Query Details

1. **Please provide significance for superscript numbers in Tables 2 and 3.**

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Seeking, sharing and co-creating: a systematic review of the relation between social support theory, social media use and chronic diseases

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Abstract

The use of social media is increasing in the treatment and management of health. Patients with chronic diseases are especially interested in using these technologies to look for support, but organizations are lagging behind. The aim of this study is to explore the implications of applying social support theory to social media use in the field of chronic diseases. A systematic review was conducted in the Web of Science Core Collection database. Our analysis retrieved ten registers on initiatives around social support theory, social media, and chronic diseases. Despite the paucity of initiatives from this perspective, the studies included in this review offer some recommendations on how health-related organizations can improve patient-physician communication. Our findings suggest that social media can provide social support regularly, but institutions need to create safe environments addressed to specific diseases where physicians also take part in the community of the site. As patients have been in social media without physicians' support for many years now, finding new ways of reducing the communicative gap between these two stakeholders is crucial. This review suggests that the

application of social support theory could be one of the solutions, especially regarding chronic pain patients.

Keywords

Social support
Chronic disease
Social media
Health communication
Patients
Physicians

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Introduction

The traditional healthcare delivery model is close to being exhausted. Digital innovations like artificial intelligence, robotics, virtual reality or blockchain offer new ways of delivering healthcare (Deloitte 2019), such as the use of sensors to monitor patients' conditions (Lupton 2013) or the development of devices to ease the lifestyle of chronically ill patients. Since the 2.0 disruption, individuals are increasingly utilising m-health apps, wearables, social media platforms, and similar, to manage both health and illness. Only in the USA, 7 out of 10 consumers want to use technology to improve their health care, according to a survey conducted in 2016 (Korenda et al. 2016). Moreover, a worldwide report from 2014 says that 90% of patients look for health information online (PatientView 2015). All these innovations, however, are generating big amounts of data that organizations still do not know how to use it to enhance healthcare (Coulter et al. 2014). In addition, this information also challenges both the way patients relate to their bodies and the procedures health professionals employ to interact with these physical figures (Lupton 2013, 2018a; Lupton and Maslen 2017). Against this background, health institutions are under pressure to find new ways to engage and communicate with their patients in these environments (Sendra and Farré 2017).

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This paper focuses on social media, one of the tools that could be the next revolution in the treatment and self-management of healthcare (Laestadius 2017). Apart from being powerful platforms to enhance patient-physician communication (McKenna 2017), patients are actively using social media due to the diverse types of support they receive in these spaces (Deng and Liu 2017;

Newhouse et al. 2018). The practice of looking for this kind of assistance is quite common between patients with chronic diseases (Frohlich 2014; Merolli et al. 2013a; Metha and Atreja 2015), especially among those affected by chronic pain (Keim-Malpass et al. 2016; Ressler et al. 2012). Since illnesses like fibromyalgia are very difficult to diagnose (Hester 2015), patients turn to social media to build "a sense of community among people with similar health issues" (Deng and Liu 2017, p. 100) and share stories with peers (Hess 2016). As Alhaboby et al. (2017, Social Identity in Online Support Groups, para. (1)) argue, "having an 'invisible disability' … seemed to be influencing participants' attitudes towards sharing their experiences". However, the fact that social relationships provide support is not new. Back in 1980, Kahn and Antonucci formulated the convoy model, where "the individual is seen in a life course perspective as travelling through life surrounded by members of his/her cohort who share experiences and life histories and who provide support to one another reciprocally over time" (Kahn and Antonucci, cited in Berkman et al. 2000, p. 846). The difference is that now these practices are happening in an online environment.

Simultaneously, using social media for health care has also associated risks. As Lupton (2012, 2013, 2018b) points out, the data collected in these spaces can be used as a new form of surveillance. Most of the platforms are developed by private companies where the information is used without the patient's consent (Lupton 2013, 2018a). Besides, the practices of support could also have negative effects, such as polarisation of opinions, the transfer of responsibilities of health care from doctors to patients, or the generation of negative emotions because of comparing the personal experience with the situation of other individuals (Lupton 2012; Newhouse et al. 2018). Nevertheless, it is clear that social media offers these patients new opportunities of empowerment for managing their health (Lupton 2013; Merolli et al. 2013b). In their study about online support groups, Coulson and Shaw (2013, p. 1698) argue that these spaces work as *communal brains* where users can "access a wealth of both factual and experiential information, advice and support". With the creation of these ties, patients experience a *buffering effect* (Heaney and Israel 2002).

Even though there are other theoretical perspectives (Wright 2016a) that are used to study online communities (like the Optimal Matching Model (coincidence between provider and receiver), the Social Comparison Theory (experiences are normalized when comparing with others), or the Social Information Processing Theory (the support provided through online tools is seen as positive)), the Buffering Effect Model is the one that fits best the reality of social media. In face-to-face interactions, this model has proved that participating in the group reduces the stress of the patients (Wright 2016a). At the same time, in online

environments, the buffering effect permits the network to grow (along with greater participation in the community) (Wright 2016a). Applied to platforms like social media, this model permits the combination of both realities (benefits of face-to-face and online interactions).

Another theory that can be applied to the context of social media is the Strength of Weak Ties Theory (Wright et al. 2010; Wright 2016a). According to this perspective, the reach of the support depends on the structure of the community (Wright 2016a). This theory could be used by healthcare organizations to analyse if these patients' interactions within these platforms are really beneficial or not (Frohlich 2014). The difference between the two models is that the buffering effect is more health-oriented, while the Strength of Weak Ties Theory is "more communication process-oriented" (Wright 2016a, p. 76). Regardless of the theoretical perspective used by institutions, online "groups/communities can offer a number of advantages […] in terms of social support" (Wright 2016b, p. 2). However, these connections are rarely discussed with reference to this theory. According to previous studies, social support describes "the functional content of relationships" (House, cited in Heaney and Israel 2002, p. 186), and can be classified in four types: emotional (providing empathy, affection… and similar), instrumental (offer services), informational (giving information) and appraisal support (supplying practical resources for self-evaluation) (Deng and Liu 2017; Heaney and Israel 2002). In this regard, earlier research already validated emotional and appraisal support "in the context of social media websites" (Cha, cited in Deng and Liu 2017, p. 100).

One important aspect of this theory is that support happens within networks. With social media, now there are spaces where these connections can take place without the necessity of face-to-face interactions. Nevertheless, the origin of these online platforms lies on social networks. According to Israel, networks have three dimensions: structural (number of connections), interactional (how these connections take place, based on frequency and reciprocity), and functional (which are the roles of the members) (Israel 1985). All these features, which define social relationships (Israel 1985), are also taking place in these online environments. Though networks work correctly through the combination of the three features (Israel 1985), the interactional dimension is a crucial characteristic of social networks—especially in spaces like social media—: if the users of the network do not interact, the provision of support through these platforms cannot take place.

