An empirical note on classification of patients on the basis of their beliefs related to branded pharmaceutical drugs Social media sites

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Abstract:

Patients are increasingly using social media to search for health information. Most of the studies have used the term "DTCA" or "Direct to consumer advertisement" as a general term for a variety of different types of digital channels. Therefore, the understanding of the use of certain social media is still a relatively unexplored topic. This is due to the fact that the role of social media in seeking health information has grown exponentially and patients are increasingly relying on social media to make choices. However, when it comes to understanding the exact reasons for using a particular drug or treatment, there is relatively little research undertaken so far. The purpose of this study is to determine if it is possible to classify patients' on the basis of beliefs related to branded pharmaceutical drugs social media sites. The study followed a quantitative approach. ~~The sample size is 1500 patients from Kolkata, India.~~ The results indicate that there is moderate possibility to predict tendency and trust is social media on the basis of attitude towards select positive and negative factors.

Keywords Social Media, health information, India, Discriminant analysis, Patient

1.   Introduction

Healthcare and agriculture are so fundamental to existence, they remain the two most important pillars of human society. Therefore, how social media promotion impacts health-care and attitude towards it is a crucial theme. As Gann (1986) points out, *further information is regarded as a crucial resource in improving one's health*. It is "*the initial step to any healthy choice*" (Rolinson, 1998).

The digital transformation we've witnessed over the past three decades has impacted healthcare. The only people who had access to health information prior to the advent of social media were health professionals, so this deprived patients and other health consumers (Giddens, 1991; Goldsmith, 2000; Hardey, 1999). Some researchers found that almost 60% of people are using social media to search for health information (Page, 2018). Social media has opened up gates of a flood of information for patients and the general public. Therefore, it is important to emphasize that healthcare consumers looking for

information online is not just changing the way they search for information or simply exploit a new opportunity, but are demonstrating a dynamic change in their self-determination about their health outcomes (Cotten , 2001; Diaz, 2001); When it comes to their health, it is easier for them to comprehend and influence their health. (D'Alessandro & Dosa, 2001), take more responsibility for their own well-being, and participate in health care decisions (Anderson et al., 2003). But despite some concerns (Flis Henwood, 2003), this ability is welcomed as a right to information, and clinicians are encouraged to treat patients as individuals rather than treatment options" (Gann and Needham, 1992). Even information experts, such as Calvano (1996), believe that individuals should be empowered by having access to health information. Kreps G. (2001) believes that health information plays a vital role in healthcare because it provides both direction and justification for strategic health behaviors, treatments, and decisions (Kreps GL.; 2001).

Health-related questions (disease status, symptoms, precautionary measures, and medication options) are increasingly being answered by patients on the Internet. They can also self-diagnose, research their illnesses, share their experiences with other patients and caregivers, and learn about treatment options. It is often viewed as a beneficial development despite conventional and current concerns. Therefore, understanding how the patient's behavior is getting affected by the health information on social media is crucial. Emotional support, marginalized group, medical adherence, self-medication, negative patient behavior, and patient-physician relationship have been identified by various scholars as the main reason that patient party seek health related information on social media (Cotten and Gupta ,2004 ; Kalichman et.al., 2002).

An important source of uninterrupted and instant information in India is social media (Cotten and Gupta, 2004). Many people use social media and look for health-related information that is available online because it is affordable and easily accessible (Corley et al., 2010; Signorini et. al, 2011). As in rich countries, people in developing countries turn to doctors for answers to their health questions. In recent years, health awareness has increased in India. Completely changed. An important source of uninterrupted and instant information in India is social media (Cotten and Gupta, 2004).

The use of social media to search health information has increased exceptionally during this pandemic and it was appreciated by every stakeholder ((Mukherjee et. al., 2021)TELE). Certainly, there are parts of digital media that have not been researched enough, which limits their effectiveness and usefulness. For example, it is difficult to distinguish between the reasons for using them. With this study, we hope to shed some light on this under-explored area of digital marketing communication.

