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Using Social Network Sites in Healthcare Management: Opportunities and Challenges

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Abstract
This paper reviews the history and evolution of the major Social Network Sites (SNS) – Facebook, Youtube, Instagram, Twitter, Blogging, Health 2.0 – and describes applications of each SNS to the healthcare industry administration. While SNS applications to healthcare are numerous, the paper is focused on the use of SNS for health administration; it analyzes patients and physicians' patterns of using SNS for obtaining and processing healthcare-related information and the application of SNS for patients' outreach. Among unique SNSs' features applicable to healthcare administration are trackability of patients' intents, the opportunity for early interventions, the timeliness of patient-provider connections, and personification of health-promotion and education messages. SNSs limitations and concerns include loss of control over the content, lack of policies regulating SNSs healthcare content, and limitations of the available research. As SNSs continue gaining popularity, understanding its strengths, limitations, and policies could be instrumental in conducting effective health outreach and strengthening communication channels among providers and patients.
Keywords: social media, social network sites, social media and healthcare, social media and patients, social media and healthcare providers, Facebook, Instagram, Twitter and healthcare education, social media and healthcare administration.

1. Introduction
Social media or social networking and their use in healthcare are a relatively new and constantly changing area; consequently, the amount of available empirical work and research associated with it is limited. Therefore, in addition to drawing information from primary sources, this article presents information from a variety of secondary sources, including blogs, web reports, web posts/comments, web group discussions, forums, Twitter, Pinterest, Facebook, Instagram, Askbook, Quora, Tumblr, VKontakte, Google+, videos, newspaper articles, and similar sources.

Social Media. Definition
Over the past two decades, people have had to rethink their connections with and affinities toward others. Since the inception of the Internet in 1991, the way how humans communicate, as well as the nature of their professional and social lives, have been continually evolving. First, there was Web 1.0- a read-only website that provided access to the information that was supplied and updated by the organizations themselves. Then Web 2.0 was created, an interactive tool that engaged individuals in discussing their concerns and sharing their knowledge. However, only the creation of Facebook, LinkedIn, YouTube, Twitter, and other similar applications produced a "massive harnessing of the now-pervasive online connectivity in our everyday lives" (Davis et al.,

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2012: 3). As of now, according to different sources, approximately 2.789 billion people in the world use various social media sites (SNS), devoting 900 billion minutes per month to integrating with pages, groups, and events. Among top SNSs are Facebook, Youtube, Instagram, and Twitter (Similarweb.com, 2019; Smart Insights, 2017; Noyes, 2019). In this paper, we will discuss how SNSs have been evolving and in what way it impacted one industry, – healthcare.

Boyd and Ellison's (2007) describe social network sites (SNSs), as web-based services that allow individuals to (1) construct a public or semi-private profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system (Boyd, Ellison, 2007: 211)

The above description addresses the debate about whether or not social networking represents one aspect of social media or whether social media represents one aspect of social networking (Cavazza, 2008; Falls, 2008). It also implies the use of visible profiles and reveals a public display of connections, the potential for interactions and the capacity to target specific ethnic, religious, professional, sexually-oriented, political, age-related, linguistic, or other identity-driven groups (Boyd, Ellison, 2008)—all features that are associated with SNSs.

2. Materials and methods

This part includes a detailed review and analysis of the social network sites history, evolution and application to the field of healthcare administration.

Analysis of History, Evolution, and Connection to Healthcare Industry
Beginning

Many traced the beginning of social networking to 1971 when the first e-mail was sent from one computer to another; the computers were sitting in one room, next to each other. However, larger-scale social networking began in 1997 when SixDegrees.com was launched. It had the majority of features that characterize SNSs today: It allowed users to create profiles, list their friends, and surf their friend lists. Three years later, in 2000, the server closed, largely due to the limitations of the Internet geographic penetration and a rather narrow scope of allowed activities (Boyd, Ellison, 2008). Blogging, another form of SNSs, also started in 1997. It offered a much large spectrum of communication opportunities, such as shared online journals and diaries, which allow readers to share comments in response to various posts. Unlike sixdegrees.com, blogs are still popular today, there are approximately 505 million blogs[6] in existence. However, their features and capabilities are somewhat unique and different from those offered by SNSs. In healthcare, blogs are being actively used for educational purposes.