Paradoxically, while patients are actively communicating with each other on these platforms; health organizations and their professionals are falling behind due to strict regulations (Harris et al. 2013), lack of time, or simply because they

do not know how to effectively use these tools (Lupton 2018b; Sendra and Farré 2017). As Roland (2018, p. 151) points out, "despite relatively wide availability of resources in relation to how to use social media to disseminate information, in particular Twitter and Facebook, many researchers felt poorly informed and equipped to do this". Over the years, organisations were more focused in collecting data rather than discover what to do with it (Coulter et al. 2014). Moreover, other study found that "online groups' members were cautious in dealing with 'outsiders', being academics or healthcare professionals" (Alhaboby et al. 2017, Social Identity in Online Support Groups, para. (3)). In other words, those who participate in social media for health reasons trust peers more than 'superior' figures, like doctors or nurses. Consequently, this type of behaviour increases the communication gap between patients and physicians in these spaces.

Although "moderating an online forum can enable the moderator and users to proactively manage their condition, to deal more effectively with health care professionals and to better access health care services available to them" (Coulson and Shaw 2013, p. 1699); health-related institutions cannot fall behind since the use of social media involves certain risks, like lack of reliability, privacy concerns or information overload (Lupton 2018b; Lupton and Maslen 2017; Roland 2018). It is the responsibility of these organisations to address those potential risks to that the use of these technologies is not harmful to patients. In the end, participating in these communities helps people "reinterpret events or problems in a more positive and constructive light" (Thoits, cited in Heaney and Israel 2002, p. 189). Social support theory also discusses the possibility of sharing this moderator role: "a combination of formal and informal helpers may be the most effective in situations in which both informational and emotional support are needed" (Heaney and Israel 2002, p. 195). What is clear is that health-related institutions need to learn how they can use digital technologies to improve the traditional healthcare delivery system.

Aims

At a time when health 2.0 is reaching a defining moment, Wright (2016b, p. 4) suggests that "more meta-analyses and meta-analytic reviews will be needed to assess the impact of social networks/relationships on health across similar studies". In this sense, previous reviews have explored the relationship between social media and health from different perspectives. For example, Moorhead et al. (2013) analysed the uses of social media for health communication. Other reviews explored how social media can improve chronic disease management (Allen et al. 2016; Merolli et al. 2013a; Patel et al. 2015). On the other hand, Vianna and Barbosa (2017) investigated how computing can aid social support in

non-communicative diseases. Another study even examined how Twitter content analysis can be improved for health researchers (Hamad et al. 2016). However, none of these reviews explored the relation between social support theory, social media and chronic diseases from a communicative perspective. For this reason, this study explores the implications of applying the social support theory to social media use in the field of chronic diseases.

By conducting a systematic review, our research has a twofold objective: (1) to determine how many initiatives exist in social media that have been applying social support theory in the field of chronic disease; and (2) to provide a list of recommendations about how health institutions can improve the communication with their patients in social media relating to advances in health communication theory. Due to the innovative approach, it is assumed that there are few initiatives that are applying social support theory in the field of chronic diseases.

Methods

The PRISMA recommendations for improving the publication of systematic reviews and meta-analysis were followed (Urrútia and Bonfill 2010). The review included all the studies that met the following inclusion criteria: (1) studies related to chronic diseases, (2) articles related to social media, (3) peer-reviewed articles published in English between 2004 and December 2017, (4) studies related to the social support theory, and (5) studies related to the object of study.

Data search

The search was conducted in the Web of Science Core Collection database (see Table 1).

Table 1 Capital letters should be kept for the names of the indexes.

Databases used for this review

Web of sScience eCore eCollection: eCitation iIndexes
Science eCitation iIndex eExpanded (SCI-EXPANDED)
Social sSciences eCitation iIndex (SSCI)
Arts & hHumanities eCitation iIndex (A&HCI)
Conference pProceedings eCitation iIndex-sScience (CPCI-S)
Conference pProceedings eCitation iIndex-sSocial sScience & hHumanities (CPCI-SSH)
Book eCitation iIndex-sScience (BKCI-S)
Book eCitation iIndex-sSocial sSciences & hHumanities (BKCI-SSH)

Emerging ~~s~~Sources ~~e~~Citation ~~i~~Index (ESCI)

For this search, the following keywords were used: ~~(chronic (disease OR illness) AND social support) AND (social media)~~**(chronic (disease OR illness) AND social support) AND (social media)**. We have used the keyword *social media* instead of *social network* to prevent confusion between the two terms, since the expression *social network* "refers to the web of social relationships that surround individuals" (Heaney and Israel 2002, p. 8). In contrast, *social media* "are the various platforms, generally Internet based, that enable communication among users using a unique frame of reference" (Roland 2018, p. 149). After conducting the search under these keywords, we obtained 94 results. An additional 7 studies were added after picking them through reference lists, leaving a final sample of 101 papers to be analysed.

Study selection

As Fig. 1 shows, the first step was removing the duplicates (2), reducing to 99 the studies selected for the analysis. Then, these registers were individually examined (by reading the abstracts) to determine if they met the inclusion criteria defined for this study. In this second phase, 67 papers were excluded for various reasons (not related to the object of study, not related to chronic diseases, not related to social support, or not related to social media). After concluding this second step, 32 studies were selected for a full-text in-depth review. Again, in the third phase, 22 full-text articles were excluded for different causes (not related to the object of study, not related to chronic diseases, not related or focused on social media, or for being reviews).

