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Dedication

Thank you, first and foremost, to my husband, Brian, who has supported me and stood by me throughout PA school. Thank you for your understanding, patience, and for making me smile on even the most difficult days. Special thanks, also, to my mother, who has always supported me, believed in me, and challenged me to be my best. Thank you for teaching me the importance of education and for inspiring me with your own example. I would not be who I am or where I am without you.

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Introduction

As Internet use across America and around the world has increased over the last decade, use of the Internet as a source of health information has also increased (Pew Internet & American Life Project [PIALP], 2008; Trotter & Morgan, 2008). Data from the Pew Internet & American Life survey conducted in December of 2007 indicated that 75% of surveyed American adults had used the Internet, and of Internet users, 75% had looked for health or medical information on the Internet (PIALP, 2008).

The Internet is both a vast and unregulated source of information. As the number of patients using the Internet for health information increased, concerns over patient use of such information arose. Patient motivations for using the Internet, their methods for evaluating Internet information, and their trust in physicians have been topics of research. Physician attitudes about Internet information and the patients who use it have also been examined in the scholarly literature. Finally, the effect of the Internet on the provider-patient relationship has been questioned.

While much research exists on patient and physician attitudes toward Internet information, very little research focuses on other healthcare providers who closely interact with patients. No formal study has examined physician assistant (PA) attitudes and practices regarding Internet health information. The present study seeks to describe PA attitudes and practices regarding patients' use of the Internet for health information.

Literature Review

Internet Usage

The Pew Internet & American Life Project has been collecting data on Americans' Internet usage since 2000. Data reveals clear trends of both increasing Internet use in general and increasing Internet use for health information. In 2000, 46% of respondents reported using the Internet, with 60% of Internet users reporting that they had used the Internet the day before being surveyed. In 2008, 73% reported using the Internet, with 70% of Internet users reporting they had done so the day prior to being surveyed (PIALP, 2008). Data from the Harris Poll indicates similar increases, with 9% of adults reporting Internet use in 1995, 30% in 1997, 63% in 2000, 73% in 2004, and 81% in 2008 (HarrisInteractive, 2008). The Harris Poll also shows that the amount of time Americans spend on the Internet is increasing from an average of 7 hours per week in 1999 to an average of 14 hours per week in 2008 (HarrisInteractive, 2008). Fifty-five percent of households now have a broadband connection to the Internet, increasing the frequency and depth of searches performed by these households (Fox, 2008). Both the Pew Internet Project and The Harris Poll found increasing numbers of Internet users who have searched for health information online, with findings of 75 to 80% and 81%, respectively (Fox; HarrisInteractive, 2007). A study conducted in the United Kingdom found similar increases in Internet use and its use for health information between 2000 and 2006 (Trotter & Morgan, 2008). The National Cancer Institute's Health Information National Trends Surveys (HINTS) from 2003 and 2005 also showed an increase in the number of people who use the Internet for health information (National Cancer Institute, 2005).

Andreassen et al. (2007) sought to find out if those who use the Internet for health information differ demographically from the general population. In their sample of 7903

Europeans, the researchers found that those who used the Internet for health information were more likely than the general population to be women, have a higher education, be of a younger age group, and work a white-collar job or have no job at all. They also found that participants who had chronic illnesses and who visited their general practitioner more often were more likely to seek information on the Internet (Andreassen, et al., 2007). A study conducted in the U.S. in 2003 showed similar results, reporting that use of the Internet for health information was more common among women, those younger than 65, and those with higher levels of education and income (Hesse, et al., 2005). The same study found that whites or those reporting “other” race (i.e. not white, black, or Hispanic) were more likely to search for health information on the Internet (Hesse, et al.). A Canadian survey of oncology patients also found that the majority of those who used the Internet to search for health information were female, white, and had a high school education or beyond, reinforcing the idea that these characteristics describe the majority of people who use the Internet for health information worldwide (Chen & Siu, 2001).

Salo et al. (2004) examined Internet usage among patients in an inner-city emergency department. They found that patients conducting health-related searches most often searched for disease information, followed by drug information, alternative treatments, surgery information, and other health information. Thirty-three percent had difficulty or could not find relevant information and 22% said that the information they found was not useful or only somewhat useful (Salo, et al.).

A study in Germany utilized a naturalistic observation method along with focus groups and in-depth interviews, to study consumer methods of searching for health information on the Internet (Eysenbach & Kohler, 2002). All participants began their search for answers to health questions at a search engine. Participants most often (65% of searches) used one search term

(rather than two or more) when searching. When choosing from search engine results, 97.2% of the sites patients chose to view were among the first 10 results and 71.3% of sites were among the first 5 results. Participants spent an average of 1 minute and 9 seconds on each website, and took an average of 5 minutes and 42 seconds to find an answer to each health question. While participants reported in interviews and focus groups that they chose sites from official authorities and considered the source of the information when assessing reliability, they were not observed actively searching for the source of the information (i.e., by clicking on an “About Us” link on the page) nor were they able to report their source for 79.1% of answers. Despite suboptimal searching practices and inability to report the source of information, researchers did not find any of the participants’ answers to be grossly inaccurate, but rather found that inaccurate answers were more commonly due to misinterpretation by participants (Eysenbach & Kohler).

The Patient Perspective

Several studies have examined patient motivations for using the Internet as a source of health information. Kivits (2006) found that the most common reasons patients turned to the Internet were: (1) to find answers that were not satisfactorily provided by their physician, and (2) to take an active role in their own health and wellness. The author observed that patients didn’t turn to the Internet because physicians were not providing a sufficient quantity of information, but rather, patients sought other information than that provided by the physician or sought to be more fully informed about their health issues (Kivits). Andreassen et al. (2007) found that the Internet was most commonly used to read about health or illness, decide whether to see a physician, to look up information after an appointment and/or to prepare for an appointment. In a focus-group study in the UK, Donnelly, Shaw, and van den Akker (2008) reported that patients use the Internet for health information to research possible diagnoses, to

ease their mind while waiting to see a physician, as well as for support relating to diagnoses. Participants also expressed that they use the Internet to supplement, but not replace, seeing a physician and that using the Internet made them feel empowered by the ability to find health information when a physician was not available (Donnelly, et al., 2008). Stevenson, Kerr, Murray, and Nazareth (2007) conducted 8 disease-specific focus groups to question patients about their views on the effect of Internet information on the physician-patient relationship. The authors found patients valued the Internet as an additional source of information that often made their interactions with health care providers easier and improved the patients' understanding of their medical conditions and medications without "bothering" the doctor. Patients in the study did not seek to change the balance of power within the physician-patient relationship, but wished to be better equipped to discuss their physician's recommendations (Stevenson, et al., 2007).

A number of studies have explored the construct of trust in the patient-Internet interaction. Some have examined how patients decide if an Internet source is trustworthy while others have explored the level of trust that patients invest in the Internet in comparison to their doctor and various media sources of health care information (Andreassen, et al., 2007; Dutta-Bergman, 2003; Hart, Henwood, & Wyatt, 2004; Hesse, et al., 2005; Kivits, 2006; Stevenson, et al., 2007). Participants in focus group-type studies acknowledged that while the Internet has a vast amount of information, it is an unmoderated medium and information obtained online cannot always be trusted (Kivits; Stevenson, et al.). Patients used several methods to determine the trustworthiness of information found on the Internet. Kivits found that patients used strategies including cross-referencing, and using science-based websites and websites of established organizations and universities when seeking health information. In one study, patients were asked to choose the three sources they trusted the most for health information on

the Internet (Dutta-Bergman). The most trusted sources of health information on the Internet were personal doctor, federal government, and medical universities (Dutta-Bergman). Patients also use common sense, instinct, and personal experience to identify trustworthy sources (Kivits). Participants in Kivits' study acknowledged that they consulted their physician if in doubt of information found on the Internet and that they considered their physician more trustworthy than the Internet. Several other studies have confirmed that patients continue to trust their physician more than any other source for health information (Andreassen, et al.; Hart, et al., 2004; Hesse, et al.). Among patients interviewed by Hart et al., the most trusted source of health/medical information was their family doctor, followed by family members, friends, pharmacists, and alternative practitioners. Media sources such as magazines, television, and the Internet ranked lower (Hart, et al.). Andreassen et al. found that patients valued face to face contact with a health professional as a better source of health information than the Internet and found that patients also upheld family and friends, books, pharmacies, newspapers/magazines, and courses and lectures as better sources of health information than the Internet. However, a study based on the Health Information National Trends Survey (HINTS) of 2003 found that patients preferred to go to the Internet rather than books, brochures, family/friends, magazines, or the library when seeking information about cancer (Hesse, et al.). A majority of respondents to the HINTS indicated that they would prefer to go to their health care provider before the Internet when seeking cancer information, but when actually searching for information, the majority turned to the Internet before their physician, likely reflecting the immediate availability of the Internet (Hesse, et al.).

