Acquiring Health Information: Interpreting Terminology and Reported Search Sources

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Abstract

This study examines two main topics concerning the acquisition of health-related information. One was to explore how people interpret some relatively common terms used in the labeling of prescription and non-prescription drugs, specifically focusing on the terms "family history" and "MAOI." The second is to determine the sources people report they would use to gather health information, or specifically, where they would go to get health-related information associated with an iron supplement. The results show that "family history" evoked an interpretation of older more than the younger blood relatives. Few persons could report what monoamine oxidase inhibitor (MAOI) meant. People report being more likely to consult the Internet or a health professional than any of the other sources listed. Implications for better health-related information acquisition through better-designed warning systems are discussed.

INTRODUCTION

Getting useful information regarding consumer products is important for managing health and reducing personal injury. If the consumer does not understand the information on a label or cannot find the appropriate information when doing a search, then they may be exposing themselves and others to potential injury.

The present research examined two main aspects or issues regarding the acquisition of health-related information about products that could have positive or negative effects on people's health. The first aspect concerns people's interpretation of terms used on prescription and non-prescription drug labeling. The purpose of labeling is to give information on proper and improper use. Usually included in the labeling are warnings regarding inappropriate, potentially hazardous use (e.g., contraindications, side-effects). Proper label interpretation is vital to enabling people to use the product effectively and safely and to avoid harm.

The second aspect examined in this research was what kinds of sources people use to search for product-related information. Interest was focused on where people would go for information concerning a product that could have both positive and negative consequences for health. The following sections give additional rationale for these two main issues.

Terminology

Well designed labeling for consumed products like drugs, foods, and dietary supplements is important because some of their characteristics, both positive and negative, are not obvious. Labeling serves to convey and promote the proper use of the product and to warn about associated hazards. The terminology used to communicate to consumers needs to be understandable. People need to interpret it in a way so that inappropriate, injurious effects are avoided. Misinterpretations could cause harm without users realizing that they are taking a risk.

In the present research, two terms commonly found on the labeling of prescription and non-prescription drugs were examined with regard to their interpretation. They are "family history" and "monoamine oxidase inhibitor (MAOI)."

Analysis of "family history" has become increasingly important in predicting illness and health due to genetic makeup. Therefore, when deciding if a person should use a medication that has a label stating not to take the medication if the individual has a 'family history' of heart diseases or high blood pressure, it is important that the consumer understands what 'family history' is intended to mean. For example, some individuals may interpret it to mean only parents and grandparents and not consider other blood relatives who may have the relevant health conditions (e.g., heart disease) that should be considered in the use of the medication.

A study by the U.S. Centers for Disease Control and Prevention suggests that awareness of people's own family health history is not particularly high (CDC, 2004). Only 29.8% of the persons surveyed reported having actively collected information to develop a

family health history, of those who did, twice as many were females than males, and respondents were more likely to report the health status of maternal relatives than paternal relatives.

Another medical term that is common to prescription and non-prescription drug labels is "monoamine oxidase inhibitor" and its abbreviation "MAOI." For example, in recent years the packaging of some non-prescription (over-the-counter) medications stated the following:

"**Drug Interaction Precaution**. Do not use this product if you are taking a prescription drug containing a monoamine oxidase inhibitor (MAOI) without first consulting your doctor. If you are uncertain whether your prescription drug contains an MAOI, consult a health professional before giving this product (FDA, 1993)."

A more recent (2006) warning on an allergy and sinus relief medication is the following:

"Warnings
Do not use if you are now taking a prescription monoamine oxidase inhibitor (MAOI) (certain drugs for depression, psychiatric, or emotional conditions or Parkinson's disease) or for 2 weeks after stopping the MAOI drug. If you do not know if your prescription drug contains an MAOI, ask a doctor or pharmacist before taking this product."

The hazard identified here is a dangerous interaction between medications, where some knowledge about what a MAOI is may help to prevent inappropriate use of the labeled product.

Without any actual product labeling available to cue them, participants in the present research were asked how many people in the population would they expect to know what an MAOI is. Then they were then asked if they knew what it is, and if they indicated that they knew, they were asked to give its definition.

Information Sources

Health care systems are in transition. For example, patient examinations by physicians commonly last five minutes or less. Consequently, consumers are making more health-related choices without the direct consult of a physician. However, research examining where people get their health-related information has been rather sparse.