Fig. 1

Flowchart of the different phases of the systematic review
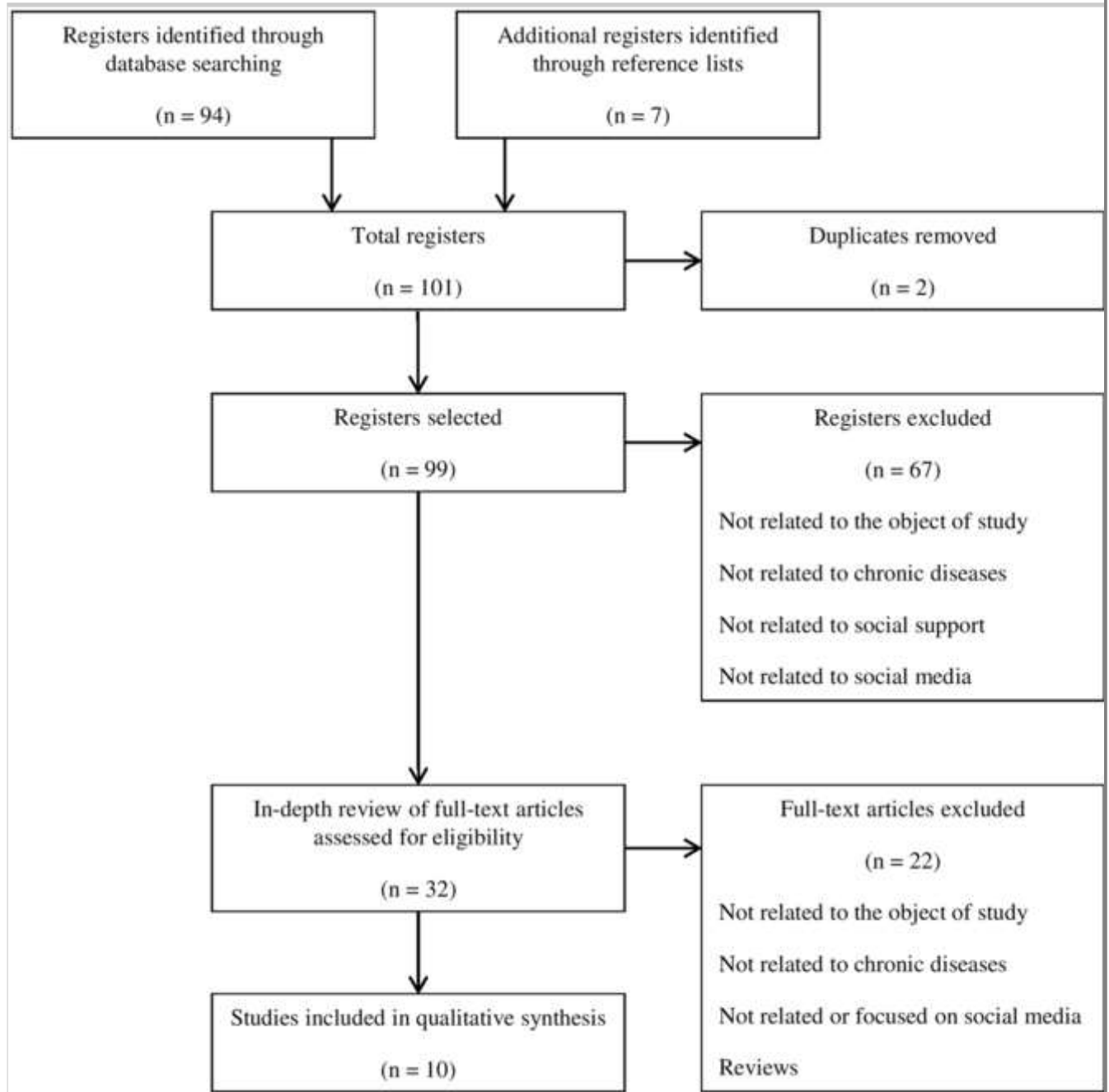
Once the analysis was completed, only 10 registers were included in the qualitative synthesis of the study (see Fig. 1).

Results

As suggested, it seems that there is a lack of initiatives that are applying the social support theory to social media use in the field of chronic diseases. Table 2 assembles the 10 papers collected in the qualitative synthesis, all of them related to social media in different ways. Later, in the discussion part, we are going to examine common topics between these studies and explore how healthcare can be improved considering the advances of social support theory and the use of social media platforms.

Table 2

Papers included in the qualitative synthesis of the study

Author/s, year	Social media used	Chronic disease or illness analysed in the study	Aim of the study	Patients/user reached
Becker (2013)[33]	Better Choices, Better Health (6-week online chronic pain management workshop)	Multiple (epilepsy, high blood pressure, osteoarthritis, depression, sleep apnea, hypertension, type 2 diabetes, MS, chronic back pain, chronic sinusitis, fibromyalgia, rheumatoid arthritis)	Examination of the discursive practices of chronic pain sufferers on online environments	18 participant 2 facilitators
Brosseau et al. (2015)[34]	Facebook (as a part of the PGrip-RA, an online program for patients with rheumatoid arthritis)	Rheumatoid arthritis (RA)	Examination of the effects of the implementation of an online program for patients with RA, with help from healthcare professionals and electronic brochures	396 people with RA across Australia and Canada (prediction)
Fatima et al. (2015)[35]	Twitter (as a part of a monitoring that also includes data from trajectories and email analysis to develop a Social Media and Interaction Engine (SMIE))	Chronic diseases in general	Using the data from different patient's social interactions to improve healthcare support system through a Smart Clinical Decision Support System (Smart CDSS)	6000 patients tweets
Grosberg et al. (2016)[36]	Camoni	Multiple (diabetes mellitus, pain, depression, hypertension)	Measure the level of patient activation (PA) of individuals who participate in a health-based social media	277 participants
Lavorgna et al. (2017)[37]	SMsocial network.com	Multiple sclerosis (MS)	Determine the impact of using the SMsocialnetwork.com on MS coping and social interaction between people with this disease	130 users

Author/s, year	Social media used	Chronic disease or illness analysed in the study	Aim of the study	Patients/user reached
Magnezi et al. (2014)[38]	Camoni	Multiple (diabetes, heart disease, spinal injury, kidney disease, depression/anxiety)	Examination of the effects and benefits of the participation in a health-based social media	296 participants
Merolli et al. (2015)[39]	Facebook, YouTube and chronic pain blogs	Multiple (fibromyalgia, osteoarthritis, posttraumatic stress, temporomandibular joint syndrome, sciatica, low back pain)	Determine which research design aspects are fundamental to achieve the success of implementing a larger-scale study of social media in chronic pain management	17 patients
Milani and Lavie (2015)[40]	Web 2.0 tools	Chronic diseases in general	Conceptualizing the development of a new model where web 2.0 technologies are the core of the change of the healthcare delivery system	–
Nordfelt et al. (2010)[41]	Diabit	Type 1 diabetes	Examination of patients' and parents' attitude to a diabetes-based social media created specifically to support the management of the disease	24 participant
Rus and Cameron (2016)[42]	Facebook	Diabetes	Determine which are the type of messages that increase user engagement of organizations that provide diabetes information and support through Facebook	500 posts of 10 diabetes-related pages

Firstly, out of the 10 papers included in the qualitative synthesis, we can see a variety of countries where these studies were conducted: 3 in the USA, 2 in Israel, 1 in Canada, 1 in Australia, 1 in Sweden, 1 in Italy, and 1 in South Korea.

This fact also leads to a diversity of languages of the initiatives developed in the studies: most of the interventions were implemented in English ($n = 6$); but also in Hebrew ($n = 2$), Italian ($n = 1$) and Swedish ($n = 1$).

