



Popular Media and Cardiovascular Medicine: “with Great Power There Must Also Come Great Responsibility”

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Abstract

Purpose of Review Media sources, such as the Internet, television, and social media, have become powerful communication tools that have transformed the way medical information is acquired across the world.

Recent Findings Over 40% of today’s patients report that social media affects their healthcare decisions, and approximately 65% of healthcare professionals report using social media for professional activities. These enhanced communication tools have made a substantial impact on the widespread dissemination of medical information. However, as a consequence, popular media platforms have also become purveyors of medical misinformation.

Summary In this review, we propose a framework for clinicians on how to effectively and appropriately integrate medical information available via online resources including social media platforms into modern healthcare practices.

Keywords Social media · Twitter · Shared decision-making · Medical misinformation

Introduction

Social media has emerged as a common communication tool among the cardiovascular community including clinicians and patients alike. Its far reach has united the corners of the world to create a global online community. The first social media

networking site called Six Degrees was introduced in 1997, and since that time, social media platforms such as Facebook, Twitter, LinkedIn, Doximity, and Instagram have only grown in popularity. Today, they have become major sources of news and marketing, and information on an infinite number of topics can be obtained at lightning speed.

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Statistics on Social Media Use in General and in Healthcare

Currently, more than 4 billion people worldwide (over 56% of the population) and almost 90% of the North American population use the Internet [1]. Nearly 3.5 billion people use social media worldwide, and Facebook is by far the most popular social media platform. In 2018, roughly 170 million individuals (over 50% of the US population) and approximately 41% of US individuals above the age of 65 years reported using Facebook. Twitter was introduced in 2006 and is used by roughly 55 million individuals in the USA (nearly 17% of the US population) with users posting more than 500 million tweets per day [2, 3].

More than 40% of people report that social media affects their healthcare decisions, and 90% of individuals between the ages of 18 and 24 years indicated that they would trust information that is shared by others on social media

networks [4]. The most accessed online resources for health-related information include WebMD (56%), Wikipedia (31%), health magazine websites (29%), Facebook (17%), YouTube (15%), online blogs (13%), and Twitter (6%) [5]. Social media platforms are also used by healthcare professionals, and approximately 65% of them report using social media for professional activities including networking, personal branding, and career development [6–8]. These include platforms such as Facebook, Twitter, LinkedIn, and Doximity.

The surge in popularity of social media has been seen across the world and among a number of different demographic groups. Roughly 37% of the population in Africa, 52% of Asians, 87% of Europeans, and 68% of people in Latin America and the Caribbean use the Internet, and these numbers have only continued to grow [1]. With a growing number of individuals turning to online resources for medical information, new conveniences and challenges have arisen. Recently, an increasing number of publications have commented on the impact of social media on healthcare. Many of these publications seek to explain the basics of these innovative tools and make recommendations on how to navigate their use appropriately in academic and clinical medicine [9, 10, 11, 12]. In this review, we will detail the advantages and pitfalls of accessing medical information via social media platforms and online resources. We will propose a framework on how to effectively integrate online medical resources into modern healthcare practices to enhance the patient-clinician relationship.

Effects of Social Media and Online Resources on Patients

The use of social media to access medical information has had mixed consequences on the healthcare industry. On one hand, it has made medical information readily accessible to a vast number of people with a simple click of a button. However, the lack of regulation of content on online sites has led to the proliferation of misinformation that has adversely affected healthcare decisions [13].

Increased Awareness

In 2015, Dr. Clyde Yancy and colleagues launched the Rise Above Heart Failure campaign in partnership with the American Heart Association and Queen Latifah. The goal of the campaign was to increase public awareness of the impact of heart failure and to decrease heart failure hospitalizations. The initiative was promoted on social media websites such as Twitter, Facebook, Instagram, and Pinterest where hashtags such as #RiseAboveHF were used to tag and highlight key material. A Twitter search of #RiseAboveHF yields access to

infographics on heart failure causes and statistics, videos featuring celebrities such as Queen Latifah, information about apps that can be used to track physical activity, and polls to disseminate important information about heart failure within the community. The Rise Above Heart Failure campaign highlights the many ways in which the power of social media can be harnessed to educate and raise awareness of medical conditions in a simple, effective, and interactive manner.