LinkedIn

The year 2003 marked the beginning of LinkedIn, a business-oriented SNS designed for professional networking. Today, the total number of LinkedIn users is over 500 million, with 260 million active monthly users and 200 million users accessing LinkedIn every day in 200 countries. The average amount of time a user spends monthly on LinkedIn is 17 minutes. LinkedIn lists more than 10 million active job posts and presents data on 9 million companies (Gallant, 2019). Unlike in other SNSs, such as Facebook, Twitter, Instagram, and similar, LinkedIn is less "social"; there are no followers[7] and following[8] on LinkedIn and it doesn't apply a friends-and-family model. A member can ask to be connected to another LinkedIn member by identifying their prior professional connectivity. However, similarly to other SNSs, members can like and share other members' posts as well as offer their comments and opinions. The number of connections is reflected in another LinkedIn feature – a professional endorsement; the total number of LinkedIn endorsements is at around 10 billion. LinkedIn also offers an opportunity for creating and joining professional groups that can be easily found through the LinkedIn "Group Directory" and for publishing and accessing professional articles. There are over 100,000 professional articles that

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[6] This number is an approximation and is constantly changing. In addition, different software may have a slightly different count.

[7] Follower is a SNS user who is choosing to see all of another user posts in their content feed

[8] "Following" someone means you will see their SNS posts in your personal timeline. For instance, Twitter or Instagram social media platforms will let you see who you follow and also who is following you. Followers are people who receive other people's updates (http://www.webopedia.com/TERM/T/Twitter_following.html). If one has more people who follow his or her posts in comparison to how many people this person follows, than this person is more popular in SNS hierarchy

appear on LinkedIn pages weekly. Overall, LinkedIn content is less personal and social, and more professionally oriented.

Over 1.5 million healthcare professionals have LinkedIn accounts; among them, 422,158 people have listed themselves under "hospital and health care" industry, 179 thousand people have listed themselves under "medical practice," 350 thousand members are in the pharmaceutical industry, and 170 thousand are registered under the "medical device" industry (Santiago, 2018).

Facebook

Facebook began in 2004 as a Harvard-exclusive SNS. It later expanded to other schools but managed to maintain an exciting exclusivity, because open sign-up does not provide easy access to users in closed networks. Facebook creates an opportunity for building "applications," allowing users to personalize their profiles, create school profiles, share stores, and compare preferences. According to different sources, today, Facebook has approximately 2.13 billion monthly active users worldwide, which is approximately a quarter of the entire world population; 50 % of users log on to Facebook daily spending 900 billion minutes per month interacting with pages, groups, and events (Noyes, 2018). The rating of a Facebook page popularity can be measured by the ratio of this page followers and how many people this page is following.

Of the total of 3,371 hospitals in the United States, 2,251, or 99.4 %, have a Facebook account (Gandolf, 2019). Patients can inspire other patients to join specific hospital groups and share health-related information. Facebook also offers healthcare organizations the ability to communicate with patients through direct and targeted messages, and "view detailed statistics on the usage of the organization's page" (Reuben, 2008: 3).

YouTube

The domain name YouTube.com—an SNS for watching and sharing original videos – was registered and activated on February 14, 2005, and the first YouTube video was uploaded in two months, on April 23. 2005. YouTube eliminated the cost of creating video cassettes and/or burning CDs/DVDs, as well as the cost of postage, and tremendously widened the audience of potential video consumers. In 2019, the number of monthly YouTube users reached 1.9 billion and the number of hours of YouTube videos watched reached one billion hours a day, more than Netflix and Facebook videos combined (Smith, 2019). About 70 % of YouTube viewers live outside of the U.S., Google's automatic speech recognition technology can translate YouTube videos into 51 world languages, and the YouTube player is embedded across over 10 million websites worldwide (Website Monitoring Blog, 2018), the platform has also launched in 91 countries. Researchers identify that Youtube is increasingly being used for disseminating health information (Madathil, 2015; Zhao, 2017).