BACKGROUND

Although the pharmaceutical companies are allowed direct marketing to consumers in the United States and New Zealand; there, too, protests against this policy can be heard loud and clear. All prescription drug promotion in India is prohibited by the Medicines and Magical Remedies (Objectionable Advertisements) Act of 1954.

Different studies have shown that patients do not always utilize social media as a method to avoid doctors, but rather as a substitute for doctors' therapy to satisfy those requirements that doctors cannot provide. To their disapproval, physicians are providing more practiced knowledge about the patient's situation and

making recommendations for appropriate therapy based on their medical expertise (Colineau & Paris, 2010).

Patients sometimes find it difficult to empathize with the doctors, so they tend to filter the facts for the patient. Therefore, he must be well informed about all the important facts. In addition, patients may feel that their doctors are unaware of the state of the art (Colineau and Paris, 2010). A patient's dissatisfaction with the inability of their doctor to meet their emotional and informational demands is another extremely important reason to seek information on social networks (Gu et al., 2011). The use of social networks as a tool for conventional health information was another reason for patients to do so (GómezZiga et al., 2012). It is a resource to improve the patient's overall health (Kofinas et al., 2014).

When it comes to a support network, "meet other patients who have been through" (Bers et al., 2010). Information and psychosocial support can be provided to patients via social media (Rupert et al., 2014; Ho et al., 2014). The use of social networks can help patients (Rupert et. al., 2014; Hawn, 2009). Specifically, different types of support emerged, such as "information support" when taking medication or contacting providers of mental illnesses, "appreciation support" including positive feedback for encouragement, "network support" for the exchange of similar experiences, and "emotional support" for understanding when expressing a partner's situation and offering hope or confidence (Chang 2009). According to Bauer et al. (2013), the primary motivation for patients with bipolar disorder to participate in online self-help forums was to share emotions with others, facilitate the exchange of information, and benefit from being part of an online social group. The use of social networks through Patients has the main benefit of minimizing the doctor-patient knowledge gap, in addition to providing a better understanding of the doctor during an exam (Lee and Wu, 2014). Social media enables patients to take control of their health by giving them the right information and the opportunity to participate, which increases their participation (Smailhodzic et al., 2016). Finally, patient empowerment improves the patient's ability to communicate with doctors (Van UdenKraan et al., 2008).

People who use social media are between 11 and 34 years old (Selkie et al., 2011 and Marcus et al., 2012). The digital divide in access to health information, on the other hand, has been highlighted in several previous studies with marginalized populations (Jha and Pandey, 2017). According to various studies, social networking sites have fewer male users than female users (Jha et al., 2018). According to some studies (Scanfeld et. al., 2010, Mukherjee et. al., 2021), social media users come disproportionately from low-income families, which suggests that patients (patient group) use social media regardless of their educational background. According to some researchers, more females are using social media to search for health information in urban areas (Mukherjee et. al., 2021). Especially during this pandemic geriatric patients and the ones suffering from the chronic disease had to use social media as a telehealth tool for consultation with their physician as they were unable to go and visit their physician due to fear of infection (Mukherjee et. al., 2021(TELE)). A wide range of intervention options for older people reflect the potential of social networks in clinical practice (Leist, 2013). In fact, these people have very few cases of depression and other cognitive disorders. Some report claims that older people who use social media have better control of their blood pressure and sugar levels than those who don't (Newportcare, 2021).

Patients' perception of the impact of the BPDSM on medical adherence is not well documented. Exactly how BPDSM positively affects medication adherence was identified by few researchers (Holmer, 1999; Bonaccorso, 2002; Murray, 2004; Morris, 2006 and Parker, 2003). This type of platform empower patients by helping them overcome the barriers of medication adherence, according to Kear (2015). It also helps patients who are suffering from chronic diseases like hypertension (Kear, 2015). Researchers also found that the patients who are suffering from tuberculosis are using less social network (Sabaté and Sabaté, 2003). Interventions based on Social media have been shown to increase patient engagement, self-efficacy, and adherence. Social media will have a significant impact on patient adherence as well (Sadun & Schanderg, 2018). They assist health care professionals in identifying the precise points in the patient's path where adherence ceases, identifying the causes of such discontinuities, and developing programs to address them with the tools and incentives required to improve adherence (Capgemini, 2011).