Knowledge about what people use and where people go to obtain health-related information could assist in the design of efficient communication systems that better inform people about potential benefits and risks. Several studies have examined the methods physicians use to gather information to answer patient's

specific questions (e.g., Covell, Gwen, Uman, Phil, & Manning, 1985; Dee & Blazek, 1993; Hastrup, Phillips, Vullo, Kang, & Slomka, 1992). These studies indicate that physicians are most likely to ask colleagues or examine print sources (e.g., journals and books), followed by medical meetings and libraries. Most of these information-source studies focus on physicians' search for information (and not consumers'). They were also conducted during an era when the Internet was not as prevalent as it is now. The sources that consumers are using today are probably different than they were a decade or so ago (Eysenbach, Powell, Kuss, & Sa, 2002). A recent study by Hicks, Viglante and Wogalter (2005) examined the sources that people report using in acquiring information on prescriptions drugs. Hicks et al. (2005) found that consumers rated health professionals as the most preferred source of prescription drug information, followed by family or friends, followed next by manufacturers' websites, which was higher than other sources (e.g., advertisements). Thus, there is an indication in the Hicks et al. (2005) study that the Internet is serving in a relatively large capacity as an information source.

In the present study, participants were asked where they would prefer to find health information about the side effects of dietary supplements. The iron supplement product was chosen because it has both positives (e.g., for women's health and anemia) and negatives (consumption by children) – some of which may not be known by consumers. Also, a search about its health effects could be directed to several potential sources. The list of sources used in this study were adapted from the sources used in Hicks et al.'s (2005) study on prescription drug information sources. Interest was focused on the sources of information people report using when they are doing a search for health information.

METHOD

Participants

A questionnaire was administered to a total of 235 participants, comprised of two groups. One group was college students (n = 132) with an average age of 20.2 years (SD = 3.0). The other group was non-students (n = 103) from Raleigh, North Carolina with an average age of 33.4 years (SD = 12.1). Across both groups, 45% were male and 55% were female, with an age range from 18 to 79 years (M = 26.0, SD = 10.1). Also, there were 74.4% Caucasians, 6.8% Hispanics, 2% Asians, 2.1% African Americans, and 14.7% were other ethnicities. Forty-two participants (18%) indicated that English was not their native language.

Materials and Procedure

Each participant was given a multi-topic questionnaire that concerned various topics such as clothing choices, cell phone use, and warning wording. One section contained three questions, with subparts, concerning health-related terminology and information sources, and the responses to these questions are discussed in this article.

One question asked participants to look over a list of 22 family relationships, and mark with an 'x' any that they believed were relevant in 'family history' considerations involved in using the indicated medication. The specific item stated:

"Some medicine containers containing pills and liquid have a label stating: "Do not use it if you have a 'family history' of heart diseases or high blood pressure." Please look over the entire list and then put a check mark, or "x" by each of the family relationships listed that you think are relevant in "family history" considerations."

Table 1 contains the list of family relatives that were evaluated by participants. List order was randomized, and approximately half of the participants received the reverse order of what the other participants received.

The question regarding MAOIs had three sub-parts. First, participants were asked to estimate the number of U.S. adults out of 100 who they believed would knew what an monoamine oxidase inhibitor (MAOI) was. Then they were asked whether they knew the definition of a MAOI, for which they could give either a 'yes' or 'no' response. Finally, if they responded that they knew the definition of a MAOI, they were asked to define the term in their own words or write "don't know" if they did not know the definition. Two judges scored the definitions with an inter-rater reliability of 90%. A response was considered correct if they contained terms such as "treats depression" or "anti-depression," which is found in many definitions for MAOIs (e.g., FDA, 1993; MedlinePlus, 2004). All other answers were considered incorrect.

Lastly, participants rated how likely they were to use a set of information sources to find the health effects of using dietary supplements containing iron. The specific item stated:

"Suppose a close relative asked you to find out information on the health effects of dietary supplements that contain iron (e.g., as in vitamins). Please use the 0 to 8 point scale to indicate how likely would you use the information from each of the following sources?"

Eight information sources were provided: family or friend, product label, Internet, university library, public library, retail bookstore, physician or health profession, or a home reference book. A 9-point scale was provided having numerical and textual anchors labeled: (0) would not use at all, (2) might use some, (4) probably would use, (6) likely would use, and (8) definitely would use. There were two versions of this question where one had a randomized list of sources that was the reverse order of the other.

RESULTS

Analyzed in the following are data corresponding to the two main terminology issues (family history and MAOI) and the sources examined for information.

Terminology

Table 1 shows which family relationships people consider relevant to their "family history." Most frequently, participants consider their parents (92%), grandparents (91%) and siblings (76.5%) when considering their family history. Furthermore, most people indicated they would not consider a father-in-law (2%), step brother (2%), mother-in-law (1%), or step sister (1%).

Demographic differences were examined, of which only the significant ones are mentioned here ($p < .05$). Significantly more females ($M = .83$, $SD = .4$) than males ($M = .71$, $SD = .5$) reported considering a sister's medical history when taking medication, $t(215) = 2.04$, $p < .05$. Also, slightly (though significantly) more males ($M = .04$, $SD = .2$) than females ($M = 0$, $SD = .0$) would consider a step-brother's medical history when taking medication, $t(229) = 2.11$, $p < .05$, although clearly very few did. Significantly more students ($M = .73$, $SD = .5$) than non-students ($M = .60$, $SD = .5$) would consider an uncle's medical history, $t(206) = 2.09$, $p < .05$.