Twitter

Twitter—a combination of instant messaging and blogging that allows users to share short (at first 140 and now 280-characters including spaces) posts—was introduced in 2006. On Twitter, users can follow their friends, send friends direct messages, reply publically to the updates, and post questions, comments, pictures, and web links —all in real-time (Reuben, 2008; YouTube, 2011). Users' profiles are usually public, which means that everyone has access to what users have twitted or retweeted. In 2018, the number of Twitter's registered users was over 800 million, with more than half of them twitting actively and more often than once a week. Various healthcare organizations have Twitter accounts, the largest number of followers – 311,325 – has a twitter account of Sangobion, an iron supplement with vitamins and minerals that increase red blood cell levels in the body. The other eight most popular healthcare twitter accounts belong to pharmaceutical companies, such as Novartis, Pfizer, Roche, GSK, Merck, AstraZeneca, and others. Research conducted in 2014, identified 355 million healthcare-related tweets posted during that year with 3,000 active healthcare-related hashtags[9]. Of the 3,371 hospitals in the US, 1,713 or 50.8 % have a Twitter account (Gandolf, 2019).

Instagram

Instagram – a photo-sharing social networking service – was introduced in 2010. Instagram allows users to post and share their photos and short videos online and enhance these images through various editing filters. There is also an opportunity for posting texts and using hashtags, but not weblinks. Users can like posts, comment and send these images to individual friends or groups. In August 2016, Instagram released Instagram Stories platform. Stories allow users to

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[9] A word or a phrase preceded by a hash sign (#) that is used by SNS to seek for messages and information on a specific topic.

upload photos and videos that would expire in 24 hours similar to Snapchat. As of 2019, there are an estimated one billion active Instagram users, with over 60 % of them logging in daily. Instagram images collect an estimated 3.5 billion likes daily. There are 105 million Instagram users in the U.S. (Gotter, 2019). In healthcare, Instagram is mostly used for healthcare marketing. Among other things, Instagram provides images that help to introduce facilities, doctors, promote contributions and fundraising, demystify places, and procedures (Patientpop, 2018; Gandlof, 2020).

Health 2.0

Health 2.0 is a platform that was introduced sometimes in mid -2000s and combined elements of websites with SNSs. Health 2.0 includes telemedicine, electronic health records, home health monitoring, e-learning, and online medical publications; it also offers the ability to aggregate individual health information with the possibility of improving healthcare delivery, management, and outcomes. Patients have an opportunity to interact through message boards and blogs and can provide greater insights related to the information generated about them, their diagnoses and treatment. Medical professionals can provide peer-to-peer consultations and feedback (Fernandez-Luque, Bau, 2015; Hubner et al., 2019). Users of the Health 2.0 are also referred to as e-patients and are defined as citizens who "use the Internet as a health resource, studying up on their diseases, finding better treatment centers,… and increasingly serving as collaborators and advisors for their clinicians" (Thielst, 2010: 6).

Starting in 2005, many SNSs have been launched in the US and abroad, including Askbook, BEBO (Blog Early, Blog Often), Digg, Dropbox, Flickr, Friendfeed, Google+, Orkut, Pinterest, Reddit, Renren, Tumblr, Quora, Vevo, and VKontakte. Statistical analysis of members' activities reveals that none of these listed sites enjoys the same size membership as the SNS discussed earlier, and their presence on the healthcare organization websites is not as significant (Curtis, 2013; Dugan, 2012).

3. Results
Opportunities and benefits for the health administration field

In healthcare, the use of SNS is multidimensional and complicated. On the one hand, it provides additional channels for patients-physicians communication, improves the dynamics of information sharing, empowering patients, and opens the channels for patients' self-management and psychological support. It also brings in new research opportunities and provides ground for collecting high-quality, evidence-based data. On the other hand, the use of SNSs fosters a discussion about the validity of the SNS facts and opinions, of the effectiveness of patients' self-management and patients' noncompliance. It creates ground for exchanges related to the ethical aspect of SNS use in healthcare, and ultimately, of the effect, the use of SNS makes on the health outcomes. Those are just a few aspects of the controversy that surrounds the use of SNSs in healthcare. The focus of this review is narrowed down to a discussion about patients' and physicians' patterns of using SNS for obtaining and processing healthcare-related information and to the review of barriers, limitations, and information privacy.