Proliferation of Misinformation and Lack of Adherence

In several instances, popular media has allowed for proliferation of misinformation that has led to detrimental public health consequences. Statins are a class of cholesterol lowering medications that arrived on the market in 1987. Despite numerous large-scale randomized clinical trials demonstrating the cardiovascular benefits of statin therapy (significant reductions in major vascular events including cardiovascular death, myocardial infarction, stroke, and coronary revascularization) [14–16], the adverse effects of statins including new onset diabetes and myopathy (muscle pain or weakness) have been disproportionately publicized [17, 18]. Many social media and online forums have expounded on the negative effects of statins, leading to underutilization of this life-saving class of medications. A simple Google search of the words statin and risk yields almost 2.4 million results, and within the first few articles listed, there is one entitled “More Docs Wonder if Statins are Worth the Risks.” This article, published by WebMD, one of the most widely used online resources, concludes that “given the small chance of benefit, it doesn’t always make sense for a person who has had trouble on a statin to try again” and “If they ruin quality of life, it’s almost certainly not worth it [19].” The disproportionate emphasis on the adverse effects of statin therapy, without such emphasis on the benefits of therapy, has been seen in physician offices across the world, where patients often decline or discontinue statin therapy citing fear of their adverse effects.

Approximately 56 million people in the USA are thought to be eligible for statin therapy; however, roughly half of those patients receive treatment [20]. Even among those at highest risk for cardiovascular disease, only 61% of patients who were prescribed statin therapy remained adherent after 3 months [21]. The USAGE survey, a cross-sectional, Internet-based survey of 10,138 US adults evaluated reasons for discontinuation of statin usage. Sixty percent of individuals cited muscle pain as the reason for discontinuation, followed by 16% citing cost and 13% citing perceived lack of efficacy [22]. Patients who discontinued statin therapy reported less satisfaction with the explanation of the treatment by their physicians and were more likely to turn to the Internet to research statin therapy. Conversely, patients with established long-term

physician-patient relationships tended to have improved adherence highlighting the importance of physician education and the physician-patient relationship in treatment adherence [22]. Direct-to-consumer advertising regarding risks of statin therapy has been shown to be a contributing factor when it comes to misperceptions about statin therapy. In an assessment of the hepatotoxic risk of statins, patients who received information from non-physician sources (television, Internet, magazines, friends and family, etc.) were more likely to believe that the risk of liver damage was a more or equally likely outcome of statin therapy as compared to decreasing the risk of myocardial infarction or stroke (44%). Those who received information from physicians were more likely to believe that decreasing the risk of myocardial infarction or stroke would be a more likely outcome (72%) [23]. We, as a society, are vastly undertreated for primary and secondary prevention of cardiovascular disease with statin therapy, and this may, at least in part, be attributable to the negative effects of media.

In October 2013, the Australian Broadcasting Corporation aired a special edition two-part series entitled “Heart of the Matter” that showcased information suggesting that high cholesterol does not cause heart disease and that the use of cholesterol-lowering drugs could result in death. Following the airing of this series, there was a significant reduction in statin dispensing in Australia: a 2.60% (95% CI, 1.40–3.77%; $P < 0.001$) reduction, which equates to 14,005 fewer number of statin prescriptions dispensed each week [24]. Researchers who tracked statin prescription outcomes estimated that over 60,000 people were affected by the broadcasting of this series, and it was estimated that if those patients remained off of statin therapy for the next 5 years, roughly 1500 to 3000 potentially avoidable heart attacks and strokes would occur [18••]. Similar trends of statin discontinuation following negative press have been observed in Denmark and the UK [25, 26]. If the effects on statin treatment following the airing of a television series can be so devastating, then the widespread influence of social media can have an even deadlier impact.

A quick Google search of “statin risks” yields websites, infographics, and videos on the adverse effects of statins. The Renegade Pharmacist, authored by an ex-community pharmacist, claims: “Recent studies have demonstrated that high cholesterol does not cause heart disease, suggesting that there is no real purpose for statins to be prescribed [27].” The views of the Renegade Pharmacist have also been circulated on social media sites including Instagram, Facebook, and YouTube. Infographics circulated on Pinterest and other social media websites state that “Statins do not lower cholesterol but INCREASE cancer and memory loss risk [28].” Another YouTube video article states that “The link between cholesterol and heart disease is weak at best [29].” Not only are these strong statements based on misinformation, they incite

unnecessary fear among patients. A cross-sectional survey of patients in Saudi Arabia assessed the use and influence of Facebook, WhatsApp, and Twitter on healthcare decisions. Almost 90% of the individuals surveyed reported using WhatsApp, roughly 59% reported using Facebook, and 42% reported using Twitter. Most responders received healthcare information via WhatsApp, and nearly 43% of them responded that they had stopped treatment as advised on a social media platform [30]. The authors of the study conclude that health education needs to be accurate, evidence-based, and regulated, and we could not agree more.