Concerning the social media platform used, the results were the following: 4 of the 10 studies are using existing platforms (like Facebook or Twitter) for their analysis ($n = 4$); another 4 have created their specific social media platform according to the chronic disease they are studying ($n = 4$); 1 paper explores the implementation of a chronic pain management workshop; and, finally, the remaining study discusses web 2.0 tools more generally. Moreover, most of the initiatives were focused on the treatment of chronic diseases in general ($n = 6$); except for 2 studies dedicated specifically to diabetes ($n = 2$), 1 to rheumatoid arthritis ($n = 1$), and 1 to multiple sclerosis ($n = 1$).

The studies also present various methodological approaches: of the 10 papers included in the qualitative synthesis, 4 opt for quantitative methods ($n = 4$), 3 for qualitative techniques ($n = 3$), 2 for mixed-methods procedures ($n = 2$), and the last study opts for a theoretical approach ($n = 1$). At the same time, most of the studies had participants (chronic disease patients) who were directly affected by the illnesses analysed in the studies ($n = 7$); apart from 2 papers that only analysed social media data ($n = 2$), and the theoretical study—that didn't have participants ($n = 1$).

Finally, according to the results, we can classify the studies into 3 groups: most of the papers discuss (a) the implications of using social media platforms in healthcare delivery or treatment (Becker 2013; Brosseau et al. 2015; Fatima et al. 2015; Grosberg et al. 2016; Lavorgna et al. 2017; Magnezi et al. 2014; Nordfelt et al. 2010; Rus and Cameron 2016); (b) but there is also a study based on design improvement of large-scale studies (Merolli et al. 2015); (c) and another paper that discusses healthcare delivery models (Milani and Lavie 2015).

Discussion

As mentioned earlier, there are indeed few studies analysing the application of social support theory to social media use in the field of chronic diseases. As Roland (2018, p. 14) points out, "the specific role of social media in health policy has been relatively poorly explored". Nevertheless, even with this lack of literature, the studies included in the qualitative synthesis present some interesting results that can be used to improve the communication between patients and physicians. In the end, within health-related organizations "there is

a need for clear guidelines on how healthcare professionals make use of social media to support their patients" (McKenna 2017, p. 470).

At the same time, of the different types of social support described by Heaney and Israel, we need to bear in mind that instrumental support can't take place in social media since it "involves the provision of tangible aid and services that directly assist a person in need" (Heaney and Israel 2002, p. 186). Since these platforms function exclusively online—and the process of communication takes place without the need of physical presence, instrumental support cannot be applied to these technologies. Therefore, we can only consider informational, emotional and appraisal support in our analysis. As Table 3 shows, the papers included in the analysis suggest that social media technologies involved in the studies are valid platforms to promote these three types of social support (see Table 3).

Table 3

Types of social support implemented in the studies

Author/s	Social support implemented
Becker (2013)[33]	Emotional and informational support
Brosseau et al. (2015)[34]	Emotional, informational and appraisal support
Fatima et al. (2015)[35]	Informational and appraisal support
Grosberg et al. (2016)[36]	eEmotional, informational and appraisal support
Lavorgna et al. (2017)[37]	Emotional, informational and appraisal support
Magnezi et al. (2014)[38]	Emotional, informational and appraisal support
Merolli et al. (2015)[39]	Informational support
Milani and Lavie (2015)[40]	Emotional, informational and appraisal support
Nordfelt et al. (2010)[41]	Emotional and informational support
Rus and Cameron (2016)[42]	Informational support

First, Heaney and Israel (2002, p. 186) define informational support as the "provision of advice, suggestions, and information that a person can use to address problems". In the case of the studies analysed, whether they are interventions that are using different social media platforms where patients can find information about their chronic disease (Brosseau et al. 2015; Grosberg et al. 2016; Lavorgna et al. 2017; Magnezi et al. 2014; Merolli et al. 2015; Nordfelt et al. 2010; Rus and Cameron 2016), or initiatives that are analysing social media data to improve health services provided through an app (Fatima et al.

2015), the presence of this type of support is always there. As social media are applications that "are designed to enable users to create, interact, collaborate and share in the process of creating as well as consuming content" (Obar and Wildman 2015, p. 746), providing content is within the nature of these technologies. Moreover, this co-creation of content in these platforms allows to "generate more available health information" online (Moorhead et al. 2013, p. e85).

This is important since "those who access health information over the Internet are more likely to have higher PAM [Patient Activation Measure]" (Grosberg et al. 2016, p. 212), especially in chronic disease patients. On the one hand, sites like Camoni offer "medical advice, including blogs, forums, support groups, internal mail, chats, and an opportunity to consult with experts" (Magnezi et al. 2014, p. e12; Grosberg et al. 2016). Other portals, like Diabit (Nordfelt et al. 2010), have different types of content (like text pages or videos) created by health professionals for the patients to access to it. To find these kinds of sources on the portals generates security to users, as they can find "correct, reliable information provided by local practitioners" all in one place (Nordfelt et al. 2010, p. e17). But, as Fatima et al. (2015) argue, informational support also can be improved by analysing social media data generated by patients to provide better and more specific information to them.

Secondly, the social media tools present in the papers analysed are also providing emotional support (Becker 2013; Brosseau et al. 2015; Grosberg et al. 2016; Lavorgna et al. 2017; Magnezi et al. 2014; Nordfelt et al. 2010). This kind of support "involves the provision of empathy, love, trust, and caring" (Heaney and Israel 2002, p. 186). In the studies reviewed, emotional support is manifested in two ways. By one side, health professionals take part in the online community (Brosseau et al. 2015; Grosberg et al. 2016; Lavorgna et al. 2017; Magnezi et al. 2014). Their role is based on answering the doubts of these chronic patients in real-time, like in the case of the SMsocialnetwork.com: on this platform, there is a "constant online presence of neurologists and psychologists from the medical team to oversee and participate on the public wall" (Lavorgna et al. 2017, p. e10). But emotional support also occurs among the patients themselves, when sharing their stories in these communities and feeling identified with other peers with exactly the same problems (Becker 2013; Nordfelt et al. 2010). It's what Becker (2013) calls *cyberhug*. This duality responds to the necessity of finding professional help, but at the same time shows distrust to recommendations that come from people who do not suffer from chronic diseases. For these patients, advice from peers seems to be more authentic (Becker 2013). According to the logic of the Strength of Weak Ties Theory (Wright et al. 2010; Wright 2016a), this authenticity can take place also

in social media even if the connections between the network are not that close. On these platforms, natural helpers—either formal or informal—are seen as reliable sources because they "are able to offer specialized information about a problem" (Wright 2016a, p. 75).