Dialogues with Healthcare Consumers
Healthcare Professionals

The most common use of SNS by healthcare professionals includes information sharing and consultations with healthcare specialists through SNS groups. These communications are often conducted through closed Facebook groups that are created and managed by different healthcare and medical professionals (Rolls et al., 2016). The restricted membership of these types of Facebook groups allows for peer-consultation with a large variety of trusted, qualified, credentialed, and competent peers in real-time, often immediately. The healthcare professionals evaluate these SNS communities as valuable knowledge-sharing communication platforms where they feel comfortable obtaining and presenting clinically relevant, quality content, receiving immediate feedback and consultations, and engaging in collegiate discussions (Antheunis et al., 2013). These unique channels of communication provided by SNS often support healthcare professionals in reaching more informed and patient-centered decisions in a time-efficient manner.

Physicians are also more likely to post a question, ask for peers' advice and opinions, and engage in healthcare-related discussions in the professional, membership-driven and medical specialty related SNS groups. They are less likely to seek professional advice or feedback by the use of hashtags or SNS search tools; – actions that are more commonly used by the general public (Rolls et al., 2016). At the same time, physicians are more likely to use other professional SNS sites – Instagram, Twitter, – as well as general SNS features for personal purposes (Bosslet et al., 2011).

Healthcare administrators may use this information to encourage physicians to join professional healthcare groups available on Facebook.

Healthcare consumers

Patients also tend to use online resources and SNS as a significant source of health-related information (Pew Research Center, 2018). One can find any health-related information on SNS instantaneously simply by using a hashtag. For instance, during flu season, it can be #flushot or #flu, which are similar. In comparison to traditional sources of information, SNSs are always at the palm of your hand and, therefore, offer immediate and easy access to real-time data, including official social media pages of healthcare organizations, such as the Facebook pages or Twitter accounts of Center for Disease Control or the World Health Organization. Patients are often members of Facebook groups or Quora communities; they participate in healthcare discussions there, can post questions and read other people's comments and answers. There is also healthcare-related information available in various blogs, YouTube videos, TikTok podcasts, and other SNS sites that can be used for gathering recommendations about doctors and health facilities, obtaining additional knowledge about chronic and acute health concerns, and receiving support related to different health conditions (Housen, 2013; Kotsenas et al., 2018).

Healthcare-related information available in SNS can influence pateints' behavior and expeditiously alter it. One example of SNS influence on healthcare consumer behavior relates to a response to a social media campaign for STD testing. The promotional video posted on YouTube received more than 3.6 million views within ten weeks and Facebook paid advertisement brought around 80 thousand visits to a campaign landing page. These "visits" were often interactive and included asking questions, receiving answers from different people that presented a wide spectrum of opinions, commenting on other people opinions, comparing notes, and sharing links. The interactions were engaging and resembled an active dialogue in contrast to traditional dissemination of information by healthcare professionals and the reception of information by patients. Many healthcare professionals believe that consumers' growing involvement with SNS and a pro-active approach to gathering information offered by SNS, may lead to an increase in the use of SNS for patients' education and patients-physicians interactions, which can support the enhancement of participatory medicine and result in the improvement in patients' health outcomes (Galland et al., 2011).

Trackability of intents and patients outreach

The majority of SNS has a build-in, unique capacity to track intents, behavioral patterns, and interests of their users. For instance, the research team of Golder, Wilkinson, and Huberman (2007) was able to analyze 362 million messages of 4 million Facebook users for insights into messaging information and "friending" activity—an immeasurably useful input for understanding patients' needs and behavior. This unprecedented "trackability" could assist healthcare professionals in strengthening their healthcare outreach efforts or in designing targeted health-behavior recommendations that can provide a fertile environment for health prevention or early intervention. Almost every SNS platform provides tools for tracking users' behavior. Twitter offers a tracking tool called TweetStats.com (2011) which presents a powerful opportunity for obtaining the number of not just tweets, but topical tweets per year, a month, or even per day, including those related to healthcare issues. For instance, this tracking tool can identify the months when vaccination tweets are at their peak. By considering this information, during a specific time-frame, healthcare educators and providers can focus their efforts on Twitter pages and write posts that dispel myths and encourage people to get vaccinated. The tracking tool also offers the option to view a percentage of replies per specific tweet, as well as the number of topical tweet followers (TweetStats, 2011), which can make the efforts of health educators to be more targeted and specific.