Lee and Hornik (2009) investigated the relationship between patient trust in physicians, Internet use, and number of physician visits. They found that patients with low levels of trust in

physicians and high levels of Internet use for health information visited their physicians significantly more often than patients with low levels of trust and low levels of Internet use. They found no significant difference in physician visits among patients with high levels of trust in physicians, regardless of their Internet use. The authors postulated that this difference occurred because those who trust their health care providers are likely to schedule appointments if they have health concerns, while those with little trust are less likely to schedule appointments. The authors believe that use of the Internet among less trusting patients may raise concerns about the severity of their illness, driving them to the physician's office for diagnosis and treatment (Lee & Hornik).

Iverson, Howard, and Penney (2008) reported several effects of patients' using the Internet for health information. They found that 55% of study participants who used the Internet for health information changed the way they thought about their health as a result of the information, with 46% making health-related behavioral changes, and 54% making dietary changes. Those who used the Internet for health information also reported asking more questions during office visits (66%) and following their physician's advice more closely (54%) (Iverson, et al., 2008).

Multiple researchers have sought to gain a better understanding of how use of the Internet affects the physician-patient relationship. Murray, Lo, Pollack, Donelan, Catania, White, et al. (2003) surveyed 3209 Americans and found that an overwhelming majority of patients felt that searching for health information on the Internet gave patients confidence to talk to their physician about concerns, improved their understanding of medical conditions, and encouraged patients to follow physicians' advice. A large majority also felt that patients having access to health information challenged physicians to stay up-to-date on the latest developments in

medicine and medical treatment. Patients who were more confident in their ability to assess the reliability of health information found on the Internet, those in poorer health, and those with physicians who encouraged information seeking were more likely to discuss their Internet findings with their physician. Most participants who had discussed Internet information with their physician said that they did not do so to try to get the physician to do something specific, such as change a medication, but rather to get their physician's opinion about the information that they found. Most patients felt that their physician reacted positively or neutrally to Internet information and very few patients felt that their relationship with their physician was worsened as a result. Participants who felt their physician had poor communication skills, felt hurried by their physician, or observed that their physician seemed challenged by their discussing Internet information were more likely to say their relationship with their relationship with the physician was harmed (Murray, Lo, Pollack, Donelan, Catania, White, et al., 2003). Bylund et al. (2007) found that patients observed their physician to validate their information searching efforts when patients introduced the information in non-threatening ways. Imes, Bylund, Sabee, Routsong, and Sanford (2008) found that one non-threatening strategy patients use is to lie about the source of their information or not reveal to their physician their information source. Patients were more satisfied when the information they presented was taken seriously by their health care provider and least satisfied when providers both disagreed and did not validate their efforts (Bylund, et al.).

Diaz, Sciamanna, Evangelou, Stamp, and Ferguson (2005) surveyed internal medicine patients and found that only 28% of patients who used the Internet for health information told their doctor that they did so. Another group of researchers asked patients why they refrained from discussing Internet health information with their health care providers (Imes, et al., 2008).

The researchers read and coded respondents' answers to the open-ended survey questions and identified the top reasons that patients did not discuss their Internet research with their physician. The top reasons were that patients believed their health care provider was not open to discussing Internet information (14.4%), they did not want to invade their provider's "turf" of medical expertise (13%), and they did not trust the quality or source of their information (10.4%). Other common reasons included that the patient was just looking up the information for themselves, lack of time at appointments, the information was irrelevant, or that the information they found confirmed or re-iterated information that their health care provider had already given them (Imes, et al.).

Diaz et al. (2005) found that although just 3% of participants reported that their physician recommended using the Internet for health information, 62% felt that their physician should recommend websites for reliable health information (Diaz, et al.). Salo et al. (2004) also found that a majority (59%) of patients would be interested in being provided with quality medical websites by their physician.

The Physician Perspective

Experts from the field of sociology have theorized that the Internet is changing the physician-patient relationship and challenging the traditionally paternalistic role of the physician by making medical information that was previously available only to medical professionals accessible to the public (Broom, 2005). A number of studies have sought to discover how physicians feel about patients accessing health and medical information on the Internet and what changes they observe in their relationships with Internet-using patients (Ahmad, Hudak, Bercovitz, Hollenberg, & Levinson, 2006; Chen & Siu, 2001; Dilliway & Maudsley, 2008; Hart, et al., 2004; Helft, Hlubocky, & Daugherty, 2003; Malone, et al., 2004; Murray, Lo, Pollack,

Donelan, Catania, Lee, et al., 2003; Newnham, et al., 2005; Podichetty, Booher, Whitfield, & Biscup, 2006; Potts & Wyatt, 2002; Schwartz, et al., 2006; Usher, 2007; Wilson, 1999)

Various studies have reported that from 74-94% of physicians have encountered patients with information obtained from the Internet at least once in their clinical practice (Dilliway & Maudsley, 2008; Malone, et al., 2004; Murray, Lo, Pollack, Donelan, Catania, Lee, et al., 2003; Podichetty, et al., 2006). Further, a survey of Detroit-area physicians found that 13.6% of participating physicians discussed Internet obtained information with at least one patient per day and 36.4% estimated that they did so with at least one patient per week (Schwartz, et al., 2006). While these results indicate that the large majority of physicians have encounters with patients that have used the Internet for health information and over one-third have such encounters on a weekly basis, Schwartz et al. also found that physicians underestimated the number of their patients who had access to the Internet and the number of their patients who used the Internet for health information purposes.

Physician attitudes on the quality of health and medical information on the Internet have been addressed in many studies (Ahmad, et al., 2006; Malone, et al., 2004; Murray, Lo, Pollack, Donelan, Catania, Lee, et al., 2003; Potts & Wyatt, 2002). Potts and Wyatt found that over two thirds of UK physicians in their survey considered health information from the Internet to be usually or sometimes reliable. Murray, Lo, Pollack, Donelan, Catania, Lee, et al. surveyed 1050 American physicians, asking them to recall their last encounter with a patient who brought Internet information to a consultation. When asked about the accuracy of the information, 8% said it was very accurate, and 66% said it was somewhat accurate (Murray, Lo, Pollack, Donelan, Catania, Lee, et al.). Malone et al. found that physicians were concerned about the volume and variable quality of information on the Internet. Due to the varying quality and

accuracy of Internet information, some physicians in the focus group study by Ahmad et al. felt that Internet information adds the role of interpreter to their profession. While some physicians in the study felt that they were the best person to interpret Internet information due to their level of training and knowledge, the role of interpreter was often viewed as a burden and many were resistant to accept it (Ahmad, et al.). The new physician role of Internet interpreter was also mentioned in a 1999 study of Glasgow, UK physicians (Wilson, 1999).

Murray, Lo, Pollack, Donelan, Catania, Lee, et al. (2003) surveyed physicians regarding their opinion on why patients bring Internet-obtained information to consultations and how they respond to patients who confront them with health information from the Internet. Ninety percent of physicians surveyed perceived that patients brought Internet information for the physician's opinion. Other reasons that physicians thought patients brought the information included requesting a change in medications (31%), a test (26%), or a referral to a specialist (13%) (Murray, Lo, Pollack, Donelan, Catania, Lee, et al.).

Physicians use a variety of strategies to deal with patients who bring Internet information to appointments. Murray, Lo, Pollack, Donelan, Catania, Lee, et al. (2003) found that when presented with a patient request related to information found on the Internet, physicians usually did what the patient requested, either completely (23%) or partially (59%). Malone et al. (2004) found that when encountered with new information, one approach physicians used was to admit their ignorance and schedule a follow-up appointment to discuss the information after they had read about it themselves. A range of physician tactics were reported by Ahmad et al. (2006) including recommending reliable websites, asking for a follow-up visit, admitting to their limited knowledge on a topic, charging for extra time, referring to a specialist, and even "firing" a patient. Several of these strategies were identified as harming the physician-patient relationship.