Certainly, no drug class can be entirely free of adverse effects and the decision to offer treatment to patients is made after consideration of the risks, benefits, and alternatives to therapy by trained clinicians. In reality, the development of myopathy and new onset diabetes is relatively infrequent when compared to the absolute benefit derived from statin therapy. A review by Collins et al. estimates that treatment of 10,000 patients with statin therapy for 5 years would prevent major vascular events in 1000 patients in the secondary prevention category and 500 patients in the primary prevention category (absolute risk reductions of 10% and 5%, respectively). Treatment of 10,000 patients with statin therapy for 5 years would yield roughly 50–100 adverse events of myopathy (0.5 to 1% absolute harm), many of which are fully or at least partially reversible after adjustment of the statin regimen or discontinuation of the medication. Another source suggests that the annual risk of developing new onset diabetes with statin treatment is estimated at 0.1% while the absolute risk reduction in major coronary events is roughly 0.42% annually [31].

The Effects of Social Media on Clinicians

Media, especially social media, has also impacted clinicians’ interactions with patients and other members of the medical and scientific community. Infographics and articles circulated online have enhanced patient grasp of key medical concepts, and overall, medical information has been disseminated to patients with greater ease. With increasing frequency, patients bring articles to their clinic appointments to use them to initiate discussions with their clinicians. Indeed, this trend has helped shift healthcare from being paternalistic to becoming one that focuses on shared decision-making in which patients can make informed decisions with ample information at hand.

In addition to providing information to patients, more than 65% of healthcare providers report using social media for professional reasons [32]. It is a communication tool that facilitates professional education, organizational promotion, public health programs, and patient care [32]. Frequent uses of social media include providing coverage on scientific meetings, bringing greater visibility to scientific publications,

consulting colleagues on challenging patient cases, and learning from experts in the field. Twitter is one of the leading social media platforms in the cardiovascular community. It provides opportunities for online networking and virtual meetings through “TweetUps,” “Tweeterials,” and “Twitter chats.” Social media platforms have enabled the development of online professional communities among clinicians who use them as an outlet to raise awareness of issues in the medical field and to discuss potential solutions. It has become a venue to foster mentoring relationships and friendships among people thousands of miles apart. A recent publication by Parwani et al. summarizes the utility of social media within the field of cardiovascular medicine and provides perspectives on best usage practices in academic and clinical medicine [10•]. The 2018 American College of Cardiology conference was tracked using the registered hashtag #ACC18 and was used in 51.4 thousand tweets by over 10,000 participants. General cardiology hashtags such as #Cardiotwitter and #CardioEd have registered upwards of 53 and 61 thousand tweets, respectively. There are even several cardiology subspecialty hashtags such as #EchoFirst and #RadialFirst that have only increased in popularity since they were introduced in 2017. Through this global unification via social media, thousands of individuals were able to access conference materials, highlights, and impressions. Despite the ease of communication, the authors of the review also remind clinicians that “their online presence is within the public arena” and can have “far reaching implications” [10•]. Clinicians must demonstrate caution in the use of social media platforms, particularly with regard to communication of privileged patient-related information with other healthcare professionals [33, 34].

Professional applications of social media involve the dissemination of healthcare information as well as the interpretation and discussion of the latest clinical trials or controversies in medicine. However, such sources of information are unvalidated, may lack quality and accuracy, and may be incomplete. Furthermore, the quality of evidence presented on social media platforms may be less rigorous (i.e., anecdotal instead of randomized controlled trials) and such platforms can more readily influence clinician behavior in a widespread fashion without significant regulatory oversight, input from an expert panel, or before formal guideline changes have been adopted. Additional potential repercussions of professional uses of social media among clinicians include potential damage to one’s professional image from perceptions gleaned from public posts, concerns regarding breach of patient privacy, and the potential for violation of the patient-clinician boundary [32, 35].

It is important to note that not all information found through popular media is accurate or high quality and therein lies a fundamental challenge. How can we, as a scientific community, improve access to quality medical information and debunk heavily circulated myths and misgivings?

How Can we Optimize the Social Media Experience for Patients and Clinicians?