There are also tracking tools provided by Google and Yahoo, named Google or Yahoo Alert, that permit healthcare organizations to follow patients' activities. Among other things, these tools collect, analyze, and offer data regarding healthcare sites reviewed by patients, about patients' common areas of concerns, geographic locations, hobbies, health interests, health-related habits and behavior, and even parental involvement in children's health habits and behavioral patterns (google.com/alert). Instant awareness of healthcare-related behavior, of what is being said and viewed by the general public, allows health educators and other professionals to quickly and strategically react to issues, challenges, and opportunities. This almost unlimited ability of SNS to track users' activities and interests can assist health outreach specialists in strategizing and focusing their efforts. The health outreach specialists can engage in writing health-related blogs, dispelling

myths, engaging in dialogues, answering questions, and providing quality and more cost-efficient content tailored to the various SNS groups' geography, demographics, interests, and needs.

Prevention and education through message tailoring

Additionally, SNSs provide tools for reinforcing social media messages and delivering them to specific demographics and population groups. The traditional information sharing, such as health fairs, or dissemination of paperless and paper promotional materials, aims at too wide of an audience. It is also subjective to various obstructions, such as, for instance, spam filters that block mass emails and "tools like RSS that makes print and display advertising less effective" (Darrup-Boychuck, 2009, slide 59). In contrast, SNSs have no obstructions and can deliver their health messages, such as, for instance, advertisements related to vaccinations, encouragement to test for diseases, and anything else, to specific groups. As an example, Facebook provides the option of delivering content to specific locations, genders, age, and interest groups. Besides, there is also no cost differentiation between targeting different audiences, while the costs of traditional forms of information sharing can differ substantially based on the location, population density and a cost of living.

Another feature of SNS, its critical timeliness, allows for posting instantaneous updates, words of advice, links to scientific articles, and real-time responses to questions and concerns. In general, SNSs are a connection tool, similar to a real-live, face-to-face conversation. This unique timeliness of SNSs is even reflected in some of the SNS names. For example, Russia's most popular SNS is named VKontakte, which means "staying in contact".

4. Discussion
SNSs: Concerns and Barriers
Quality of content

One of the biggest limitations of SNS is the quality of content. Sources of healthcare information posted on various SNS are often unknown, unreferenced, and incomplete because anyone can create an "official" account on Facebook, Twitter, and other SNSs and share any type of information with the users (Reuben, 2008; Walther et al., 2018). While evidence-based medicine warns against opinions and unverified content, SNS tend to rely on anecdotes. Besides, two of the SNS features, its interactive nature and a significant membership, can play a negative role, often quickly magnifying unreliable content (Moorhead et al., 2013). Similar concerns are connected with the content generated and shared in blogs and in comments to group posts and discussions. Negativity or fake information in contributor' commentaries can easily and instantly change readers' opinions about anything (Solis, 2008), including their perception of any healthcare provider or healthcare organization; it can negatively impact patients health behavior and dimtrust to healthcare providers.

Another concern shared by some healthcare professionals is the need to be on the same level in the SNS' proficiency as some of their patients, which, for some of the providers, involve a giant leap into the techno world. For instance, for many providers e-mail is still the primary source of connecting with peers and colleagues; however, "for young people, e-mail is how you communicate with elders informal situation, while social networks and SMS are the preferred methods of communication among peers" (Hayes et al., 2009: 110). Meanwhile, healthcare professionals are charged with many different duties and responsibilities. This professional involvement creates barriers to finding time to "rewire" themselves and become fluent in the "new languages," even if this fluency can help to reach out to larger audiences, dispel unreliable healthcare-related myths, and deliver more accurate content to health information consumers and patients.