The effect of Internet information on the physician-patient relationship has been another focus of research. Most physicians (92%) in a survey of 1050 U.S. physicians by Murray, Lo, Pollack, Donelan, Catania, Lee, et al. (2003) felt that discussing Internet information with their patients had a neutral or beneficial effect on the relationship. Worsening of the physician-patient relationship was associated with a perceived challenge to authority, belief that the request was inappropriate, perceiving the patient as not taking responsibility for their health, and the physician not complying with the patient's request (Murray, Lo, Pollack, Donelan, Catania, Lee, et al.). Helft et al. (2003) asked American oncologists to summarize the effect of Internet information on the physician-patient relationship. The authors found that the majority (54%) of physicians believed there was a negative effect on the relationship, citing inaccurate or inappropriate information, unrealistic hopes, needless patient anxiety, and patients questioning physician advice as the harming factors. Those who described a positive effect cited open discussions, patient sense of control, and increased patient understanding as positive factors (Helft, et al.).

A number of studies have investigated physicians' attitudes toward patients who use the Internet for health information. A survey of 181 general practitioners in the UK found that patients who used the Internet to self-diagnose were viewed poorly by the physician, but patients who used the Internet to learn more about an established diagnosis were viewed more favorably by their physician (Malone, et al., 2004). In a survey of 48 family physicians in Toronto, Ahmad et al. (2006) found similar results. Additionally, survey results revealed that self-diagnosing, self-treating patients were perceived as lacking trust in their provider, inciting feelings of defensiveness, anger, or frustration in physicians (Ahmad, et al.).

The professional self-esteem of physicians has also been studied in relation to Internet information. Malone et al. (2004) reported that some physicians in their study admitted to feeling “disempowered” and “professionally insecure” when encountered by patients armed with Internet information. However, Helft et al. (2003) found that the large majority of physicians (90%) rarely or never felt threatened by Internet-informed patients. Both Helft et al. and Ahmad et al. (2006) found that less computer-savvy physicians were more likely to feel uncomfortable or threatened when patients approached them with Internet information.

Another factor affecting physician attitudes toward patient Internet use may be time efficiency. Murray, Lo, Pollack, Donelan, Catania, Lee, et al. (2003) found that 38% of physicians felt that time efficiency was harmed when they discussed Internet information with patients and just 16% felt that time efficiency was improved. The largest percentage of respondents, however, felt that time efficiency was unaffected (Murray, Lo, Pollack, Donelan, Catania, Lee, et al.). Several other researchers have found that physicians feel time efficiency is harmed by patients wishing to discuss Internet information (Ahmad, et al., 2006; Dilliway & Maudsley, 2008; Helft, et al., 2003; Wilson, 1999).

Physicians have been asked in some surveys whether they refer or would consider referring patients to the Internet for health and medical information. In 1999, Wilson reported that 45% of surveyed physicians would consider referring a patient to the Internet. A 2006 survey of Australian physicians revealed that 59% recommend health websites to patients (Usher, 2007). Male physicians, younger physicians, and physicians with less than 10 years of experience were more likely to refer patients to the Internet. Of those who recommend websites, 53% recommended Internet sites to 1-20% of their patients, most often patients aged 26-45 (Usher). Reasons for recommending websites included: helping to educate the patient,

enhancing the doctor-patient relationship, the technology was age-appropriate, and the websites were treatment oriented (Usher).

Other Healthcare Perspectives

Few studies have examined the attitudes of healthcare professionals other than physicians. Four studies have included a variety of healthcare professionals including psychologists, geneticists, counselors, speech pathologists, physician assistants, physical therapists, nurses in both clinical practice and academics, and PhDs (Malone, et al., 2004; Newnham, et al., 2005; Podichetty, et al., 2006). Other studies have either included (Dilliway & Maudsley, 2008; Newnham, et al., 2005; Wilson, 1999) or exclusively surveyed (Barnoy, Volfin-Pruss, Ehrenfeld, & Kushnir, 2008; Dickerson, Boehmke, Ogle, & Brown, 2005) nurses on the topic of Internet health information.

A 1999 UK study by Wilson included Practice Nurses. Practice Nurses, usually employed by general practitioners in the UK, provide assessment, screening, treatment, care and education to patients. At the time of the survey, 41% of the nurses were concerned about the quality of health information on the Internet and only 29% of Practice Nurses surveyed would consider referring a patient to the Internet for health information.

A study by Dickerson et al. (2005) examined 20 oncology nurses' views on how the Internet is changing their clinical practice. Interviews with nurses revealed that nurses viewed patients with Internet information as generally more knowledgeable, having more questions, and being more intimidating. The researchers identified two differing schools of thought among their participants: a conventional school, where a more paternalistic relationship between provider and patient exists, and a new school, where the relationship between patient and provider is viewed as a partnership. Numbers of nurses in the study who held specific beliefs were not

reported. However, the authors drew several conclusions from analysis of nurses' comments in interviews. They concluded that nurses who held conventional beliefs were more concerned about the quality of information on the Internet and information overload. Also, the authors found that nurses embodying the new school of thought viewed patients who brought Internet information to consultations as encouraging them to keep current with new research, and recognized the positive effects of the Internet for their patients. The authors reported that many nurses (the specific number was not reported) in the study felt that the Internet was positive for patients because it gave them a sense of control and positive for providers because it forced them to be more responsive to patients. A number of nurses in the study also felt that the Internet has changed their role from patient educator to knowledge consultant and interpreter (Dickerson, et al.).

A 2008 study of Israeli nurses found that 62% of the participants had encountered patients with Internet information. Those who had encountered such patients had more positive attitudes toward them. Nurses who used the Internet more often themselves were more confident in their skills in dealing with patients who use the Internet for health information, less apprehensive about Internet information and held more positive views toward Internet-informed patients (Barnoy, et al., 2008).

A survey of Australian healthcare providers including physicians, nurses, psychologists, genetic counselors, nurse researchers, a speech pathologist, and "advanced trainees" (Newnham, et al., 2005) found that 82% of respondents felt that Internet information was either often or sometimes accurate. Sixty-two percent of respondents reported that patients only sometimes accurately interpret information from the media. Ninety-one percent of the respondents believed that the Internet had the potential to cause harm by creating unrealistic expectations in patients

(87%), by introducing patients to unproved treatments (80%), or because patients might use the Internet in place of seeing a physician who could appropriately evaluate and treat them (23%). Despite this potential for harm and inaccurate interpretation, most healthcare providers were either supportive (56%) or neutral (35%) to patients searching for health information online (Newnham, et al.).

Podichetty et al. (2006) surveyed health care professionals including physicians, nurses, PAs, PTs, and PhDs on their use of the Internet and the effects of the Internet on their practice. Fifty-eight percent of respondents were in favor of patients obtaining second opinions on the Internet. Seventy-three percent trusted the quality of medical websites, with 64% reporting they had recommended a website to a patient in the past (Podichetty, et al.).

No research has been conducted exclusively examining the PA perspective on patient use of the Internet for health information. PAs were included in a study examining the views of a variety of health professionals (Podichetty, et al., 2006), but the opinions of PAs were not analyzed separately from the opinions of other health professional groups. The issue has been addressed in editorial-type articles in PA journals with anecdotal accounts that PAs are concerned about the quality of information that patients find on the Internet. The authors of these articles stress that an emphasis should be placed on educating the patient adequately and directing them to trustworthy sources on the Internet (Grandinetti, 2000; Kole, 1999; Zarbock, 2009).

Methods

The objectives of this study were: (1) to examine PA attitudes toward health information on the Internet, (2) to examine PA attitudes toward patients who wish to discuss Internet-obtained health or medical information, (3) to examine PA practices when presented with Internet-obtained information, (4) to determine if differences in attitude and practice in regard to Internet information are present among different demographic groups of PAs, and 5) to compare the PA survey results with those of other health care professions (namely physician and nursing).

For the literature review section of the paper, a search of current literature was conducted using PubMed and Science Citation Index. Search terms included “physician and internet,” “professional-patient relations and internet,” “physician-patient relations and internet,” “nurse and internet,” “physician assistant and internet” and any related articles. Inclusion criteria: articles written in English, articles about clinician and patient attitudes toward the Internet, patient use of the Internet, clinician practices in relation to the Internet and patients who use the Internet, and the clinician-patient relationship in the context of Internet use. Exclusion criteria included articles about the use of e-mail between providers and patients, electronic medical records, use of the Internet for continuing medical education, physician web pages, doctor-patient encounters via the Internet, web-based communication between providers and patients, providing medical services online, Internet-based prescribing, Internet-based therapies, and web ratings for health care providers.

The survey was written by the student researcher and was based on the review of the literature and the researcher’s own questions about PA attitudes and practices in the Internet age. A web-based survey was constructed using Perseus SurveySolutions XP version 5.1.503. Perseus SurveySolutions allows researchers to construct a web-based survey, make the survey

available to participants by e-mail or Internet, and receive survey responses anonymously, removing all identifiers of participants.