To a lesser extent, appraisal support is also provided through these technologies (Brosseau et al. 2015; Fatima et al. 2015; Grosberg et al. 2016; Lavorgna et al. 2017; Magnezi et al. 2014). As defined by Heaney and Israel (2002, p. 186), this type of support "involves the provision of information that is useful for self-evaluation purposes". In portals like SMsocialnetwork.com, users receive "innovative, effective, and practical solutions regarding MS-related issues and management" (Lavorgna et al. 2017, p. e10). Certainly, in sites like Camoni where each community is run by a health professional, users have at their disposal "practical advice on how to maintain one's health and cope with the disease" (Magnezi et al. 2014, p. e12).

The provision of appraisal support through social media is crucial, since chronic diseases involve continuous problems—like in the case of pain (Kleinman 1988), disabilities, reduced mobilities… among others. Having online platforms where professionals can offer patients self-management solutions right away increases automatically the efficacy of the healthcare system: on the one hand, professionals gain time for other matters (like taking care of more appointments); and, on the other hand, organizations can reduce costs (because the user can receive reliable recommendations from health personnel without leaving their homes). As Milani and Lavie (2015, p. 341) discuss in their study about care models, it is time now for healthcare to "reengineer its care delivery model to manage the chief medical crisis of the 21st century, chronic disease".

The review of the papers also hints at some common patterns between the initiatives analysed. Firstly, the studies suggest that social media can provide social support regularly, making patients more motivated and engaged (Grosberg et al. 2016; Magnezi et al. 2014; Merolli et al. 2015). By engaging more health professionals into the use of these technologies (Milani and Lavie 2015), organisations have the opportunity to address the Internet problem of misinformation (Ahmad et al. 2006). Likewise, they need to create platforms that acknowledge "patient preferences for resources that adequately address disease-specific needs" (Merolli et al. 2015, p. e101), like the Diabit portal (Nordfelt et al. 2010). If health-related organizations only use these tools to provide informational support without taking part in the conversations with their users (Sendra and Farré 2017), the communicative gap between these two stakeholders will get bigger, and sufferers will have even more options for an extremely independent self-management of care without the necessity of involving health

professionals. As Coulson and Shaw (2013, p. 1699) argue, receiving support through online communities could lead patients to an "unwillingness to engage with traditional forms of healthcare".

Secondly, the provision of social support seems to work better when offered from specific social media or portals addressed to specific groups—like in the cases of Camoni, Diabit and SMsocialnetwork.com (Grosberg et al. 2016; Lavorgna et al. 2017; Magnezi et al. 2014; Nordfelt et al. 2010), rather than using existing platforms and integrating them as a part of an intervention program (Brosseau et al. 2015; Merolli et al. 2015; Rus and Cameron 2016). By using a unique platform, all the services organizations can provide are centralized in one place. Likewise, these online spaces act as a safe place for patients (Becker 2013; Nordfelt et al. 2010). Furthermore, most of the studies in our qualitative synthesis came to the conclusion that, in social media, patients look for information and groups that are specifically addressed to their illness (Becker 2013; Grosberg et al. 2016; Magnezi et al. 2014; Nordfelt et al. 2010). In the end, "each patient has individualized needs" (Merolli et al. 2015, p. e101). In the case of the SMsocialnetwork.com, the researchers came to the conclusion that using specific social media "may allow MS [multiple sclerosis] experts to reach a deeper comprehension of the needs of people with MS" (Lavorgna et al. 2017, p. e10). Whether the support is provided through specific health-related social media or through traditional platforms, organisations need to "careful design […] social media-delivered health communication using specific features to promote specific types of engagement" (Rus and Cameron 2016, p. 688).

Thirdly, health professionals develop a key role on the social media initiatives discussed in the studies. Whether they act as moderators, or are actively participating in the conversations taking place on these platforms (Becker 2013; Brosseau et al. 2015; Grosberg et al. 2016; Lavorgna et al. 2017; Magnezi et al. 2014; Milani and Lavie 2015; Nordfelt et al. 2010), they are the ones who should provide the social support their patients need to engage them in a better self-management of their health. Social support theory describes this figure as the natural helper (Heaney and Israel 2002; Israel 1985). According to these authors, "natural helpers are members of social networks to whom other network members naturally turn for advice, support, and other types of aid" (Israel, cited in Heaney and Israel 2002, p. 198) who "are usually respected and trusted network members who are responsive to the needs of others" (Heaney and Israel 2002, p. 198).

In the studies included in the qualitative synthesis, this role is developed with more or less intensity depending on the case. On the one hand, portals like SMsocialnetwork.com have a constant presence of health professionals on the

platform to "oversee the public activities of the users, post relevant information about MS [multiple sclerosis], protect users from false rumors and fake news, [or] answer questions via private or public message" (Lavorgna et al. 2017, p. e10), among other functions. By contrast, with initiatives like the People Getting a Grip on Arthritis, these specialists are in the Facebook page only a few hours a week (Brosseau et al. 2015). Nevertheless, this natural helper role is not exclusively reserved to health professionals. Expert patients (that is to say, those who have been in social media for years) also can act as this figure (Becker 2013; Nordfelt et al. 2010). Their roles, however, do not have to be excluding. As Heaney and Israel (2002, p. 195) argue, "a combination of formal and informal helpers may be most effective in situations in which both informational and emotional support are needed". One example of this is Patient Power (2005), a webpage addressed to cancer patients with multiple options according to the specific types of cancer. Involving health professionals by taking part in social media sites as natural helpers can also help in reducing the communicative gap between patients and physicians.

Lastly, another common point between the studies in our qualitative synthesis is the restricted access to these initiatives (Becker 2013; Brosseau et al. 2015; Grosberg et al. 2016; Magnezi et al. 2015; Merolli et al. 2015; Nordfelt et al. 2010). In portals like Camoni, Diabit or SMsocialnetwork.com, participants require a register with user and password (Grosberg et al. 2016; Lavorgna et al. 2017; Magnezi et al. 2014; Nordfelt et al. 2010). In other studies, participants were recruited via inclusion criteria (Brosseau et al. 2015; Merolli et al. 2015), which restricted opportunities for other patients to take part in the initiatives. For some patients, the result is looking for other resources that fulfil their expectations (Nordfelt et al. 2010). However, these kinds of barriers can help in addressing the problems of privacy and potential reputational harms (Roland 2018). At a time where patients are "used to immediate results (instant messaging, instant meals, instant gratification, etc.) and […] prefer to obtain heath information online rather than wait for a physician consultation" (Magnezi et al. 2014, p. e12), organizations need to develop platforms that are accessible to all kinds of patients without forgetting to address these ethical concerns (like privacy or data storage). In the end, "understanding the consequences of using online resources is vital for keeping stride with evolving healthcare" (Rus and Cameron 2016, p. 678).

