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Vulnerabilities to misinformation in online pharmaceutical marketing

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Summary

Given the large percentage of Internet users who search for health information online, pharmaceutical companies have invested significantly in online marketing of their products. Although online pharmaceutical marketing can potentially benefit both physicians and patients, it can also harm these groups by misleading them. Indeed, some pharmaceutical companies have been guilty of undue influence, which has threatened public health and trust. We conducted a review of the available literature on online pharmaceutical marketing, undue influence and the psychology of decision-making, in order to identify factors that contribute to Internet users' vulnerability to online pharmaceutical misinformation. We find five converging factors: Internet dependence, excessive trust in the veracity of online information, unawareness of pharmaceutical company influence, social isolation and detail fixation. As the Internet continues to change, it is important that regulators keep in mind not only misinformation that surrounds new web technologies and their contents, but also the factors that make Internet users vulnerable to misinformation in the first place. Psychological components are a critical, although often neglected, risk factor for Internet users becoming misinformed upon exposure to online pharmaceutical marketing. Awareness of these psychological factors may help Internet users attentively and safely navigate an evolving web terrain.

Introduction

An estimated 2.4 billion people, or approximately 34% of the global population, have Internet access.¹ Internet usage is particularly widespread in industrialized regions. Europe, for example, boasts approximately 518 million Internet users.¹ With growing Internet use, the volume of online health information available – as well as such

information sought – has increased. From 2005 to 2007, Europe experienced a 10% rise in health-related searches.² As the Internet has grown, pharmaceutical companies have increasingly used it to influence patients to request – and physicians to prescribe – medical drugs.

Although the Internet is a particularly powerful medium to inform and market, it can also be used to misinform and mismarket. Whenever

pharmaceutical companies mislead users or withhold from them relevant safety or efficacy information, this influence may be counted as 'misinformation'. Inaccuracies, imbalances, failures to meet accepted scientific standards and other misleading presentations may all result in poor patient outcomes, including increased healthcare costs (when patients are persuaded to buy new drugs over cheaper alternatives, including non-pharmaceutical treatments) and injury or death (when patients are persuaded to buy drugs for which there exist safer alternatives, or for which marketed drugs are not fully approved).³

Pharmaceutical company misinformation occurs not only because of the supply of misleading information strategies by companies, but also because of the psychological vulnerabilities of people who rely on this information. Vulnerable Internet users – whether patients in need, or clinicians strapped for time – are more likely to be misled. There is need, therefore, for a more nuanced understanding of the interaction between Internet-enabled misinformation and human vulnerabilities to this misinformation. Despite extensive evidence of pharmaceutical company misinformation strategies (e.g. Refs. 4 and 5), almost no previous work to our knowledge has identified what major factors make Internet users vulnerable to such misinformation in the first place. Here, we employ a systematic review to address this question. We identified five major, closely-related factors that contribute to Internet users' vulnerability to misinformation from pharmaceutical company marketing. An awareness of these vulnerabilities can inform public and professional education designed to promote wiser use of the Internet as a health information resource.

Methods

We searched MEDLINE, PsycINFO, Google Scholar and Google, using the Boolean operator 'AND' to combine 'online' or 'Internet' with the following terms: 'drug advertising', 'pharmaceutical advertising', 'drug company misinformation', 'pharmaceutical industry misinformation', 'misleading drug marketing', 'misleading pharmaceutical marketing', 'misleading drug information' and 'misleading pharmaceutical

information'. We later combined the terms 'vulnerability' or 'vulnerabilities' with each of the above searches. Given the dearth of literature on vulnerabilities to pharmaceutical misinformation, we imposed no language or date restrictions (although we excluded older articles whenever their content overlapped significantly with that of more recent articles), and we included a broad range of articles. From peer-reviewed publications we selected both original and review articles, and from non-peer-reviewed publications we selected only those articles from sources generally considered reputable (e.g. Pew Internet, the US Food and Drug Administration and EMC Corporation). All selected articles were subjected to a more refined quality appraisal, and sorted into different groups based on the particular factors of vulnerability they highlighted. Any content overlap between articles in different groups was resolved by re-grouping overlapping articles into more suitable groups, or, in a few cases, by re-defining groups. Finally, we selected only the most representative and high-quality articles from each group, working to remove any redundancy between articles.

Factors of vulnerability

The literature coalesced around five major factors of vulnerability to online pharmaceutical misinformation.