The twenty-eight item survey consisted of multiple choice and Likert-item questions. Multiple-choice questions assessed demographic information including: gender, age, state of practice, specialty of practice, number of years practicing as a PA, hours worked per week, and number of patients seen per week. Multiple-choice questions assessed PA use of the Internet, PA attitudes toward Internet information, and PA experiences with patients who bring Internet information to consultations. Likert-item questions assessed PA attitudes toward patients who seek health information on the Internet and PA attitudes toward changing practice (see Appendix 1). The survey was trialed on a group of four PAs, to ensure that it was easy to understand and complete, as well as to test the process of survey delivery to subjects and anonymous receipt by the researcher. The survey was approved by the University of Toledo IRB committee following submission of the proposal describing the research to be carried out.

Currently practicing PAs in the United States were the target population of this study. A representative sample was selected including PAs from all fifty states and the District of Columbia. The researchers sought to obtain a sample demographically similar to the population of PAs in the United States, so twenty PAs from each state and the District of Columbia, who listed their e-mail on the American Academy of Physician Assistants (AAPA) online directory, were randomly selected to receive the e-mail invitation. This selection of 1020 PAs was conducted in February 2009. The target sample received the initial e-mail on March 4, 2009 requesting that they complete an attached web-based survey (Appendix 2). This e-mail invitation included the IRB number, a description of the study, the voluntary nature of participation, and steps taken to ensure participant anonymity. Contact information for the

student researcher was included for use if participants had any questions regarding the study or study participation. All members of the survey sample received follow-up e-mails on March 12, 2009 and March 18, 2009 asking them to complete the survey if they had not already done so. A survey was attached to the follow-up e-mails and each included information about being removed from the contact list if the participant requested (see Appendix 2).

Survey results were imported directly into a Microsoft Database using Perseus SurveySolutions, transferred to a Microsoft Excel spreadsheet, then imported into SPSS for analysis. Data was not manually imported by the researcher. SPSS 17.0 was used for statistical analysis of the results. Frequencies and percentages of response to all survey questions were analyzed in this study. Pearson chi-square tests of independence were conducted for some questions to determine if interactions existed between variables. Chi-square tests were conducted analyzing relationships or lack of relationships between years in practice and feeling challenged by patients, feeling challenged by patients and changing plan or diagnosis, PA Internet use and beliefs about Internet accuracy, and PA internet use and whether the PA provides Internet sources to patients. The chi-square test was also used to assess whether attitudes about the availability of health information on the Internet differed between physicians in a previous study and PAs in the present study. Differences between PAs in the present study and physicians in the study by Helft et al. regarding feeling threatened by patients with Internet information were also analyzed using a chi-square test. SPSS output for the tests listed above can be found in Appendix 3. Results were then analyzed by the researcher and conclusions drawn based on the data.

Results

Of 1020 surveys sent by e-mail, 48 were returned as “undeliverable” and did not reach the intended recipient. Thus, the response rate was calculated from a total of 972. Of 972 delivered surveys, 195 were completed, for a total response rate of 20.06%. Further, 19 of the returned surveys were completed by PA students and were excluded from the results as this study sought to describe the attitudes and practices of currently practicing PAs. One-hundred and seventy-six survey results were evaluated for this research study.

Demographics

The sample consisted of 42.6% males and 57.4% females. The most prevalent age group represented are participants aged 30-39, followed by those aged 20-29. The fewest respondents fell into the 60-69 age group (Table 1). Almost seventy-five percent of respondents had been in practice as a PA for less than 10 years, with the largest group practicing for between one and five years (43.1%). The large majority (87%) of respondents worked at least 31 hours per week (full time) as a PA. The majority (56.3%) of survey respondents see between 51 and 100 patients per week. Alabama and California were the only states not represented in the survey, with the remaining states and District of Columbia being represented by between 1 and 7 PAs (Table 2). Respondents were divided among urban, suburban, and rural practice settings (Table 3). Multiple medical specialties of practice were represented in the survey, with PAs in family medicine being the most represented (28.4%) (Table 4).

Internet Use by Physician Assistants

Sixty-nine percent of PAs reported using the Internet for fifteen hours or less in a given week, with the remaining 31% reporting greater than fifteen hours per week of Internet use (Table 5). Ninety-five percent of PAs reported being somewhat (33.5%) or very confident

(61.4%) in their ability to use the Internet to search for information and find what they were looking for.

PAs on the Accuracy and Availability of Health and Medical Information on the Internet

The majority of PAs (58.5%) considered health and medical information on the Internet to be of variable accuracy (Table 6). Time spent on the Internet was not associated with PA opinion on accuracy (chi-square = 5.149; sig 0.272, $\alpha=0.05$). Ninety-two percent of PAs indicated that the increased availability of health and medical information via the Internet was either good or very good (Table 6).

PA Encounters with Internet-informed patients

Eighty-eight percent of PAs surveyed reported having encountered a patient wanting to discuss Internet-obtained information (Table 7). Of those, 81% encountered five or fewer such patients per month (Table 8). When encountered with patients who wish to discuss Internet information, 90.8% of responding PAs often (13.8%) or always (77.0%) discuss the information with the patient (Table 8). Over three-quarters of PAs (78.3%) reported that more time is spent with patients who use the Internet for health information compared to patients that do not (Table 8). Ninety-four percent of survey respondents reported that they rarely, never, or sometimes feel challenged by patients who wish to discuss medical information they found on the Internet (Table 8). Number of years in practice as a PA did not correlate with whether a PA felt challenged or not by Internet-informed patients (chi-square = 1.831, sig 0.176, $\alpha=0.05$). One-third of PAs surveyed felt that patients using the internet for health information improves the PA-patient relationship while 62.9% felt there was no change and 3.3% felt that it harms this relationship (Table 8).

PA Attitudes toward Internet-Informed Patients

About one-half (49.4%) of PAs agreed or strongly agreed that patients who use the Internet for health and medical information are better informed than those who do not (Table 9). A majority (51.1%) of PAs agreed or strongly agreed that patients who use the Internet for health and medical information have a greater understanding of their health and their medical conditions compared to those who do not use the Internet for this information (Table 9). A majority (53.4%) also agreed or strongly agreed that patients who read medical information on the Internet are more confused (Table 9). Ten percent (10.3%) of surveyed PAs felt that patients who use the Internet for health and medical information question their PA's competence (Table 9). The majority (56.2%) did not feel that their competence was called into question. The largest number of respondents (39.2%) were neutral (neither agree or disagree) on whether they felt that patients are able to find accurate health and medical information on the Internet (Table 9).

PA Practices Regarding Internet Information

The vast majority (82.8%) of survey respondents reported that they rarely (61.6%) or never (21.2%) change their diagnosis or plan based on Internet-obtained information presented by patients (Table 10). PAs who often or sometimes felt challenged by Internet-informed patients were no more or less likely to change their plan or diagnosis than those who rarely or never felt challenged (chi-square = 0.197, sig 0.906, $\alpha=0.05$).

When asked if they provided Internet sources to patients, the majority (67.1%) of respondents indicated that they provided Internet sources to patients who brought in or discussed Internet information with them or patients who asked for Internet sources (Table 10). There was no association between hours of Internet use by PAs and whether they provide Internet sources for patients (chi-square = 6.447, sig. 0.168, $\alpha=0.05$).

PA Attitudes on Interacting with Internet-Informed Patients

The majority of PAs (61.7%) disagreed or strongly disagreed that they feel frustrated by patients who want to discuss Internet information. The majority (58.8%) of respondents disagreed or strongly disagreed with the statement that they don't have enough time to discuss Internet –obtained medical information with patients (Table 11). The vast majority of PAs surveyed (88%) agreed or strongly agreed that the PA role includes answering patients' questions about Internet information (Table 11).

Discussion

The present study is the first to describe the attitudes and practices of physician assistants regarding health information on the Internet. Several e-mail-based surveys of health professionals have reported similar or lower response rates to those obtained in the present study (Aitken, Power, & Dwyer, 2008; Hassenbusch & Portenoy, 2000; Hollowell, Patel, Bales, & Gerber, 2000; Kim & Kim, 2009; Sur, Scales, Preminger, & Dahm, 2006). The response rate of 20% can be explained in two general ways. First, several independent studies and meta-analyses have found Internet-based surveys to have lower response rates than traditional paper surveys (Braithwaite, Emery, De Lusignan, & Sutton, 2003; Grava-Gubins & Scott, 2008; Leece, et al., 2004; Shih & Fan, 2008). Secondly, Shih & Fan (2008) reported that medical doctors and professionals, among other groups, appear to be more responsive to traditional surveys than web-based surveys.