The quality (Adams, 2010) and unreliability of information on health and drug products are the main limitations of social networks (Adams, 2010; Tian, 2010; Kukreja et al., 2011); making it difficult for patients to determine whether or not they can find the information they find (Adams, 2010). Social media can be viewed as an important tool for deceiving the public (Housman, 2017).

A wealth of information about prescription drugs is available on social media platforms, and verifying its accuracy is a difficult task (Adams, 2010, Mukherjee et. al., 2019). Patient privacy is a primary concern for many critics, as well as potential issues that may arise. (Adams, 2010) Social media is a popular way for patients to gather info about medicine, but they are often unaware of the dangers of disclosing personal information online (Adams, 2010, Mukherjee et. al., 2021) and receiving harmful or inaccurate advice from social media conscious (Adams, 2010).

On social media, patients may not know which medicine is right for them and how to properly take it (Adams, 2010). Exposure to false information from social media, such as pictures of smokers, can have a negative impact. (Freeman and Chapman, 2007). Misinformation on Twitter suggested Nigerians were consuming more saltwater to treat the disease. Two people died from it and more than a dozen more (Carter, 2014). Negative risk behavior for health. , such as dangerous sexual activity, have been found in certain studies (Moreno et al., 2009). Promoting prescription drugs on social media also makes it possible for a patient to forego them (Kim, 2009). Despite the fact that patients and physicians work together to cure patients, their differing views on the pros and cons of SNP could cause problems in their association (Pandey et. al., 2015; Pandey et.al., 2019; Jha et al., 2018). Users frequently look for information about doctors before planning a visit, which can help the patient switch providers multiple times. Patients are now more aware of negative reactions shared by other users. They can also change doctors after engaging in an online discussion with another patient (Fobers, 2018).

Patients' subjective well-being has been shown to be affected by social media rather than being addictive, and they have become the target of advertisements and have lost their privacy. Altering the doctor-patient relationship that promotes more equitable contact between the two (Smailhodzic et.al, 2016). According to research (Volpp and Mohta, 2017), doctors' time expenditure is the biggest obstacle to medical care. According to Dali Dugan, CEO of HealthworxCBD "When patients bring social media content to consultation, along with their strong opinions on the matter, healthcare professionals are forced to

spend time on sorting and verifying that information. As a result, they feel that their expertise is being challenged and that can impact their behavior with the patient during the session. Negative reactions from the doctor can affect the patient's subjective wellbeing, making them feel disempowered." (Fobers, 2018).

The literature review throws the question if it is possible to classify patients and high moderate or low in their propensity to visit Branded Pharmaceutical Drugs Social Media (BPDSM) sites on the basis of their beliefs associated with it. Accordingly the objective of the study is to determine if it is possible to classify patients' on the basis of beliefs related to branded pharmaceutical drugs social media sites.

The relevant theory in this respect is Uses and Gratification theory (Severin and Tankard, 1997). The theory discards the belief that audience are merely passive consumers of media. Rather they actively seek to interpret and integrate media to fulfill their needs and desires. The more they find it useful the more will be there propensity to accept it (Katz et. al., 1973).

METHODOLOGY
These studies are exploratory and empirical in nature, with data derived from patients 'and family members' perceptions of the effects of social media promotion of prescription drugs and other health information. In an exploratory study, patients/relatives were asked about their propensity to search for health-related information on social networking pages. A total of 1500 people were interviewed; In the study, this sample was considered statistically significant, of which 92 did not respond; SPSS 25 was used for all analyzes, which, after checking the test data, followed a normal distribution. The 95 percent confidence level is used for hypothesis testing. The study is only applicable to the pharmaceutical sector and only applicable to patients in India.

