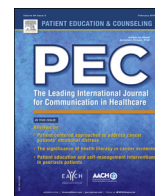




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Consumer confusion between prescription drug precautions and side effects

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ABSTRACT

Objective: Multiple studies have identified consumers' difficulty correctly interpreting risk information provided about prescription drugs, whether in printed format or online. This study's purpose was to explore whether consumers can distinguish between prescription drug precautions and side effects presented on brand-name drug websites.

Methods: Participants ($n = 873$) viewed fictitious drug websites that presented both precautions and side effects for one of four drugs, and they completed a survey assessing recall and comprehension. We coded open-ended recall data to identify whether drug precautions were mentioned and, if so, how they were interpreted.

Results: Approximately 15% of participants mentioned at least one drug precaution. The majority (59.7%) misinterpreted precautions as potential side effects. Participants who misinterpreted precautions rated the drugs as significantly more likely to cause side effects than participants who accurately interpreted the precautions. Age, education, literacy, and other factors did not appear to predict precaution interpretation.

Conclusion: At least some consumers are likely to interpret precautions on drug websites as potential side effects, which might affect consumer preferences, treatment decisions, and medication safety.

Practice implications: Healthcare providers should be aware of this potential confusion, assess patients' understanding of precautions and potential side effects, and address any misunderstandings.

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1. Introduction

Consumers in developed countries around the world increasingly seek health information online, with information about prescription drugs—including drug side effects—being one of the most commonly sought topics [1–7]. Although large government and commercial websites (e.g., NIH.gov, WebMD.com) are the most popular sources of online drug information [6], brand-name drug websites (i.e., DrugName.com) are also a leading and frequently visited source [5,6,8,9]. This is true even in countries that ban direct-to-consumer marketing of prescription drugs, because the Internet enables consumers in these countries to access brand-name drug websites [10]. More than two-thirds of search engine results for prescription drugs contain at least one link directing

individuals to brand-name drug websites regardless of geographic location [11].

Brand-name drug websites typically contain the same information provided in hard-copy package inserts, and they are designed both to educate consumers about the drug as well as promote it [12,13]. However, evaluation of brand-name drug websites suggests that many sites do not present information in a balanced manner, often presenting information about benefits higher on the site and in larger font and placing risk information in less conspicuous locations [14–17]. Beyond brand-name drug websites, online health information in general has many limitations: Information is typically written at a high reading level and consumers scan information rapidly, with the average website visit lasting less than one minute [18,19].

Although little research has been conducted on consumers' understanding of the information presented on brand-name drug websites, previous research suggests that most consumers have difficulty comprehending this same information when it is presented in package inserts. Specifically, consumers struggle to interpret multiple elements of package inserts, including dosage,

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indication, method of administration, instructions for use, and warnings and contraindications [20–22]. This is especially true when consumers are older, take multiple medications, have lower literacy skills, and have limited English proficiency and when labels include medical terminology, multistep instructions, and distracting content (e.g., unrelated visuals) [22–29].

More alarmingly, few consumers know the potential side effects and warnings of their current prescription drugs, especially consumers who are older, take multiple medications, and have lower health literacy [30–33]. Even when presented with educational materials, such as medication guides or brief summary pages—which are designed to improve knowledge of drug risks—consumers have difficulty recalling risk information [34–36].

Given consumers' difficulty understanding and recalling risk information, one important area of concern is their potential confusion between drug precautions and drug side effects [37]. Precautions and side effects are often presented together in a drug's detailed risk information, yet they contain very different messages. Precautions are a type of drug warning that directs consumers to tell their healthcare provider if they have a certain pre-existing health condition so that the dosage can be adjusted or contraindications can be avoided (e.g., tell your doctor if you have hypertension as your dosage may need to be adjusted). Conversely, side effects alert consumers to potential adverse events that might result from taking a medication (e.g., the drug may cause hypertension). Consumers who misinterpret precautions as side effects may be at greater risk for serious adverse reactions, incorrect dosing, and insufficient monitoring. Consumers who misinterpret side effects as precautions may unnecessarily avoid a medication, leading to poor illness management or less effective treatment. Despite these implications, no research has examined how likely consumers are to confuse these two types of risk information or how such confusion might affect consumer risk perceptions and behavior.