The fabric of social media continues to evolve, and we as healthcare professionals must evolve with it. While we strive to strike a balance between enabling patients to learn and access medical information, it is important that accurate, high-quality information is presented. A recent article by Armstrong et al. describes digital sources as a “new frontier without editorial oversight or curation” and asserts that “worse, exciting falsehoods apparently spread faster than boring truths on social media.” Armstrong et al. outline several strategies to counteract medical misinformation: (i) containing the dissemination of misinformation—scientific journals should bring to light sources of medical misinformation, and social media platforms can use this information to contain the spread of misinformation; (ii) general immunity towards medical misinformation through science literacy—educators and policymakers are key participants who can improve scientific literacy of high school and college graduates enabling them to develop critical thinking skills; (iii) health-specific inoculation and education—this includes promoting a general understanding of medical science and its common misconceptions using digital media, conventional printed materials, and public broadcasting; and (iv) debunking myths and discrediting purveyors of misinformation via direct rebuttals and publishing strategies to contain the influence of misinformation [13•, 36].

Information on social media sites is not regulated, so how does one know what information is reliable or evidence based? Here, we propose several strategies by which high-quality information can be accessed and how individuals and groups play a role in this [13•].

There are several participants in the delivery and access of medical information, each with a distinct role in the dissemination and interpretation of information: patients, clinicians, medical journals, and online resources such as social media platforms, blogs, and search engines. At the heart of optimizing the online and social media experience for medical information lies the concept of shared decision-making between patients and clinicians; patients should be enabled to make informed decisions with regard to their medical care and should be able to foster a relationship of trust with their clinicians.

Patients and Clinicians

Patients should be educated and encouraged to access high-quality information and directed to appropriate resources by which to do so. Clinicians should initiate discussions with patients regarding the sources that they use to obtain medical information and help them identify online resources with vetted information. Examples of vetted sources of high-quality,

evidence-based information within the field of cardiology are listed in Table 1.

Finally, the responsible and judicious use of popular media ought to be and is encouraged among healthcare professionals to foster career development and collaboration, and to improve the quality of patient care. Appropriate social media use by patients can positively affect the relationship between healthcare professionals and patients as well as foster the individual well-being of clinicians and patients. It allows for equal communication, decreased switching of providers, harmonious relationships, and an overall improvement in the delivery of healthcare [37]. The dynamic of an open relationship with freely flowing communication presents an optimal opportunity for shared decision-making, incorporating evidence-based practices, and enhancing the mental well-being of clinicians and patients.

Medical and Scientific Journals

Scientific journals and professional societies publish high-quality, evidence-based materials that are widely available. Though valuable, these resources may be too technical or difficult for patients with limited medical knowledge to understand. In this instance, we recommend that scientific journals take a more active role in counteracting misinformation by increasing the visibility of medical information via infographics and articles that are easily understood by those with limited medical knowledge. For example, major publications could be accompanied by a short, succinct message or an infographic tailored to a non-medical audience. These messages and infographics should be distinctly different from the ones directed towards healthcare providers. Medical and scientific journals should harness the power of popular media tools to promote important and relevant information to clinicians and the general public. Additionally, publications directed towards a general audience that counteract controversial and popular medical misgivings and provide appropriate medical information may help improve overall healthcare literacy. Resources should be made readily available and be widely circulated so that they are easily accessible. It is important that the general public remains connected to the

scientific community and understands the basis for treatment decisions in order to maintain a relationship of trust. One way to enhance this relationship is by publishing patient resources concurrently with novel treatment guidelines or major changes to existing guidelines. These resources should be made available along with the publication of the guidelines to ensure that correct messaging is implemented immediately at the time of publication prior to the publication of popular media distortions of the medical information. This timely “messaging window” can potentially have a profound impact on clinicians and patients and should be used effectively. Some of this has already been implemented via patient-facing portals from the American Heart Association and the American College of Cardiology. These portals are easily accessible and tailored to the knowledge level of the general public. Patients should be encouraged to use these materials, and healthcare professionals should bring these resources to the attention of their patients.