Internet dependence

Both the medical community and the public depend heavily on the Internet for health information. According to a 2010 survey of over 12,000 people in the UK and 11 other developed nations, at least three in five of those with Internet access seek health information online.⁶ A 2005 survey found that about half of participating patients reported turning to the Internet first for health information, while only about 11% initially spoke with a physician.⁷

Physician dependence on the Internet appears to be even greater than that of patients. In the US, the proportion of physicians who sought medical information online increased from 72% in 2004 to 86% in 2009;^{8,9} global data on physician Internet usage are more scarce. While it is possible that many physicians turn to peer-reviewed journals and online reference resources (e.g. UpToDate

and Harrison's Online), nearly three-quarters of physicians also use Google to search for clinical information, and only 13% of those who do so use Google Scholar (the domain of Google devoted to searching scholarly, academic and research-based journal and book publications).⁹

Internet dependence goes beyond sheer usage for information gathering, to how people process information. Computers have become such an integral component of the human social and psychological experience that online activities are often construed as real social interactions.¹⁰ Psychological research suggests that people use the Internet as a form of external memory for all this information, a type of cognitive prosthesis.¹¹ Doing so has become something of a modern necessity, given that the amount of global data is growing at an overwhelming rate, more than doubling every two years.¹² This modified information processing may increase confidence in the online information obtained,¹³ even as it requires greater information selectivity on the part of the user – the more information available, the more necessary it becomes to disregard inaccuracies. Yet all too often – especially for an overloaded, concerned clinician or an exhausted patient – first impressions can endure indefinitely, and the first hyperlink clicked may be the last.¹⁴

Excessive trust in the veracity of online information

Underlying this dependence on the Internet is the fact that a majority of both physicians and patients overestimate the trustworthiness of online information. Trust-building factors and processes are 'widely deployed' on health-related websites, a number of which hold pharmaceutical ties.¹⁵ Perhaps partly as a result of these trust-building efforts, 69% of e-patients (persons seeking health information online) in a 2002 study said they had never encountered false or misleading information online.¹⁶ Studies in 2010 and 2011 reveal, respectively, that 85% of e-patients think online health information is reliable¹⁷ and that 79% of e-patients in France, the UK and the US believe they 'critically assess online content.'¹⁸ Fewer than one out of five e-patients in 2002 considered third-party seals of approval 'very important' when searching for medical information online.¹⁹ Furthermore, observational studies have repeatedly found that e-patients seldom

consider source credibility when searching for health information online (e.g. Ref. 20, in Australia). Even among physicians, 69% have been found to trust online clinical information.⁹

Notably, this perceived credibility is often the basis for medical decision-making. Three out of five e-patients in a 2006 survey said that health information online affects their medical decisions.²¹ Most important, online information can directly influence which drugs patients request from physicians.²² Nearly one-third of physicians surveyed in 2009 'always' or 'often' initiated treatment or changed medications based on information found online.⁹

Unawareness of pharmaceutical company influence

Beyond overestimating source credibility, users are vulnerable to online pharmaceutical misinformation when they are unaware of whether the source of health information is a drug company or a more neutral party (e.g. a health information website). Given the Internet's speed and ease of use, web users are also often unaware of drug misinformation because they seldom take time to verify the reliability of the sources they access.²³ A 2002 observational study in Germany found that e-patients generally do not read disclaimers, disclosures or 'about us' sections on health sites.²³ The few who are determined to read these sections may sometimes encounter a string of distracting hyperlinks, which they may tangentially follow without noticing that they have deviated from the initial informational objective.¹⁴

More than three-quarters of physicians believe that the Internet has made clinical practice 'easier', according to a 2009 survey.⁹ With increasing technological means for gathering diagnostic information and treatment options, more choices must be considered. This can leave less time for clinical decisions, which often need to be made within a matter of minutes. The authors of one UK study note that 'healthcare professionals are increasingly finding that they have more information available than they can handle with confidence in their busy time schedules'.²⁴

About 70% of doctors searching the Internet in a 2009 study spent 3 minutes or less researching a patient scenario.⁹ Verifying the reliability of online information could take hours of searching, and might not yield any identifiable source.

With such limited time, checking the credibility of information is understandably not a top priority for most physicians. Indeed, website reliability is not even among the top five considerations for physicians when selecting a source from an online search result.⁹ Explicit concern regarding the credibility of search results is overshadowed by more salient factors, such as the rank order and the page number in which a result appears, the site's familiarity to the physician, its description on the search engine page, and its perceived clinical relevance.⁹

Social isolation

Social isolation can further increase Internet users' susceptibility to pharmaceutical misinformation online. Some patients feel isolated because they do not believe that their busy doctors have time to attend adequately to their medical problems. For these patients, the Internet can offer a limitless, ever-available information source. In addition, patients suffering from illness are already at a greater risk of feeling alone, alienated and afraid, especially when lacking significant social support. Although the Internet pseudo-community can be a source of consolation, it may keep ill patients from real-life social interactions,²⁵ creating a vicious cycle of loneliness and Internet dependency.²⁶ Further perpetuating this cycle is the fact that an individual may perceive her virtual, created persona – or 'second self'¹⁰ – as included in a group. When separated from the computer, however, the true self may feel lonelier than ever, since going offline severs connections to both the online community and the second self.

