media, mentions on Twitter and other social media outlets, and other forms of online attention and interaction [23-26]. While altmetrics have been rightly criticized as poor surrogates for scientific validity, research quality, and future citation potential, such data can highlight publications that rise to high levels of visibility [27,28]. Twitter in particular, with approximately 335 million active monthly users globally, has emerged as a popular forum for discussion of biomedical publications, interaction with authors, promotion of research efforts, and the conduct post-publication peer review. Engagement with social media is therefore increasingly championed for clinicians and researchers alike [29-31]. There are several providers of altmetrics data that attempt to ascertain and catalogue the performance of publications in these domains, and biomedical publishers now frequently display elements of altmetrics performance online. The adoption and display of altmetrics has largely outpaced the scientific community's understanding of their meaning and utility, which offers an important opportunity for critical examination in specific content areas.

We sought to use altmetrics data provided by Altmetric.com (Altmetric; Digital Science, a subsidiary of Holtzbrinck Publishing Group, Stuttgart, Germany), the most ubiquitous provider of altmetrics data, and conventional citation counts to identify and describe a subset of highly cited clinical and mechanistic investigations about sepsis from 2012 to 2017 to elucidate their reach beyond the peer-reviewed scientific literature. This was motivated by the potential value offered by an exploratory, descriptive analysis in highlighting the complementary

roles that both conventional citations in the peer-reviewed literature and altmetrics can play in the evaluation of individual publications. We also hypothesized that there may be differences in the media coverage of publications with implications for daily clinical practice in sepsis management versus those seeking to explore underlying mechanisms, and that these differences would be reflected in altmetrics to a greater extent than in citation count.

2. Materials and methods

An exemption from review was granted by the Emory University Institutional Review Board. Reporting follows the Strengthening the Reporting of Observational Studies in Epidemiology statement guidelines where applicable [32]. The general methodologic approach is summarized in Fig. 1 and was as follows: (1) identify all publications potentially related to sepsis during the dates of interest via a PubMed query, (2) extract altmetrics and conventional citation data for all identified publications, (3) synthesize the data by sorting and manual filtering to identify three subsets of high-performing publications, (4) extract additional altmetrics data for these subsets, and (5) conduct comparative analyses within tese subsets.

2.1. Altmetric.com data overview

Altmetric.com, referred to herein as Altmetric, is one of several commercial providers offering nontraditional publication mention, social media discussion, and general online interaction metrics, which are
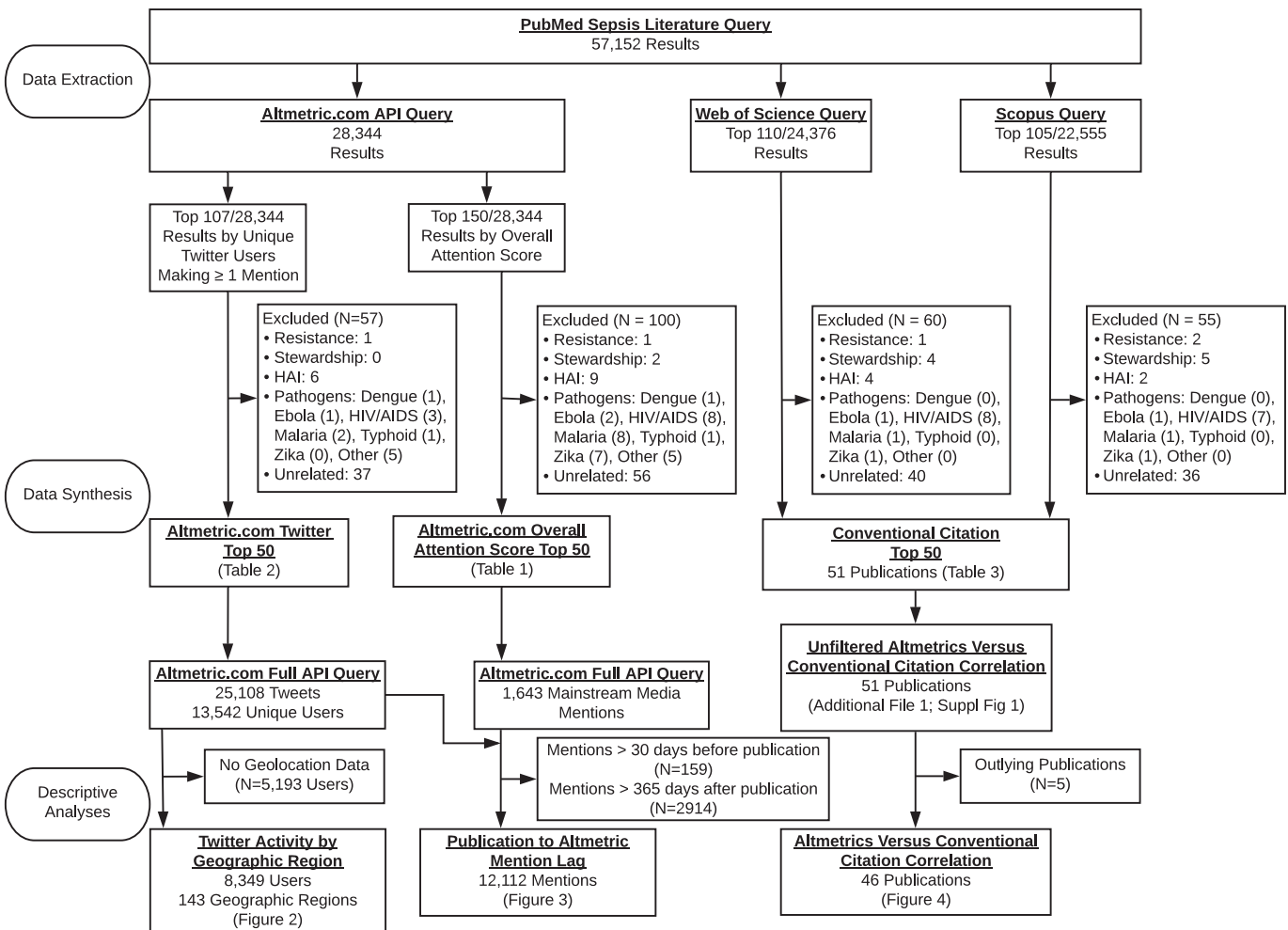
Fig. 1. Title: Approach to data extraction, synthesis, and analysis. API: application programming interface; HAI: healthcare-associated infection.