The respondents to this survey appear to be representative of the PA population in the United States. In regards to gender, this sample was similar to the population of PAs described in the 2008 American Academy of Physician Assistants (AAPA) Census (57.4% vs. 59.6% female, respectively). Additionally, distribution among medical specialties was also similar, with the 2008 AAPA Census reporting the most common specialties as Family Medicine (25.9%), Emergency Medicine (10.5%), and Orthopedics (10%) and this survey including just over 28% working in family medicine, 8% in Emergency Medicine and 11.9% in Orthopedics. The sample population of the present survey may have differed slightly in median age and median years in practice from the population described by the 2008 AAPA Census. The current survey had a median age of 30-39 years old and median years in practice of 1-5 years compared with the 2008 AAPA Census reported median age of 42 years old and median years in practice

of 7 years. Since the present survey used age and years in practice ranges, direct statistical analysis cannot be performed. However it does appear that the present survey had slightly younger and less experienced respondents. This could possibly be attributed to greater use of the Internet and e-mail among younger populations as compared to older populations. Younger populations may also be more comfortable receiving communication through e-mail than older populations, and thus may be more likely to allow their e-mail to be displayed on the AAPA's online directory. A meta-analysis by Shih & Fan (2008) found that college students were more responsive to Internet-based surveys than other population groups, supporting the idea that young adults may be more accepting of Internet-based surveys than middle age and older adults. Another note regarding the demographics of the current survey compared to AAPA Census data is that the current study purposely sampled twenty random PAs from each state as opposed to the actual distribution of PAs in the country (ie. California having more PAs than Rhode Island). This was done in an effort to obtain responses from PAs in all states.

All respondents to the survey reported using the Internet at least 1 hour per week, with most PAs being confident in their ability to use the Internet to search for information and find what they are looking for. These results suggest that negative attitudes PAs may have regarding Internet information probably do not stem from their own inexperience or uncertainty about using the Internet. It does not appear that PAs are opposed to patients having access to health and medical information via the Internet, even if some of what the patient reads may be inaccurate. The vast majority (92%) of PA respondents to this survey felt that the increasing availability of such information on the Internet was a good or very good thing, which compares favorably to results from physicians (75%) when asked the same question (Murray et al. 2003). Chi-square analysis showed that this difference between PAs and physicians is statistically

significant (chi-square = 27.352, sig = 0.000, $\alpha=0.05$). These results suggest that PAs look more favorably on increased access to health and medical information on the Internet for patients than do physicians..

The amount of time that a PA spends on the Internet does not appear to influence their opinion about the accuracy of Internet information. PAs who spend more time on the Internet do not differ significantly from PAs who spend less time online in their opinions on accuracy of Internet information. These results suggest that all PAs have had experiences, either personally or through their patients, in which they have encountered health information of variable accuracy on the Internet.

A similar proportion of PAs (88.1%), compared to physicians (74-94%) surveyed in other studies, report that they have encountered a patient who wished to discuss health information from the Internet (Dilliway & Maudsley, 2008; Malone, et al., 2004; Murray, Lo, Pollack, Donelan, Catania, Lee, et al., 2003; Podichetty, et al., 2006). These results indicate that patients are just as likely to consult PAs as physicians with questions about Internet information. A 2008 study of Israeli nurses indicated that just 62% of those surveyed had encountered Internet informed patients. While this difference may indicate that patients are more likely to approach physicians and PAs with Internet questions than nurses, the difference might also be attributable to the differing cultural and socioeconomic atmospheres of the United States and Israel.

It appears that while patients are discussing Internet-obtained information with PAs, this is still a relatively rare event for PAs, because most only encounter patients asking about Internet information five times or fewer per month. When a patient wishes to discuss Internet information, most PAs (77%) always discuss the information with the patient. No respondents indicated that they rarely discuss this information, and only 1 PA indicated that they never

discuss Internet information with patients who request to do so. These results indicate that PAs are willing to interpret Internet information for patients. Further, 88% of PAs surveyed agreed or strongly agreed that part of the PA role was to answer patients' questions about Internet information. This contrasts to the results of a focus-group study by Ahmad et al. (2006) which described physician resistance to the role of Internet interpreter.

Though most PAs surveyed (78.3%) reported spending more time with patients when discussing Internet information, the majority (73.7%) were either neutral (neither agree nor disagree) or disagreed that they did not have enough time to discuss such information with their patients. Physicians in other studies also reported spending more time with patients when discussing Internet information (Ahmad, et al., 2006; Dilliway & Maudsley, 2008; Helft, et al., 2003), but Ahmad et al. reported that physicians felt that the time needed to discuss Internet information was a problem due to their time-constrained schedules. This apparent difference between PAs and physicians may be attributed to differences in patient load or complexity of patients. Another possible explanation is that PAs often fulfill the role of patient educator and are may be more accustomed to long, explanatory conversations with patients.

One interesting finding of the present survey was that PAs perceived patients who use the Internet for health information as being both better informed and more confused about their health and medical conditions than patients who do not use the Internet. Nurses in a study by Dickerson et al. (2005) similarly viewed Internet-informed patients as both more knowledgeable and having more questions. This may be reflective of patients using the Internet to prepare for appointments and read more about their medical conditions, as reported by several patient surveys (Donnelly, et al., 2008; Kivits, 2006; Stevenson, et al., 2007). While such patients would certainly be more informed about their specific symptoms or diagnoses, they have not had

the extensive medical training of nurses or PAs and cannot fully understand the information they are reading.

Most PAs (62.5%) report rarely or never feeling challenged or threatened by patients who wish to discuss Internet information. While these results indicate that most PAs are confident in their knowledge and ability to answer patient questions, this percentage is lower than the 90% of physicians reported by Helft et al. (2003) who did not feel challenged by patients with Internet information. Chi-square analysis showed that this difference between PAs and physicians was statistically significant (chi-square = 34.023, sig. = 0.000, $\alpha=0.05$). This difference may be attributable to PAs having less didactic training, specifically in pathophysiology, than physicians or may simply be attributable to differences in demographic measures, such as years in practice, between the two samples. Eighty-two percent of PAs reported that they rarely or never change their diagnosis or plan based on Internet information provided by the patient. While a direct comparison cannot be made due to differing wording of the questions, Murray, Lo, Pollack, Donelan, Catania, Lee, et al. (2003) reported that physicians usually did what the patient requested, either partially (59%) or completely (23%). These results may indicate that PAs are less likely to change their plan than physicians when encountered by Internet-informed patients.

Nearly 80% of PAs surveyed provide Internet sources to some or all of their patients, indicating that PAs are willing to use trustworthy health and medical websites for patient education. This is a substantially larger percentage than the 45% of physicians who were willing to consider referring patients to the Internet in Wilson's 1999 study and the 59% of Australian physicians reported by Usher (2006) to recommend websites to patients. There are several possible explanations for these differences. One explanation may simply be a passing of time.

The Wilson study took place 10 years ago and the Usher study was conducted 4 years ago. Internet usage and attitudes about the Internet have certainly changed over that period of time and the progression of increasing numbers of practitioners providing Internet sources may just be a reflection of these changing attitudes. Another possible reason for these differences may be cultural. Both the Usher and Wilson studies were conducted outside of the U.S., while the present study surveyed PAs in the U.S. Other demographic differences between samples could also explain differing results. Finally, a real difference between PAs and physicians may exist regarding willingness to provide Internet sources for further education.

An overwhelming majority of PAs (96.7%) surveyed felt that patient-provided Internet information either improved (33.8%) or had no effect (62.9%) on the PA-patient relationship. These results are comparable to those reported by Murray, Lo, Pollack, Donelan, Catania, Lee, et al. (2003), who found that most physicians felt that patients bringing Internet information to the visit had a beneficial (38%) or neutral (54%) effect on the physician-patient relationship.