Using discriminant analysis, one or more continuous or binary independent factors can be used to predict a categorical dependent variable.

The aim was to investigate the influence of social media health information on the health behavior of Indian patients.

Result and Discussion
Hence, it is important to determine if social media can be used to predict people's reaction to health information; by using discriminant, data analysis starts with the eigenvalue. In this case, the value is 0.457, which is on the low end. These values are often related to poor performance. Although discriminant analysis is a weak feature, it is useful to use.

Table 1: Eigenvalues					
Function	Eigenvalue	% of Variance	Wilk's Lambda	Chi-square	p-value
1	**0.457**	**98.2**	0.681	539	0

In the next phase, we calculate Wilk's lambda value. A value of 0.681 was discovered. It ranges from 0 to 1, with low values indicating a high degree of discrimination from the sum of squares within the group to the sum of squares (Wilk Lambda). They show an overall variation that cannot be explained by the difference between the groups. Although the lambda is small, it means that the difference is prominent. If all Wilk lambda values (Table 1) are high (above 0.5), this indicates that the group means are slightly different as a result. This number is significant with a 95 percent certainty because the associated p-value is close to zero. Wilk's Lambda statistic was determined to be significant. As a result, it was determined that the discriminant function adequately explained group membership.

Based on the discriminant function, the chi-square measures whether the two function levels differ significantly from one another. A high value (539 in this example) indicates that the function has a high degree of discrimination. There is a significance level attached to what he says. Since the significance value is 0 in our situation, we can validate this.

Table: 2 Structure Matrix

	Function
	1
Negative behaviour	.782[*]
Unethical practice	.329[*]
Self-medication	.248[*]
Emotional support	.441
Patient physician	.436
Marginalized group	.385
Medication adherence	.134

To predict whether a person would follow health information on social media, we use the canonical discriminant function coefficients (Table 2) in the structure matrix. The tendency of negative beahviour is highest (0.782), followed by medication adherence (0.134). The structure matrix (Table 2) provides us with function values of variables (Negative behavior, unethical practice, self-medication, emotional support, patient-physician relationship, marginalized group and medication adherence) that are being used to forecast whether or not a patient would search the social media for health information According to the table 2, the most distinguishing characteristic in health information searching behavior is Negative behavior (0.782) followed by Emotional support (0.441), patient-physician relationship (0.436), Marginalized group (0.385), Unethical practice (0.329), and Self-medication (0.248), and Medication adherence (0.134).

As a result, we can set up the discriminant equation,

Y = (0.782) (Negative patient behaviour) + (0.329) (Unethical practice) + 0.248 (Self-medication) + 0.441 (emotional support) + 0.436 (Patient-physician relationship) + 0.385 (marginalized group) + 0.134 (medication adherence)

TABLE 3: Classification Results

		Social media	Predicted Group Membership			Total
			1.00	2.00	3.00	
Original	Count	1.00	**101**	**34**	**14**	**149**
		2.00	**85**	**156**	**152**	**393**
		3.00	**73**	**227**	**566**	**866**
	%	1.00	**67.8**	**22.8**	**9.4**	**100.0**
		2.00	**21.6**	**39.7**	**38.7**	**100.0**
		3.00	**8.4**	**26.2**	**65.4**	**100.0**

58.5% of original grouped cases correctly classified.

The classification matrix in Table 3 was used to assess the accuracy of the categorization of the discriminant function. 58.5 percent of the respondents in the current study were classified exactly according to discriminant functions, as shown in Table 3. It can be seen that the result is divided into 3 categories low (1), medium (2), and high (3). In summary, the study found that when people seek health information, they used social media to communicate with each other because they found the social media pages are useful and easy to use. Due to the fact that most digital platforms and devices are compatible with websites, the study's results can be explained by the fact that people use social media quite extensively. Any classification on three categories up to 33.33% success is meaningless to draw any conclusion. Statistically speaking minimum 50% success rate is essential to proclaim any meaningful attainment in classification. 58,5% in this case, therefore at best may be called a low to moderate success. Is the theoretical construct not substantial? Perhaps so and possibly some important variable such as mood or mental state may play an important role.