Conclusions

As this review has shown, the application of social support theory to social media use in the field of chronic diseases still needs to come a long way. As we posited in our first objective, there is a paucity of studies working from this

perspective. This review only found 10 of them (Becker 2013; Brosseau et al. 2015; Fatima et al. 2015; Grosberg et al. 2016; Lavorgna et al. 2017; Magnezi et al. 2014; Merolli et al. 2015; Milani and Lavie 2015; Nordfelt et al. 2010; Rus and Cameron 2016). How can we explain this paucity? On the one hand, patients have been using social media in their own way without physicians taking part in their conversations; sometimes because they are not speaking the same language (Alhaboby et al. 2017; McKenna 2017), at times because they do not have all the requirements to participate in these types of platforms (Lupton and Maslen 2017). On the other hand, maybe because medical codes (starting with the Hippocratic Oath) still do not contemplate the use of social media and health 2.0 technologies for treatment and management of patients' health. However, this review suggests a solution to reduce the communicative gap between these two stakeholders. Before the creation of social media, Owen et al. (2002, p. 510) started to hint at the possibility of using theories of social support in online support groups of "people with diseases viewed as stigmatizing". Now, with all the technological advancements that we have at our disposal, health-related institutions can create specific communities where patients and physicians could take part in the conversation simultaneously.

Nevertheless, the introduction of these tools for the management of health must come necessarily with a revision of physicians' work routines (Lupton 2018b). Both "practitioners and patients are faced with finding new ways […] to interact with technologies" (Lupton and Maslen 2017, p. 1566), since some digital health resources transform the body in an element where the senses (like the touch) are absent (Lupton 2012; Lupton and Maslen 2017). Besides, "health care professionals are still learning to understand their patients' interactions with the Internet" (Newhouse et al. 2018). In this regard, practitioners face two major challenges with the expansion of these innovations, because they need to learn how to diagnose a patient relying only on data (in the case of using a m-health app) and to deal with online information during consultations with these individuals (in the case of face-to-face interactions). Consequently, if we want to use these practices to improve the delivery of health care, "a more coordinated approach is needed […] to make better use of people's reports on their experiences" (Coulter et al. I added the page of the direct quote because it was missing. 2014), p. g2225). As Tjora and Scambler (2009) point out, most of the studies that discuss how to incorporate digital health into day-to-day habits of hospitals only put the focus on the micro level interactions.

Apart from dealing with the inherent problems of the Internet (Roland 2018), organizations have the opportunity of reshaping the healthcare delivery model by providing support to patients through these technologies; and, at the same time, creating a more economic and efficient health system (Milani and Lavie 2015)

where users can feel engaged again. Over the last years, patients (especially those with chronic diseases) have felt ejected from the health system for various reasons: lack of time in the appointments with their doctors to explain their problems more calmly, eternal waiting lists (for surgeries or visits to specialists), overmedication, etc. By not meeting their needs in the environment to which they habitually went, users started to look for other spaces or resources to feel heard and understood again (Newhouse et al. 2018). Now, health-related institutions have the opportunity to win back lost ground if they benefit from these tools to reconnect with their patients. In social media, organizations cannot act only as providers of information (Lupton 2012; Sendra and Farré 2017). According to our second objective, from the results of this review we can extract a list of recommendations on how health institutions can address this communicative gap. In order to improve patient-physician communication, organizations should (1) use social media technologies to provide social support regularly; (2) create specific portals addressed to specific diseases; (3) include health professionals in the management of these sites as natural helpers; and (4) offer secure environments where patients can manage their health, and taking as few risks as possible.

Certainly, if chronic disease is the crisis of this century (Milani and Lavie 2015), chronic pain is one of their major challenges. Only in Europe, 20 per cent of the population has chronic pain (150 million), and a 2 per cent of this group (15 million) has a pain that is difficult to live with (Eccleston et al. 2018). Moreover, pain is a growing health problem, because now populations live more and longer —and, in turn, they have more health problems (Milani and Lavie, 2015). Patients who suffer from this condition are one of the most active groups on social media (Gonzalez-Polledo 2016), since their condition is often linked with isolation, distress and stigma (Newton et al. cited in Johnson and Hudson 2016). In these spaces, they have found their community and space to share experiences with peers (Hess 2016; Ressler et al. 2012). On the one hand, pain organizations do not engage with their communities online (Sendra and Farré 2017). On the other hand, pain patients are in social media expressing their own narratives, and dealing with their identity and self-expression problems (Gonzalez-Polledo 2016; Gonzalez-Polledo and Tarr 2016). Particularly in this field, the gap between physicians and patients is quite large due to the aforementioned reasons. In the case of pain, the application of the principles of the social support theory (especially the introduction of natural helpers) could be one of the possible solutions according to the findings of this review.

However, digital health does not automatically lead to more efficient systems. As Tjora and Scambler (2009, p. 523) argue, hospitals are "negotiated orders" that function because of complex decision-making processes. If technological

innovations are introduced without considering these particularities, the most probable thing is that they end up failing (Tjora and Scambler 2009). In a similar vein, Lupton (2013, p. 260) also points out that most of the studies in the field of digital health assume "that more information will lead to better healthcare and economic efficiencies" without analysing the issue in depth. Against this background, the development and implementation of these platforms requires to be supervised by the different actors who take part of the healthcare system; and it also needs "to be explored at meso- and/or macro-levels, factoring in professional awareness" (Tjora and Scambler 2009, p. 523). In other words, digital health solutions will only be successfully implemented if organisations consider these processes of negotiation. In this vein, the results of this review are strengthened with the findings of Tjora and Scambler's study.

In the same vein, this research and the possible application of social support theory presents its limitations. For now, researchers have only looked at the possible advantages of using social media for healthcare. One of them is that patients always benefit from taking part and participating on these platforms. On the one hand, there is the threats to privacy (Lupton 2012, 2013, 2018b). ~~From~~ In May 2018 Change made in this sentence because of verb tense consistency. , the EU General Data Protection Regulation (GDPR) ca~~o~~mes~~s~~ into force (EU General Data Protection Regulation Portal n.d.). This will oblige organizations to have much stricter conditions for handling patient data. On the other hand, more studies are needed to analyse whether these online connections are really beneficial or not for patients. As Berkman et al. (2000, p. 848) argue in their study about social networks, "not all ties are supportive and that there is variation in the type, frequency, intensity, and extent of support". In a similar way, Milani and Lavie (2015, p. 340) assert that "the fact that patients are embedded within social networks suggests that both good and bad behaviors could spread over a range of social ties". This is important since platforms like Facebook permits people "to reach out to others and mobilize support with relatively less effort, particularly in times of need" (Kim 2014, p. 2213). Some studies have documented the positive impact of social media for pain patients (Merolli et al. 2013b), but what happens when the participation can lead to potential harm? Are these practices between patients offering real solutions, or they are reinforcing the consequences of having an illness?