Table 1. *Percent of participants who indicated relatives would be part of their "family history" in a medication use scenario.*

Family Relation	%	Family Relation	%
Mother	92	Great aunt	33
Father	92	Daughter	29
Grandmother	91	Son	28
Grandfather	91	1st cousin	25
Brother	77	Grand daughter	17
Sister	76	Grand son	16
Uncle	66	2nd cousin	12
Aunt	64	Father in law	2
Great grandmother	56	Step brother	2
Great grandfather	55	Mother in law	1
Great uncle	33	Step sister	1

When asked what a monoamine oxidase inhibitor (MAOI) is, only 15% of the participants indicated "Yes," that they knew. Only 53% of those participants correctly defined the term as a medication used to treat depression. In addition, significantly more non-students ($M = .24$, $SD = .4$) than students ($M = .09$, $SD = .3$) indicated they knew what medical condition an MAOI is prescribed for, $t(230) = 3.36$, $p < .001$. No other comparisons involving the MAOI questions are were significant ($ps > .05$).

Information Sources

A 2 (Gender) x 8 (Information Source) mixed-model analysis of variance (ANOVA) showed no significant main effect of gender or interaction ($ps > .05$), but yielded a main effect of information sources, $F(7, 1631) = 80.35$, $MSe = 370.88$, $p < .0001$. Table 2 gives the mean ratings for participants' reported likelihood of consulting the set of information sources. Results of pairwise comparisons using Tukey's Honestly Significant Difference (HSD) test are shown with subscripts. The data shows that consumers were most likely to refer to a physician or health professional followed by the Internet. They were least likely (given the list of sources) to use to a retail bookstore for health information.

A 2 (Student vs. Non-student) x 8 (Information Source) mixed-model ANOVA indicated a significant main effect of information source, $F(7, 1631) = 80.19$, $MSe = 368.58$, $p < .0001$, yielding the same pattern of means shown in Table 2. Although there was no main effect of student status, this factor significantly interacted with information source, $F(7, 1631) = 2.18$, $MSe = 10.03$, $p = .03$. Simple effects analysis showed only one significant difference: students ($M = 3.78$, $SD = 2.71$) report that they are more likely to use a university library than non-students ($M = 2.85$, $SD = 2.85$), $F(1, 1433) = 8.55$, $p = .004$.

Table 2. *Mean reported likelihood of consulting an information source.*

Information Source	Mean	SD
Physician or health professional	6.36[A]	2.22
Internet	5.71[B]	2.04
Home reference books	4.52[C]	2.49
Store product label	4.32[CD]	2.31
Family or friend	3.86[DE]	2.25
University library	3.38[E]	2.80
Public library	3.29[E]	2.67
Retail bookstore	2.64[F]	2.42

Note. Means in the same column that do not share superscripts differ at $p < .05$.

DISCUSSION

This research examined two main issues associated with information acquisition for health-related products. One main issue concerned terminology in medication labeling that consumers may not understand as intended. Two examples of terminology were explored in the present research. Both concerned the interpretation of words commonly found on prescription and non-prescription medications: "family history" and "MAOI." The other main issue examined in this research concerned the sources of information that people report they would use in searching for information concerning a dietary supplement.

If people do not understand or misinterpret the wording on product labeling, unintended hazardous consequences could result. Consider the participants' choices for the "family history" question. The item asked participants to indicate the relatives that they would consider when evaluating whether to use a medication. The evaluations suggested that primary consideration would be given to immediate family or first-degree relatives, but there is a clear drop off with greater degrees of genetic separation. They also tended to consider older generation relatives more than younger generation relatives. In particular, participants were less likely to consider (genetically close) relatives of future generations such as a daughter, son, granddaughter, or grandson as part of their medical family history. This can be important as sometimes younger individuals show health problems before older individuals and because some genetic diseases skip generations or are sex-linked. The results also showed an indication of a difficulty considering an uncle or aunt as part of family history because some of these individuals might be related through marriage only. The pattern of results suggests that there are some embedded biases and inaccuracies in the interpretation of "family history" suggesting that the selections were not simply based on genetic similarity (Scheuner, Wang, Raffel, Larabell, & Rotter, 1997). The interpretations of "family history" suggest that labeling information might need some additional specificity or elaboration or perhaps different terminology substituted to better communicate the intended concept. Alternative terms could be evaluated in future work such as "close blood relative."