While the responses of 176 practicing PAs help to define attitudes among the PA population, the sample may not be representative of the entire PA population. The researcher acknowledges several potential limitations in the current study. Because the survey was sent by e-mail, only PAs who allowed the AAPA to list their e-mail on the AAPA online directory had a chance for inclusion in this survey. Consequently, only PAs who use the Internet were surveyed. This sub-population (though likely comparable to the vast majority of PAs) may have differing views regarding the Internet and its effect on the PA-patient relationship than PAs who do not use the Internet. Of the 1020 e-mail invitations sent, 48 were returned to the researcher as undeliverable, likely because the e-mail address no longer existed or because the intended recipient's inbox was full. It is possible that an even larger portion of the population did not

receive the survey for similar reasons. Throughout the course of the study, the researcher received e-mail replies from 13 willing participants who were unable to complete the survey as the URL hosting the survey instrument was malfunctioning. Upon receipt of these e-mails, the researcher replied by thanking the participant for their willingness to participate and re-sending the link to the survey. In all cases but one, the participant was then able to complete the survey. It is likely that an even larger portion of the sample encountered similar problems with the survey and were unable to complete it, but did not contact the researcher.

This study was the first to describe PA attitudes and practices regarding Internet information. While the researcher believes that much can be taken from this study, further research is necessary to better describe PA attitudes and practices regarding the Internet. A larger, more representative sample may provide more comprehensive results than those obtained in the present study. Further, an obvious bias of self-reporting is present in this study. Direct observation of PA-patient interactions may produce less biased, and possibly different, results.

While comparisons between PAs and other healthcare providers were drawn in this paper, direct comparisons could not be made in most cases due to differing survey methods (focus group or open-ended survey questions versus multiple choice survey), different wording of questions, or unavailability of complete data sets for statistical comparison. Future studies could include a variety of health care providers so that more accurate comparisons of attitudes and practices between disciplines could be described.

Conclusion

The present study sought to describe PA attitudes toward health information on the Internet and patients who wish to discuss Internet health information, to examine PA practices when presented with Internet information, and to compare PA attitudes and practices regarding Internet information to those of other health care providers. While PAs acknowledge the variable accuracy of health information on the Internet, most have positive attitudes toward patient use of the Internet for health information. PAs are willing to discuss and interpret Internet information for patients and do so even if additional time is required in order to do so. They rarely feel challenged or threatened by patients with Internet information and are rarely swayed in their plan or diagnosis based on Internet information. PAs appear to be similar to physicians in most attitudes and practices regarding Internet information, with the exception of two areas. PAs appear to feel challenged more often than physicians when questioned about Internet information, yet appear to be more willing than physicians to spend additional time with patients discussing Internet information.

As increasing numbers of patients turn to the Internet for health information, PAs must be prepared to adapt to a more engaged, involved patient. The results of the present survey help to describe how PAs are currently meeting this challenge and in which areas they might improve.

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Tables

Table 1. Demographics of Sample

Demographics	Number	Percent
Gender		
Male	75	42.6
Female	101	57.4
Age		
20-29	52	29.5
30-39	59	33.5
40-49	24	13.6
50-59	34	19.3
60-69	7	4.0
Years in Practice*		
< 1	24	13.8
1-5	75	43.1
6-9	29	16.7
10-14	13	7.5
15-19	7	4.0
20-24	12	6.9
25-29	6	3.4
≥ 30	8	4.6
Hours worked per week		
0	6	3.4
1-10	5	2.8
11-20	2	1.1
21-30	10	5.7
31-40	56	31.8
41-50	67	38.1
51-60	23	13.1
>60	7	4.0
Patients seen per week		
0	6	3.4
1-25	21	11.9
26-50	29	16.5
51-75	54	30.7
76-100	45	25.6
101-125	10	5.7
126-150	6	3.4
≥151	5	2.8

* 2 participants did not respond to the question. Percents calculated from the number of responses to the question.

Table 2. State of Practice of Sample

State Of Practice	Number	Percent
Alabama	0	0
Alaska	5	2.8
Arizona	3	1.7
Arkansas	4	2.3
Colorado	3	1.7
Connecticut	3	1.7
Delaware	2	1.1
District of Columbia	4	2.3
Florida	2	1.1
Georgia	6	3.4
Hawaii	5	2.8
Idaho	3	1.7
Illinois	4	2.3
Indiana	4	2.3
Iowa	3	1.7
Kansas	3	1.7
Kentucky	3	1.7
Louisiana	3	1.7
Maine	1	0.6
Maryland	2	1.1
Massachusetts	6	3.4
Michigan	2	1.1
Minnesota	5	2.8
Mississippi	3	1.7
Missouri	3	1.7
Montana	1	0.6
Nebraska	4	2.3
Nevada	3	1.7
New Hampshire	4	2.3
New Jersey	3	1.7
New Mexico	6	3.4
New York	2	1.1
North Carolina	4	2.3
North Dakota	1	0.6
Ohio	5	2.8
Oklahoma	3	1.7
Oregon	5	2.8
Pennsylvania	7	4.0
Rhode Island	5	2.8
South Carolina	4	2.3
South Dakota	5	2.8
Tennessee	2	1.1
Texas	6	3.4
Utah	6	3.4
Vermont	3	1.7
Virginia	3	1.7
Washington	2	1.1
West Virginia	2	1.1
Wisconsin	3	1.7
Wyoming	3	1.7
Other	2	1.1

Table 3. Practice Setting of Sample

Practice Setting	Number	Percent**
Urban	66	38.5
Suburban	77	43.8
Rural	59	33.5

**Percentages do not equal 100% because participants were allowed to select more than one setting if applicable

Table 4. Specialties of Sample

Specialty	Number	Percent
Do not practice clinically	4	2.3
Allergy/Immunology	1	0.6
Cardiology	3	1.7
Dermatology	6	3.4
Emergency Medicine	14	8.0
Endocrinology	4	2.3
Family Medicine	50	28.4
Gastroenterology	2	1.1
Internal Medicine	6	3.4
Nephrology	2	1.1
Obstetrics/Gynecology	4	2.3
Oncology	3	1.7
Orthopedics	21	11.9
Pediatrics	5	2.8
Psychiatry	1	0.6
Pulmonology	1	0.6
Radiology	2	1.1
Surgery-General	1	0.6
Surgery-Other	21	11.9
Urology	2	1.1
Other	23	13.1

Table 5. Internet usage among PAs

PA Personal Internet Use	Number	Percent
Internet Use (Hours/Week)		
1-5	38	21.6
6-10	45	25.6
11-15	39	22.2
16-20	28	15.9
>20	26	14.8
Confidence in Own Internet skills		
Very confident	108	61.4
Somewhat confident	59	33.5
Neither confident nor unconfident	3	1.7
Somewhat unconfident	3	1.7
Very unconfident	3	1.7

Table 6. PA beliefs on accuracy and availability of health and medical information on the Internet

Internet Information Beliefs	Number	Percent
Internet Information Accuracy		
Accurate	9	5.1
Mostly Accurate	62	35.2
Variable in Accuracy	103	58.5
Mostly Inaccurate	2	1.1
The increased availability of health and medical information on the Internet is...		
Very Good	55	31.2
Good	107	60.8
Neither Good nor Bad	13	7.4
Bad	1	0.6
Very Bad	0	0.0

Table 7. Numbers and Percentages of PAs who have encountered Internet-informed patients

Has a patient brought information found on the Internet to an appointment or wished to discuss with you health information found on the Internet?	Number	Percent
Yes	155	88.1
No	17	9.7
Unsure	4	2.3

Table 8. PA encounters with Internet-informed patients

	Number	Percent*
Number of Internet-informed patients encountered per month		
Less than 1	27	17.8
1-5	96	63.2
6-10	16	10.5
11-15	9	5.9
16-20	3	2.0
21-25	0	0
>25	1	0.7
How often do you discuss Internet information with such patients?		
Always	117	77.0
Often	21	13.8
Sometimes	13	8.6
Rarely	0	0.0
Never	1	0.6
Time spent with Internet-informed patients		
More time spent	119	78.3
No change in time spent	33	21.7
Less time spent	0	0.0
PA's feeling challenged by Internet-Informed patients		
Always	0	0
Often	9	5.9
Sometimes	48	31.6
Rarely	69	45.4
Never	26	17.1
Effect on PA-patient relationship		
Improves relationship	51	33.8
No change	95	62.9
Harms Relationship	5	3.3

*Percentages are based on total number of PAs answering "yes" to having encountered an Internet-informed patient (See Table 8).

Table 9. PA Perceptions of Patients who use the Internet for health and medical information.