Moreover, it has to be taken into account that not everyone is in social media. As Merolli et al. (2015, p. e101) claim, "until social media interventions can better address the needs of chronic pain patients who suffer from a lack of Internet access, poor literacy skills, poor Internet literacy, and language barriers, they will always be biased". At the same time, "one of the most challenging tasks of mobile social media providers and health policy makers is to encourage

consumers to participate in self-health management" (Deng and Liu 2017, p. 104). Without leaving aside these technological innovations, health-related organizations need to find a balance between online and offline management options. However, it is necessary to take into account the audiences (that is, patients) to change the system. In social media environments, these audiences—especially patients with chronic illnesses (Isika et al. 2015)—have gone on their own because institutions did not listen to them. According to Isika et al. (2015), patients have appropriated these technologies for sharing knowledge. As "science is facing new challenges with the reality of social media's role in the spreading of knowledge based on personal anecdotes and fostering deceitful health messages" (Jervelund I added the page of the direct quote because it was missing.   2018) , p. 168), health-related organizations need to work closely with their audiences if they want to address the existing communicative gap between patients and physicians.

In conclusion, since the irruption of 2.0 technologies, patients have always Change made in this sentence because of verb tense consistency.   lookeding for a change in the way their health management is delivered. Although institutions are still in the early stages of reshaping the healthcare model, the results of this review suggest that the path for change is beginning to materialize. This study has shown that the implications of applying social support theory to social media use in the field of chronic diseases could be beneficial for improving patient-physician communication. Consequently, further research is needed to analyse the consequences of the application of social support theory to social media use in the long-run. In short, before implementing digital solutions in health care, future studies need to consider the particularities and complexities of professional practices as well. With more or less intensity, patients and physicians are present on these online platforms. Now it is time for health organizations to use the advances in health communication theory to embrace the available technological revolution.

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References

Ahmad, F., et al. 2006. Are physicians ready for patients with internet-based health information? *Journal of Medical Internet Research* 8 (3): e22.

Alhaboby, Z.A., et al. 2017. Challenges facing online research: Experiences from research concerning cyber-victimisation of people with disabilities. *Cyberpsychology* 11 (1): 8.

Allen, C., et al. 2016. Long-term condition self-management support in online communities: A meta-synthesis of qualitative papers. *Journal of Medical Internet Research* 18 (3): e61.

Becker, K.L. 2013. Cyberhugs: Creating a voice for chronic pain sufferers through technology. *Cyberpsychology, Behavior, and Social Networking* 16 (2): 123–126.

Berkman, L.F., et al. 2000. From social integration to health: Durkheim in the new millennium. *Social Science and Medicine* 51 (6): 843–857.

Brosseau, L., et al. 2015. Internet-based implementation of non-pharmacological interventions of the "People getting a grip on arthritis" educational program: An international online knowledge translation randomized trial design protocol. *JMIR Research Protocols* 4 (1): e19.

Coulson, N.S., and R.L. Shaw. 2013. Nurturing health-related online support groups Exploring the experiences of patient moderators. *Computers in Human Behavior* 29 (4): 1695–1701.

Coulter, A., et al. 2014. Collecting data on patient experience is not enough: They must be used to improve care. *BMJ* 348: g2225.

Deloitte. 2019. 2019 Global health care outlook. Shaping the future, https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-lshc-hc-outlook-2019.pdf. Accessed 19 March 2019.

Deng, Z., and S. Liu. 2017. Understanding consumer health information-seeking behavior from the perspective of the risk perception attitude framework and social support in mobile social media websites. *International Journal of Medical Informatics* 105 (September): 98–109.

Eccleston, C., et al. 2018. Pain in Europe. In *European pain management*, ed. C. Eccleston, C. Wells, and B. Morlion, 3–7. Oxford: Oxford University Press.

EU General Data Protection Regulation Portal. n.d. GDPR Portal: Site Overview. Home Page of EU GDPR, https://www.eugdpr.org/eugdpr.org.html. Accessed 20 March 2018.

Fatima, L., et al. 2015. Smart CDSS: Integration of social media and interaction engine (SMIE) in healthcare for chronic disease patients. *Multimedia Tools and Applications* 74 (14): 5109–5129.

Frohlich, D.O. 2014. The social support model for people with chronic health conditions: A proposal for future research. *Social Theory & Health* 12 (2): 218–234.

Gonzalez-Polledo, E. 2016. Chronic media worlds: Social media and the problem of pain communication on Tumblr. Social Media + Society (January-March): 1–11.

Gonzalez-Polledo, E., and J. Tarr. 2016. The thing about pain: The remaking of illness narratives in chronic pain expressions on social media. *New Media & Society* 18 (8): 1455–1472.

Grosberg, D., et al. 2016. Frequent surfing on social health networks is associated with increased knowledge and patient health activation. *Journal of Medical Internet Research* 18 (8): e212.

Hamad, E.O., et al. 2016. Toward a mixed-methods research approach to content analysis in the digital age: The combined content-analysis model and

its applications to health care twitter feeds. *Journal of Medical Internet Research* 18 (3): e60.

Harris, J.K., et al. 2013. Social media adoption in local health departments nationwide. *American Journal of Public Health* 103 (9): 1700–1707.

Heaney, C.A., and B.A. Israel. 2002. Social networks and social support. In *Health behavior and health education. Theory, research and practice*, ed. K. Glanz, B.K. Rimer, and F.M. Lewis, 185–209. San Francisco: Wiley.

Hess, A. 2016. The Social Media Cure. Slate, 4 March, http://www.slate.com/articles/technology/users/2016/03/how_spoonies_people_wit Accessed 10 March 2018.

Hester, J.L. 2015. Living With Invisible Illness. The Atlantic, 17 July, https://www.theatlantic.com/health/archive/2015/07/invisible-illness-chronic-disease-fibromyalgia/398393/. Accessed 10 March 2018.

Isika, N.U. et al. 2015. Appropriation of social media by patients with chronic illness to share knowledge. Proceedings of the Australasian Conference on Information Systems, https://minerva-access.unimelb.edu.au/handle/11343/58177. Accessed 20 March 2018.

Israel, B.A. 1985. Social networks and social support: Implications for natural helper and community level interventions. *Health Education Quarterly* 12 (1): 65–80.