Online health misinformation may disproportionately impact isolated and underserved medical communities in which the ratio of physicians to patients is especially low, and physicians' time as well as access to health information is scant. For similar reasons, physicians practising far from general medical communities, with few opportunities for medical dialogue, are more likely to rely on Internet information for continual medical exchange and practice with problem-solving,²⁷ making them more vulnerable to misleading information.

Detail fixation

Worried and helpless individuals are more likely to selectively attend to details at the expense of the

'big picture' and to discount tried-and-true knowledge schemas.²⁸ These differences are also present when such persons process messages intended to persuade.²⁹ As suffering increases, problem-solving becomes more exclusively focused on present details and less based on pre-existing and global conceptual frameworks.³⁰ As the amount of health knowledge has grown, so too has the number of medical details on the Internet. Beyond the average user, detail-fixated patients may be distracted by these ever-accumulating minutia.³⁰

Certain populations are disproportionately susceptible to distraction by excessive information, which can be compounded by suggestion, misattribution and placebo or nocebo effects. These populations include children, the chronically ill, the mentally ill and the elderly. A sense of security and certainty in the face of helplessness and uncertainty is provided by easily available, invariably promising online misinformation.²⁷

Conclusion

The Internet is a complex medium, with dynamic and salient information constantly engaging the user's attention across multiple domains. Given the serious health and social trust implications of drug misinformation, Internet pharmaceutical marketing cannot be treated just like any other kind of Internet marketing. Although prescriptions for addressing drug misinformation have hitherto focused on the marketing strategies that pharmaceutical companies employ, the current review suggests that this conceptual framework for understanding pharmaceutical misinformation online should be broadened to include patient vulnerabilities to this information, in particular: (1) Internet dependence; (2) excessive trust in the veracity of online information; (3) unawareness of pharmaceutical company influence; (4) social isolation; and (5) detail fixation. This broadened approach can better guide both Internet use and regulation – regardless of specific web domains – since it is centred on the users who navigate this information, and not only on the sources of misinformation. Users' emotional and cognitive vulnerabilities, coupled with their partial or full unawareness of the pharmaceutical industry's online activities, allow them to be unduly influenced through misinformation.

Given our flexible search criteria, some of the sources included in the current review were not peer-reviewed, and so should be interpreted with caution. Nevertheless, our same flexible search criteria decreased the likelihood that relevant articles were overlooked. Furthermore, conclusions from non-peer-reviewed sources largely supported those presented in peer-reviewed sources. Given the available literature, therefore, the current results likely present as close to an accurate picture of the status quo as is currently possible.

The paucity of literature surrounding the aforementioned vulnerabilities suggests a need for future studies, especially primary research, to quantify the extent of these vulnerabilities, as well as how they interact with present sources of misinformation. Drug regulators such as the European Medicines Agency, the UK's Medicine and Healthcare Products Regulatory Agency and the US's Food and Drug Administration may do well to factor these vulnerabilities into their laws that aim to reduce misinformation. Pharmaceutical companies may currently be satisfying inadequate regulation laws while still employing presentational or informational techniques that exploit patient vulnerabilities, thereby misinforming patients nonetheless (e.g. by presenting accurate information, but in a manner that is hard to process for the most vulnerable patients). Similarly, the efficacy of requiring conflicts of interest disclosures should be carefully assessed for different online domains, since these requirements may sometimes be insufficient and in some cases even counterproductive insofar as they may promote a false sense of security in patients regarding the veracity of information.

It is important that users be made aware of these vulnerabilities. Drug regulators could ensure that commercial sites warn patients that ad content may influence them in subtle ways of which they may be unaware. Existing third-party 'seals of approval' provide a more objective signal to patients of site trustworthiness and patients could learn to expect them. However, resources for these kinds of quality checks (e.g. funding and staff) are often limited, and even after earning such seals of approval, sites may still alter their content again to make it misleading. It can sometimes take years before such altered content is discovered and reported to the organization that issues the approval seal. Furthermore, it is

impossible for users to report misleading information if they do not recognize it as such. To combat this, awareness could be increased through the use of notification systems for patients and continuing medical education events for physicians. The onus is also on health professionals and educators to inform both colleagues and patients and to direct them to reliable health resources.

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