	Number	Percent
Patient better informed		
Strongly Agree	9	5.1
Agree	78	44.3
Neither Agree nor Disagree	69	39.2
Disagree	20	11.4
Strongly Disagree	0	0
Patient has greater understanding of their health and medical conditions		
Strongly Agree	8	5.1
Agree	81	46.0
Neither Agree nor Disagree	61	34.7
Disagree	26	14.8
Strongly Disagree	0	00
Patient is More Confused		
Strongly Agree	18	10.2
Agree	76	43.2
Neither Agree nor Disagree	57	32.4
Disagree	25	14.2
Strongly Disagree	0	0.0
Patient questions PA's competence		
Strongly Agree	1	0.6
Agree	17	9.7
Neither Agree nor Disagree	59	33.5
Disagree	90	51.1
Strongly Disagree	9	5.1
Patient is able to find accurate information		
Strongly Agree	0	0.0
Agree	65	36.9
Neither Agree nor Disagree	69	39.2
Disagree	41	23.3
Strongly Disagree	1	0.6

Table 10. PA Practices regarding Internet information

Do you provide Internet sources to your patients?	Number	Percent
Yes, all patients	19	10.8
Yes, only patients who bring in/ discuss Internet-obtained information with me	58	33.0
Yes, only patients who ask for Internet sources	60	34.1
No	39	22.2
How often does patient-provided Internet information change your diagnosis or plan of care for the patient?		
Always	0	0
Often	0	0
Sometimes	26	17.2
Rarely	93	61.6
Never	32	21.2

Table 11. PA Attitudes on interacting with Internet-informed patients

	Number	Percent
I often feel frustrated by patients who wish to discuss information from the Internet.		
Strongly Agree	1	0.6
Agree	26	14.9
Neither Agree nor Disagree	40	22.9
Disagree	94	53.7
Strongly Disagree	14	8.0
I usually do not have enough time to discuss information from the Internet with patients.		
Strongly Agree	3	1.7
Agree	30	17.1
Neither Agree nor Disagree	39	22.3
Disagree	90	51.4
Strongly Disagree	13	7.4
Part of my role as a PA is to answer patient questions generated by Internet information.		
Strongly Agree	54	30.9
Agree	100	57.1
Neither Agree nor Disagree	14	8.0
Disagree	7	4.0
Strongly Disagree	0	0.0

Appendix 1

Survey Instrument

Note: The original survey instrument utilized drop-down boxes for questions 1-7. More than one answer could be selected for question 8. The remainder of the questions were multiple choice, for which only one answer could be selected.

Internet Attitudes and Practices Survey

1. Gender

- Male
- Female

2. Age

- 20-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70-79
- ≥ 80

3. In what state do you practice?

- Alabama
- Alaska
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- District of Columbia
- Florida
- Georgia
- Hawaii
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada
- New Hampshire

- New Jersey
- New Mexico
- New York
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming
- Other

4. In which specialty do you practice?

- I am a PA student.
- I do not practice clinically.
- Allergy/Immunology
- Cardiology
- Dermatology
- Emergency Medicine
- Endocrinology
- Family Medicine
- Gastroenterology
- Internal Medicine
- Nephrology
- Neurology
- Obstetrics/Gynecology
- Oncology
- Orthopedics
- Pediatrics
- Psychiatry
- Pulmonology
- Radiology
- Surgery - General
- Surgery - Other
- Urology

- Other

5. How many years have you been practicing as a PA?

- < 1 year
- 1-5 years
- 6-9 years
- 10-14 years
- 15-19 years
- 20-24 years
- 25-29 years
- ≥ 30 years

6. How many hours per week do you work as a PA?

- 0
- 1-10
- 11-20
- 21-30
- 31-40
- 41-50
- 51-60
- >60

7. On average, how many patients do you see per week?

- 0
- 1-25
- 26-50
- 51-75
- 76-100
- 101-125
- 126-150
- ≥ 151

8. In what setting do you practice? (*Please select all that apply*)

- urban
- suburban
- rural

9. How many hours per week do you use the Internet?

- 0, I do not use the Internet
- 1-5
- 6-10
- 11-15
- 16-20
- >20

10. How confident are you in your ability to use the Internet to search for information and find what you are looking for?

- very confident
- somewhat confident
- neither confident nor unconfident
- somewhat unconfident
- very unconfident

11. Overall, the increased availability of health and medical information via the Internet is

- very good
- good
- neither good nor bad
- bad
- very bad

12. I believe that health and medical information on the Internet is generally

- accurate
- mostly accurate
- variable in accuracy
- mostly inaccurate
- inaccurate

13. Do you provide patients with reliable Internet sources for health and medical information?

- yes, all patients
- yes, only patients who bring in/discuss Internet-obtained information with me
- yes, only patients who ask for Internet sources
- no

14. Has a patient brought information found on the Internet to an appointment or wished to discuss with you health information found on the Internet?

- yes
- no
- unsure

If you answered "No" or "Unsure" to question 14., please skip questions 15-20 and proceed to questions 21-28.

15. On average, how many times per month do you encounter a patient who wishes to discuss information obtained from the Internet?

- <1
- 1-5
- 6-10
- 11-15
- 16-20
- 21-25
- >25

16. When a patient brings information from the Internet to an appointment or wishes to discuss such information, how often do you discuss the information?
- always
 - often
 - sometimes
 - rarely
 - never
17. What effect does discussing Internet information with a patient have on time spent with the patient?
- more time spent
 - no change
 - less time spent
18. When a patient brings information from the Internet to an appointment or wishes to discuss such information, how often do you feel that the patient is challenging you or threatening your authority?
- always
 - often
 - sometimes
 - rarely
 - never
19. How often does patient-provided Internet information change your diagnosis or plan of care for the patient?
- always
 - often
 - sometimes
 - rarely
 - never
20. What effect does patient-provided Internet information have on the PA-patient relationship?
- improves relationship
 - no change
 - harms relationship
21. Most patients who use the Internet are better informed than patients who do not use the Internet.
- strongly agree
 - agree
 - neither agree nor disagree
 - disagree
 - strongly disagree
22. Most patients who use the Internet for health or medical information have a greater understanding of their health and medical conditions.

- strongly agree
 - agree
 - neither agree nor disagree
 - disagree
 - strongly disagree
- 23.** Most patients who use the Internet for health or medical information are confused about what they read.
- strongly agree
 - agree
 - neither agree nor disagree
 - disagree
 - strongly disagree
- 24.** Most patients who use the Internet for health or medical information question the competence of their health care provider.
- strongly agree
 - agree
 - neither agree nor disagree
 - disagree
 - strongly disagree
- 25.** Most patients are able to find accurate information on the Internet about health and medical conditions.
- strongly agree
 - agree
 - neither agree nor disagree
 - disagree
 - strongly disagree
- 26.** I often feel frustrated by patients who wish to discuss information from the Internet.
- strongly agree
 - agree
 - neither agree nor disagree
 - disagree
 - strongly disagree
- 27.** I usually do not have enough time to discuss information from the Internet with patients.
- strongly agree
 - agree
 - neither agree nor disagree
 - disagree
 - strongly disagree

28. Part of my role as a PA is to answer patient questions generated by Internet information.
strongly agree

- strongly agree
- agree
- neither agree nor disagree
- disagree
- strongly disagree

Appendix 2

E-mails Requesting Survey Participation

Dear Physician Assistant,

You have been randomly selected from the AAPA online directory to participate in my academic research study. This study is being conducted for my scholarly project (thesis), the completion of which is required for my graduation from The University of Toledo Physician Assistant Program.

Please complete a brief, 5 minute, web-based survey assessing your attitudes and practices regarding health and medical information obtained from the Internet, as well as your interactions with patients who wish to discuss Internet information. Your participation in the survey is completely voluntary. To complete the survey, open the attachment to this e-mail, indicate your answers to the questions, and click the "Submit" button at the bottom of the page.

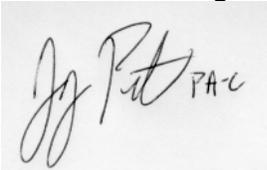
Participation in the survey is anonymous. A computer program will remove any identifying information, such as your e-mail address, and only your answers to the survey questions will be available to the researchers.

There are no foreseeable risks to participating in this study. Questions regarding this survey or the research being conducted may be directed to Jessica Dimit at jessica.dimit@utoledo.edu. If you wish to be removed from this list, please reply to this e-mail with the subject line, "please remove from survey list."

Please take a few minutes to complete this survey. Your participation is greatly appreciated.



Jessica Dimit, PA-SII
Student Investigator



Jay Peterson, MSBS, PA-C
Assistant Professor
Faculty Advisor



Dear Physician Assistant,

This e-mail is a follow-up regarding the survey you recently received assessing PA attitudes and practices toward health and medical information obtained from the Internet. The survey is an important part of my scholarly project (thesis) for the University of Toledo Physician Assistant program.