Jervelund, S.S. 2018. How social media is transforming the spreading of knowledge: Implications for our perceptions concerning vaccinations and migrant health. *Scandinavian Journal of Public Health* 46: 167–169.

Johnson, M.I., and M. Hudson. 2016. Generalizing, deleting and distorting information about the experience and communication of chronic pain. *Pain Management* 6 (5): 411–414.

Keim-Malpass, J., et al. 2016. 'It's back! my remission is over': Online communication of disease progression among adolescents with cancer. *Journal of Pediatric Oncology Nursing* 33 (3): 209–217.

Kim, H. 2014. Enacted social support on social media and subjective well-being. *International Journal of Communication* 8: 2201–2221.

Kleinman, A. 1988. *The illness narratives. Suffering, healing & the human condition*. New York: Basic Books.

Korenda, L. et al. 2016. Will patients and caregivers embrace technology-enabled health care?. Deloitte Insights, 30 August, https://www2.deloitte.com/insights/us/en/focus/internet-of-things/digitizedcare-use-of-technology-in-health-care.html. Accessed 10 March 2018.

Laestadius, L. 2017. Instagram. In *The sage handbook of social media research methods*, ed. L. Sloan and A. Quan-Haase, 573–592. London: Thousand Oaks.

Lavorgna, L., et al. 2017. Health-related coping and social interaction in people with multiple sclerosis supported by a social network: Pilot study with a new methodological approach. *Interactive Journal of Medical Research* 6 (2): e10.

Lupton, D. 2012. M-health and health promotion: The digital cyborg and surveillance society. *Social Theory & Health* 10 (3): 229–244.

Lupton, D. 2013. The digitally engaged patient: Self-monitoring and self-care in the digital health era. *Social Theory & Health* 11 (3): 256–270.

Lupton, D. 2018a. How do data come to matter? Living and becoming with personal data. Big Data & Society (July–December): 1–11.

Lupton, D. 2018b. *Digital health. Critical and cross-disciplinary perspectives*. London: Routledge.

Lupton, D., and S. Maslen. 2017. Telemedicine and the senses: A review. *Sociology of Health & Illness* 39 (8): 1557–1571.

Magnezi, R., et al. 2014. Online activity and participation in treatment affects the perceived efficacy of social health networks among patients with chronic illness. *Journal of Medical Internet Research* 16 (1): e12.

McKenna, J. 2017. Social media: a powerful tool for physicians and patients. *European Heart Journal* 38 (7): 469–470.

Merolli, M., et al. 2013a. Health outcomes and related effects of using social media in chronic disease management: A literature review and analysis of

affordances. *Journal of Biomedical Informatics* 46 (6): 957–969.

Merolli, M., et al. 2013b. Developing a framework to generate evidence of health outcomes from social media use in chronic disease management. *Medicine* 2 (2): e3.

Merolli, M., et al. 2015. Using social media while waiting in pain: A clinical 12-week longitudinal pilot study. *JMIR Research Protocols* 4 (3): e101.

Metha, N., and A. Atreja. 2015. Online social support networks. *International Review of Psychiatry* 27 (2): 118–123.

Milani, R.V., and C.J. Lavie. 2015. Health care 2020: Reengineering health care delivery to combat chronic disease. *The American Journal of Medicine* 128: 337–343.

Moorhead, S.A., et al. 2013. A new dimension of health care: Systematic review of the uses, benefits, and limitations of social media for health communication. *Journal of Medical Internet Research* 15 (4): e85.

Newhouse, N., et al. 2018. Pain and the internet: Transforming the experience? In *Painscapes. Communicating pain*, ed. E.J. Gonzalez-Polledo and J. Tarr, 129–155. London: Palgrave Macmillan.

Nordfelt, S., et al. 2010. Patient and parent views on a Web 2.0 diabetes portal-the management tool, the generator, and the gatekeeper: Qualitative study. *Journal of Medical Internet Research* 12 (2): e17.

Obar, J.A., and S. Wildman. 2015. Social media definition and the governance challenge: An introduction to the special issue. *Telecommunications Policy* 39 (9): 745–750.

Owen, N., et al. 2002. Communication technology and health behaviour change. In *Health behavior and health education. Theory, research and practice*, ed. K. Glanz, B.K. Rimer, and F.M. Lewis, 510–529. San Francisco: Wiley.

Patel, R., et al. 2015. Social media use in chronic disease: A systematic review and novel taxonomy. *The American Journal of Medicine* 128 (12): 1335–1350.

PatientView. 2015. What do patients and carers need in health apps—but are not getting?. eHealthNews.eu, 26 June, http://www.ehealthnews.eu/images/stories/pdf/patientview_white_paper_2015.pdf. Accessed 10 March 2018.

Patient Power. 2005. Connect to the knowledge of a community of cancer experts. Home page of patient power. https://www.patientpower.info/. Accessed 10 March 2018.

Ressler, P.K., et al. 2012. Communicating the experience of chronic pain and illness through blogging. *Journal of Medical Internet Research* 14 (5): e143.

Roland, D. 2018. Social media, health policy, and knowledge translation. *Journal of the American College of Radiology* 15 (1): 149–152.

Rus, H.M., and L.D. Cameron. 2016. Health communication in social media: Message features predicting user engagement on diabetes-related facebook pages. *Annals of Behavioral Medicine* 50 (5): 678–689.

Sendra, A., and J. Farré. 2017. Institutional pain communication via Twitter by Spanish and US pain societies: Analysis of levels of use and engagement. *Catalan Journal of Communication and Cultural Studies* 9 (1): 3–23.

Tjora, A.H., and G. Scambler. 2009. Square pegs in round holes: Information systems, hospitals and the significance of contextual awareness. *Social Science and Medicine* 68: 519–525.

Urrútia, G., and X. Bonfill. 2010. PRISMA declaration: A proposal to improve the publication of systematic reviews and meta-analyses. *Medicina Clínica* 135 (11): 507–511.

Vianna, H.D., and J.L.V. Barbosa. 2017. In search of computer-aided social support in non-communicable diseases care. *Telematics and Informatics* 34 (8): 1419–1432.

Wright, K.B. 2016a. Communication in health-related online social support groups/communities: A review of research on predictors of participation, applications of social support theory, and health outcomes. *Review of Communication Research* 4: 65–87.

Wright, K.B. 2016b. Social networks, interpersonal social support, and health outcomes: A health communication perspective. *Frontiers in Communication*

1: 10.

Wright, K.B., et al. 2010. Weak-tie support network preference and perceived life stress among participants in health-related, computer-mediated support groups. *Journal of Computer-Mediated Communication* 15 (4): 606–624.