The purpose of this exploratory study was to examine whether consumers can distinguish between drug precautions and drug side effects presented on brand-name drug websites. We presented consumers with one of four brand-name drug websites for fictitious prescription drugs, which contained information on both drug side effects and drug precautions. We then assessed consumer recall and interpretation of drug risk information. The ability of consumers to distinguish between drug precautions and drug side effects has important implications for treatment decision-making and patient safety. Specifically, we examined three research questions:

- (1) How likely are consumers to confuse drug precautions and drug side effects?
- (2) What types of individuals are most likely to confuse these concepts?
- (3) Does confusion between precautions and side effects influence drug risk perceptions?

2. Methods

2.1. Study design

This study was nested within a set of larger experimental studies that examined how exposure to brand-name drug websites influences consumer knowledge as well as perceptions and behaviors related to prescription drugs. For the larger studies, we created websites for five fictitious prescription drugs indicated to treat seasonal allergies, high cholesterol, high blood pressure, acid reflux, and depression; and we tailored those websites for various experimental conditions that manipulated the location and

format of risk information, the presence of patient testimonials, or the presence of animated videos. We randomly assigned study participants with the target illnesses to view these brand-name drug websites and then administered a brief online questionnaire assessing participant risk/benefit recall, risk/benefit perceptions, and other constructs related to the advertised drug.

For the study described in this paper, we examined only the control conditions (i.e., brand-name drug websites that mirrored industry practice) and did not include the experimental manipulations, because we wanted to assess consumer recall and perceptions from typical drug websites and did not want the experimental manipulations to confound the results. We also excluded the depression population from this study because the depression website contained an extremely large volume of risk information, which made it very difficult to compare the depression website content against the stimuli for other illness populations.

2.2. Eligibility, recruitment, and screening

We recruited participants from GfK Custom Research's nationally representative online consumer panel of U.S. adults (KnowledgePanel[®]), which randomly samples individuals from the U.S. adult population using a combination of random digit dialing and address-based sampling [38,39]. We identified panelists who previously reported having one of the target illnesses (seasonal allergies, high cholesterol, high blood pressure, and acid reflux) and invited them to participate in the study. To enroll in the study, panelists had to respond to the invitation, consent to participate, complete a screener to confirm their eligibility (i.e., medically diagnosed with target illness and either still had it or had taken medication for it in the past 12 months), be able to view the assigned website, and complete the questionnaire. This resulted in a total sample size of 873 completed participants ($n = 215$ seasonal allergies; $n = 217$ high cholesterol; $n = 232$ high blood pressure; $n = 209$ acid reflux) in the control conditions.

2.3. Stimuli and drug precautions

During the study, we instructed participants to view a brand-name drug website for a fictitious prescription drug indicated to treat their illness—seasonal allergies (*Glistell*), high cholesterol (*Pexacor*), high blood pressure (*Plistaz*), or acid reflux (*Fentiva*). Each website had three pages: a homepage (Fig. 1), a subpage on how the drug works (“About [DRUG X]”), and a subpage with tips for managing the illness (“Patients Taking [DRUG X]”). As with a real website, participants could navigate between the pages and were able to view the website for as long as desired; however, they could not return to the website once they moved to the questionnaire.

To mirror actual brand-name drug websites, the study websites contained information on both drug benefits and drug risks. Along with various side effects, the risk information on each website contained one to three drug precautions advising consumers to let their doctors know if they have certain pre-existing conditions (Table 1). We used the high cholesterol population as a validity check during analysis because the precaution (“Inform your doctor if you have any Asian heritage”) could not reasonably be interpreted as a drug side effect.

2.4. Data collection

We collected data during a 13-week period (January 24–April 25, 2013). As described earlier, we randomly assigned eligible participants to one of the experimental conditions, directed them to view a brand-name drug website for a fictitious prescription

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