Few people reported knowing what a MAOI is. In the present research, there was no assessment, due to ethical considerations, of whether the participants were taking or ever took an MAOI medication. Relevance has been shown to affect whether a person will take notice of a warning (e.g., Wogalter, Racicot, Kalsher, & Simpson. 1994). In addition, previous encounters with product information can affect memory (Biehal & Chakravarti,

1983). In other words, someone who has already encountered the term 'MAOI' or been informed to attend to this term on consumer products may be more likely to notice this as a relevant term in making their personal determinations of 'health risk.' Nevertheless, very few people in the present study knew what a MAOI was, which suggests that medication labeling in previous years has not done well in warning users. Labels with MAOI warnings have improved in recent years, which might help user recognition and understanding. Future research may be able to show that people are better informed with the newer MAOI warnings. In addition, future research involving a sample of users of MAOI medications may give better insight as to whether the newer drug labels are informing relevant target audiences.

Both "family history" and MAOI results are examples of how important it is that the authors of medication labels consider people's interpretations of key terminology. The important point is that what people interpret may not be the intended meaning. Consumer testing is needed to determine the best terms to use.

The last section of this research asked where participants would likely look to find information on the health effects of dietary supplements containing iron. In general, people reported being more likely to consult a healthcare professional or the Internet, which is consistent with Hicks, Wogalter, and Vigilante's (2005) findings that people would consult with a healthcare professional. This reliance on the Internet is an important new and developing phenomenon that has gone from virtually zero use to the second most likely source ahead of family and friend, libraries, and reference books (Turow, Coluccio, Hersh, Humphreys, Jacobsohn, & Sawicki, 2003). It means that the Internet has become a major information source, and the relevant parties should be concerned that people are getting the information they need. However, there have been potential concerns associated with Internet such as that it can be incomplete, inaccurate, and difficult to use (Eysenbach, Powell, Kuss, & Sa, 2002; Turow et al., 2003; Vigilante & Wogalter, 2005).

This research explored two main concepts regarding the acquisition of health-related information. Further research on how people interpret the labels of products and gain information on health-related information is a useful area of research. Further, inroads toward improvement would involve the assessment of users to determine what they interpret and what they actually do.

REFERENCES

Biehal, G., & Chakravarti, D. (1983). Information accessibility as a moderator of consumer choice. *Journal of Consumer Research*, *10*, 1-14.

Centers for Disease Control and Prevention (2004). Awareness of family health history as a risk factor for disease: United States, 2004. *Morbidity and Mortality Weekly Report*, *53*, 1044-7.

Covell, D.G., Gwen, M.D., Uman, R.N., Phil, R., & Manning, M.D. (1985). Information needs in office practice: Are they being met? *Annals of Internal Medicine, 103(4),* 596-599.

Dee, C. & Blazek, R. (1993). Information needs of the rural physicians: a descriptive study. *Bulletin of Medical Library Association, 81,* 259-264.

Eysenbach, G., Powell, J., Kuss, O., & Sa, E.R. (2002). Empirical studies assessing the quality of health information for consumers on the World Wide Web: A systematic review. *Journal of the American Medical Association*, *324*, 2691-2700.

Food and Drug Administration (1993). Cold, cough, allergy, bronchodilator, and antiasthmatic drug products for over-the-counter human use: Amendment of final monograph for OTC antitussive drug products. *Federal Register*, 58(201), 54232-54236.

Hastrup, J. L., Phillips, S. M., Vullo, K., Kang, G., & Slomka, L. (1992). Adolescents' knowledge of medical terminology and family health history. *Health Psychology*, *11*, 41-47.

Hicks, K. E., Wogalter, M. S., & Vigilante, W. J. Jr. (2005). Placement of benefits and risks in prescription drug manufacturers' web sites and information source expectations. *Drug Information Journal, 39,* 267-278.

MedlinePlus (2004). Monoamine Oxidase Inhibitor. Bethesda (MD): National Library of Medicine (US). Retrieved June 2006 from: http://www.nlm.nih.gov/medlineplus/mplusdictionary.html.

Scheuner, M.T., Wang, S-J., Raffel, L.J., Larabell, S.K., & Rotter, J.I. (1997). Family History: A comprehensive genetic risk assessment method for the chronic conditions of adulthood. *American Journal of Medical Genetics*, *71*, 315-324.

Turow, J., Coluccio, K., Hersh, A., Humphreys, L., Jacobsohn, L., & Sawicki, N. (2003). Discussions of health web sites in medical and popular media. *Consumer WebWatch*. Retrieved September 28, 2005 from http://consumerwebwatch.org.

Vigilante, W. J., & Wogalter, M. S. (2005). Assessing risk and benefit communication in direct-to-consumer medication web site advertising. *Drug Information Journal*, *39*, 3-12.

Wogalter, M. S., Racicot, B. M., Kalsher, M. J., & Simpson, S. N. (1994). The role of perceived relevance in behavioral compliance in personalized warning signs. *International Journal of Industrial Ergonomics, 14*, 233-242.