Search Engines and Social Media Platforms

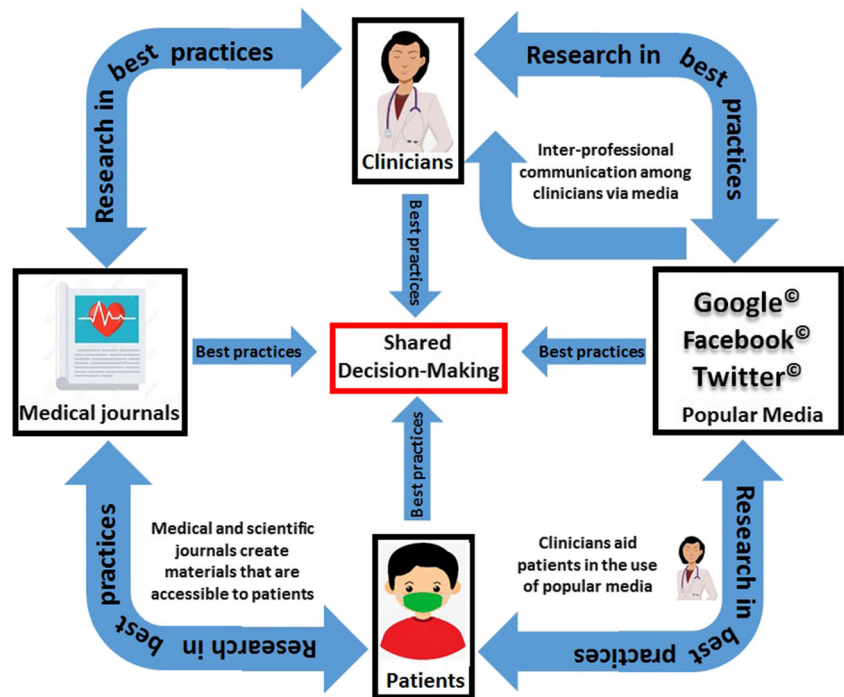
Search engines are another heavily used resource when looking for sites from which to obtain medical information. Typically, the first few sites in a search are most often viewed. If the first few results on a search are not those that contain high-quality information, the medical community runs the risk of propagating information that is inaccurate and potentially detrimental to patients. We recommend that academic journals and professional organizations work with search engines and popular media platforms to optimize features to improve the visibility of reputable medical information. Although this will have to be done keeping in mind sensitivities involving freedom of expression of views for and against any medical therapy, major search engines could potentially use deep learning and collaboration with academia to identify which of these sites is scientifically rigorous. Figure 1 depicts an optimal interplay of the key participants in the dissemination of quality medical information.

There is a need for research directed towards improving our understanding of how medical information from social media and search engines is used by patients and healthcare

Table 1 Examples of high-quality information sources that can be recommended to patients with cardiovascular disease

American Heart Association HeartHub	https://www.heart.org
American College of Cardiology CardioSmart	https://www.cardiosmart.org/
National Lipid Association	https://www.lipid.org/practicetools/tools/tearsheets
American Diabetes Association	http://www.diabetes.org/research-and-practice/we-support-your-doctor/patient-education-materials.html
Mayo Clinic	https://www.mayoclinic.org/patient-care-and-health-information
UptoDate	https://www.uptodate.com/contents/table-of-contents/patient-education
National Institutes of Health	https://www.nih.gov/health-information
Cleveland Clinic	https://my.clevelandclinic.org/health

Fig. 1 The optimal interplay of the key participants in the delivery and access of medical information. Optimal dissemination of medical information relies on 4 stakeholders: patients, clinicians, popular media, and medical journals, all of whom must work together to optimize shared decision-making



providers. Qualitative and quantitative research that seeks to understand the drivers of how patients seek medical information, differences in health information seeking behavior by patients and clinicians, and what a successful knowledge transfer looks like is needed. Finally, we are in need of a framework to link the academic community with major search engines and social media platforms to optimize the pursuit of online healthcare information yet at the same time maintain freedoms of speech and press that are ever so important.

Conclusion

Our ability to obtain medical information in today's day and age is limitless, and we as a scientific community are entrusted with the responsibility of ensuring that high-quality information is disseminated to our patients and among ourselves. The foundation of the patient-clinician relationship is one of trust and compassion. As clinicians, we must educate and empower our patients to access evidence-based materials and be open to addressing misconceptions. Medical journals can contribute to dispersing high-quality information by publishing evidence-based materials that are easily comprehended by and readily available to the general public. Clinicians can work on effective and accurate communication among each other on social media, limiting over-generalizations and strong editorializing, which can create domino effects on unvalidated information. Finally, efforts ought to be directed at optimizing search engines and social media experiences for patients and healthcare professionals alike.

“With great power there must also come- great responsibility.” With the continued rise of popular media, we each have a responsibility to our patients and must do our part to uphold the tenets of medical ethics: autonomy, justice, beneficence, and non-maleficence.

Compliance with Ethical Standards

Conflict of Interest Salim S. Virani has received research funding from the Department of Veterans Affairs, the American Heart Association, the American Diabetes Association, and the World Heart Federation; has received honoraria from the American College of Cardiology for his role as an Associate Editor; and has served on the steering committee for the Provider Assessment of Lipid Management (PALM) registry at Duke Clinical Research Institute, but received no financial remuneration. The other authors declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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