From the study we find that beliefs related to healthcare SM sites can help in prediction the extent and trust to which an individual has over such sites and tendency to visit such sites. This is an important input for the regulators, sponsors of such websites, physicians and patients. Regulators are responsible to ensure that the positive aspects of emerging social media branded drugs sites are encouraged whereas the negative ones discouraged. The more vulnerable in this respect will be the ones who trusts such sites much more and explore these more frequently. By identifying such individuals regulators efforts can be directed specifically towards them, thereby enhancing the efficacy of their endeavors. The sponsors of social media brand healthcare sites (and which often are pharmaceutical companies) have the responsibility to safeguard the interest of more vulnerable in this respect and therefore due caution and

precautions must be a part of the information these share. The young and the elderly (Seo et al 2021) may be more vulnerable. The former because of immaturity and the later because of their lack of option. Many adolescents and young adults are exposed in front of these information available in social media who have no idea how to check the reliability of these information and follow them which can be very harmful for them (American College of Obstetricians and Gynecologists, 2016) . Physicians need to identify patients more prone to visit such sites and thus are more vulnerable and keep on advising them accordingly. Patients must learn to acknowledge their vulnerability and take due precautions to diminish the same.

In a study (Sillence et al, 2013) it is suggested that low trust could be because such sites are mostly driven by pharmaceutical companies themselves. Another study (Pandey et al 2019), reports that physicians in particular believe that healthcare information sites are manipulative in nature. Such conclusions confirm that trust is linked to "willingness to be vulnerable". What makes some sites more trustable? Quality appears to be one of them (Boon-itt, 2019).

Inconsistency and conflicting information have been identified as factors that degrade attentional mechanism in processing information promptly and accurately (Barnwell et al, 2021). Neira and Barber (2014) also concluded that self-concept and self-esteem too are important for prediction.

Should greater involvement of patients need to be seen with concern? Neira and Barber (2014) report that while greater association in social media (e.g. active social media use) is related to adolescents' depressive symptoms, no relationship was found between the frequency of social media use and depressed mood. Thus, perhaps this possibility in case of at least mature patients may be discarded. Perhaps healthcare visits to social media have no link to the reported depression and teenagers' depression is linked to their involvement in social media, games, texts, mobile phones, etc. Certain studies dwell upon use of social media and resulting sleep disorders and anxiety. Perhaps even healthcare social media sites need to be explored in this respect as health information and anxiety are not entirely unrelated.

Conclusion

The study confirms that seeking health information is no longer a one-way communication and shows that patients today use social media for different reasons when searching for health information. Noteworthy results of the discriminant analysis are, which show that certain deference characteristics of a patient who uses social media to obtain medical information. Because of this, our study may uncover important factors in people's propensity to search for health information online in the Indian environment, for governments with a duty to ensure that health information reaches those who have been excluded from the Indian realm, that information can be useful. In order to improve the general health of their patients, it can be beneficial for pharmaceutical companies to adapt their information needs.

The implications of this study are that it will help the regulatory authorities to find mechanisms to reduce the negative fall outs of issues arising from BPDSM and safeguard and consolidate positive aspects of

BPDSM. Government may provide training for to the physicians and patients, so they can learn to avoid these negative aspects of BPDSM and get the crème of the BPDSM. This study also helps physicians to understand that there is no point by having strong negative perception about BPDSM. The world is changing and there are some benefits of it; physicians have to guide their patients properly to identify credible BPDSM sites and which are helpful for the patients. The patients also can benefit from this study and be more careful while visiting these sites. Academic implications of this study is that it reaffirms the uses and gratification theory. The higher the usefulness of BPDSM sites and corresponding capacity to fulfill needs a patient feels, the greater will be propensity to support such sites.

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