Privacy of information and limitations in available research.

Presently, there are no established and uniformed federal, state, or professional policies that regulate the content of SNS messages, or the follow-up use of this information. There are also no clear policies for protecting users' confidentiality. The current SNS set-up places the task of information confidentiality with the participants, which should encourage participants to practice more caution while sharing information and exhibit more vigilance in their comments and SNS dialogues Healthcare professionals are protective of patients confidentiality and consider interactions with patients on SNS to be unethical and a violation of fiduciary duties; they are "doubtful that such interactions could occur without compromising patient confidentiality" (Bosslet et al., 2011: 1172). They are also cognizant of the fact that patients are often initiating such patients-physicians interactions on SNS. To support healthcare professionals, the American Medical Association (AMA) has issued a statement named "Professionalism in the use of social media" (AMA, 2010). The statement provides guidance regarding creating and maintaining

boundaries with patients' interactions on SNS and discusses potentials consequences for crossing these boundaries and the healthcare professionals' responsibilities for reporting unprofessional online behavior.

Another significant barrier is quick evolution of SNS, the evolution that surpasses the corresponding research. Currently, the majority of information is available through secondary sources, such as blogs, Internet discussions, forums, and various sites, but more primary contemporary scientific articles are needed. Besides, research literature that is more than a year old is in danger of sounding obsolete. In order to optimize the use of SNSs, fluency in the SNS' features and content is required, as well as continues research about the SNS behavior of the healthcare professionals and consumers.

5. Recommendations and conclusion

The results of this research could be of practical use to healthcare administrators, managers and other health professionals. Practitioners could create and maintain healthcare professional groups on Facebook or LinkedIn. The information furnished by these group members can assist in care delivery improvements by answering to inquiries, sharing of experiences and "lessons learned". It can also strengthen opportunities for professional recruitment. Healthcare organizations could use SNS to generate consistent and meaningful health education content and better engage with patients. The well-developed and consistently implemented content could be instrumental in facilitating positive changes in patients' behavior, in helping them gain health education capital, and strengthening trust and relationships with providers.

As SNSs continue gaining popularity, it also could be helpful to update healthcare organizations materials to include SNSs as one of the reference choices. Additionally, meaningful information and conversations on various SNS platforms with trustworthy individuals to whom patients can relate could bring more patience to facilities. We realize that this study is limited in its generalizability, but its rich content opens opportunity for future research.

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УДК 33

Использование социальных сетей в управлении здравоохранением: возможности и перспективы

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Аннотация. Статья описывает историю и эволюцию основных социальных сетей – Facebook, Youtube, Instagram, Twitter, Blogging, Health 2.0 – и анализирует приложения каждой социальной сети в области организации и управления здравоохранения. Применение социальных сетей в здравоохранении обширно и многогранно, а потому статья фокусируется на одной сфере здравоохранения-управлении. Основное внимание уделяется анализу использования социальных сетей пациентами и врачами; первыми – для получения информации, связанной с их здоровьем и вторыми – для использования социальных сетей в работы с пациентами. Среди уникальных функций социальных сетей, применимых к управлению здравоохранением, можно назвать отслеживание намерений пациентов, возможность раннего медицинского вмешательства, своевременность связей между пациентом и медицинским персоналом, а также персонализацию образовательных сообщений. Ограничения и проблемы социальных сетей включают потерю контроля над контентом, отсутствие правил, регулирующих содержание сообщений и блогов, а также недостаточность научных исследований по данной тематике. По мере того, как социальные сети продолжают набирать популярность, понимание их сильных сторон, ограничений и регулирующих механизмов может сыграть важную роль в проведении эффективных мероприятий по охране здоровья и укреплении каналов связи между медицинским персоналом и пациентами.

Ключевые слова: социальные сети, сайты социальных сетей, социальные сети и здравоохранение, социальные сети и пациенты, социальные сети и медицинские работники, Facebook, Instagram, Twitter и медицинское образование, социальные сети и управление здравоохранением.

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