If you have already completed the survey, I thank you for your time.

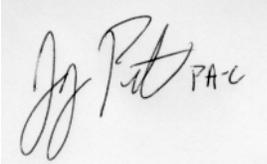
If you have not yet completed the survey and wish to participate, please take the time to do so now. Completion of the survey will take only 5 minutes and will greatly assist me in my research. For your convenience, I have attached another copy of the survey to this e-mail.

If you have any questions regarding this survey or the research being conducted, you may contact Jessica Dimit at jessica.dimit@utoledo.edu. If you wish to be removed from this list, please respond to this e-mail with the subject line, "please remove from survey list."

If you choose to participate, please complete the survey by March 25th, 2009. Thank you for your time and participation.



Jessica Dimit, PA-SII
Student Investigator



Jay Peterson, MSBS, PA-C
Assistant Professor
Faculty Advisor



Appendix 3
SPSS Output

Chi-square analysis of PAs' years in practice vs. feeling challenged or threatened by Internet-informed patients

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
years 2 groups * challenged2	150	85.2%	26	14.8%	176	100.0%

years 2 groups * challenged2 Crosstabulation

			challenged2		Total yes challenged
			yes challenged	no challenged	
years 2 groups	0-14 years	Count	49	74	123
		% within years 2 groups	39.8%	60.2%	100.0%
		% within challenged2	87.5%	78.7%	82.0%
		% of Total	32.7%	49.3%	82.0%
	15 years or longer	Count	7	20	27
		% within years 2 groups	25.9%	74.1%	100.0%
		% within challenged2	12.5%	21.3%	18.0%
		% of Total	4.7%	13.3%	18.0%
	Total	Count	56	94	150
% within years 2 groups		37.3%	62.7%	100.0%	
% within challenged2		100.0%	100.0%	100.0%	
% of Total		37.3%	62.7%	100.0%	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.831(b)	1	.176		
Continuity Correction(a)	1.285	1	.257		
Likelihood Ratio	1.911	1	.167		
Fisher's Exact Test				.195	.128
Linear-by-Linear Association	1.819	1	.177		
N of Valid Cases	150				

a Computed only for a 2x2 table

b 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.08.

Chi-square analysis of PAs feeling threatened or challenged vs. changing their diagnosis or plan

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
challenged2 * change dx or plan	151	85.8%	25	14.2%	176	100.0%

challenged2 * change dx or plan Crosstabulation

			change dx or plan			Total
			sometimes	rarely	never	sometimes
challenged2	yes challenged	Count	10	36	11	57
		% within challenged2	17.5%	63.2%	19.3%	100.0%
		% within change dx or plan	38.5%	38.7%	34.4%	37.7%
	no challenged	% of Total	6.6%	23.8%	7.3%	37.7%
		Count	16	57	21	94
		% within challenged2	17.0%	60.6%	22.3%	100.0%
Total		% within change dx or plan	61.5%	61.3%	65.6%	62.3%
		% of Total	10.6%	37.7%	13.9%	62.3%
		Count	26	93	32	151
		% within challenged2	17.2%	61.6%	21.2%	100.0%
		% within change dx or plan	100.0%	100.0%	100.0%	100.0%
		% of Total	17.2%	61.6%	21.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.197(a)	2	.906
Likelihood Ratio	.199	2	.905
Linear-by-Linear Association	.117	1	.732
N of Valid Cases	151		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.81.

Chi-square analysis of PA Internet use vs. PA opinions on accuracy of Internet information

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Internet use (hrs/wk) * accuracy	176	100.0%	0	.0%	176	100.0%

Internet use (hrs/wk) * accuracy Crosstabulation

			accuracy		Total
			accurate	variable or inaccurate	accurate
Internet use (hrs/wk)	1-5	Count	19	19	38
		% within Internet use (hrs/wk)	50.0%	50.0%	100.0%
		% within accuracy	26.8%	18.1%	21.6%
		% of Total	10.8%	10.8%	21.6%
	6-10	Count	14	31	45
		% within Internet use (hrs/wk)	31.1%	68.9%	100.0%
		% within accuracy	19.7%	29.5%	25.6%
		% of Total	8.0%	17.6%	25.6%
	11-15	Count	16	23	39
		% within Internet use (hrs/wk)	41.0%	59.0%	100.0%
		% within accuracy	22.5%	21.9%	22.2%
		% of Total	9.1%	13.1%	22.2%
16-20	Count	14	14	28	
	% within Internet use (hrs/wk)	50.0%	50.0%	100.0%	
	% within accuracy	19.7%	13.3%	15.9%	
	% of Total	8.0%	8.0%	15.9%	
greater than 20	Count	8	18	26	
	% within Internet use (hrs/wk)	30.8%	69.2%	100.0%	
	% within accuracy	11.3%	17.1%	14.8%	
	% of Total	4.5%	10.2%	14.8%	
Total	Count	71	105	176	
	% within Internet use (hrs/wk)	40.3%	59.7%	100.0%	
	% within accuracy	100.0%	100.0%	100.0%	
	% of Total	40.3%	59.7%	100.0%	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.149(a)	4	.272
Likelihood Ratio	5.185	4	.269
Linear-by-Linear Association	.386	1	.535
N of Valid Cases	176		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.49.

Chi-square analysis of PA Internet use vs. PA providing Internet resources to patients

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Internet use (hrs/wk) * provide internet	176	100.0%	0	.0%	176	100.0%

Internet use (hrs/wk) * provide internet Crosstabulation

			provide internet		Total
			yes	no	yes
Internet use (hrs/wk)	1-5	Count	24	14	38
		% within Internet use (hrs/wk)	63.2%	36.8%	100.0%
		% within provide internet	17.5%	35.9%	21.6%
		% of Total	13.6%	8.0%	21.6%
	6-10	Count	37	8	45
		% within Internet use (hrs/wk)	82.2%	17.8%	100.0%
		% within provide internet	27.0%	20.5%	25.6%
		% of Total	21.0%	4.5%	25.6%
	11-15	Count	31	8	39
		% within Internet use (hrs/wk)	79.5%	20.5%	100.0%
		% within provide internet	22.6%	20.5%	22.2%
		% of Total	17.6%	4.5%	22.2%
16-20	Count	24	4	28	
	% within Internet use (hrs/wk)	85.7%	14.3%	100.0%	
	% within provide internet	17.5%	10.3%	15.9%	
	% of Total	13.6%	2.3%	15.9%	
greater than 20	Count	21	5	26	
	% within Internet use (hrs/wk)	80.8%	19.2%	100.0%	
	% within provide internet	15.3%	12.8%	14.8%	
	% of Total	11.9%	2.8%	14.8%	
Total	Count	137	39	176	
	% within Internet use (hrs/wk)	77.8%	22.2%	100.0%	
	% within provide internet	100.0%	100.0%	100.0%	
	% of Total	77.8%	22.2%	100.0%	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.447(a)	4	.168
Likelihood Ratio	6.038	4	.196
Linear-by-Linear Association	3.010	1	.083
N of Valid Cases	176		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.76.

Chi-square analysis of profession (PAs in the present study or physicians in the study by Murray, Lo, Pollack, Donelan, Catania, Lee, et al. (2003)) vs. opinion on availability of health information on the Internet

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
profession * Internet availability	1226	100.0%	0	.0%	1226	100.0%

Profession * Internet availability Crosstabulation

			Internet availability			Total
			good or very good	neutral	bad or very bad	good or very good
Profession	Physician	Count	788	157	105	1050
		% within Profession	75.0%	15.0%	10.0%	100.0%
		% within Internet availability	82.9%	92.4%	99.1%	85.6%
	PA	Count	162	13	1	176
		% within Profession	92.0%	7.4%	.6%	100.0%
		% within Internet availability	17.1%	7.6%	.9%	14.4%
Total	Count	950	170	106	1226	
	% within Profession	77.5%	13.9%	8.6%	100.0%	
	% within Internet availability	100.0%	100.0%	100.0%	100.0%	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.352(a)	2	.000
Likelihood Ratio	37.765	2	.000
Linear-by-Linear Association	27.156	1	.000
N of Valid Cases	1226		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.22.

Chi-square analysis of profession (PAs in the present study or physicians in the study by Helft et al. (2003)) vs. feeling threatened by patients with Internet information

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
profession * threatened	442	100.0%	0	.0%	442	100.0%

profession * threatened Crosstabulation

			threatened		Total Sometimes, often, or always
			Sometimes, often, or always	rarely or never	
profession	Physician	Count	27	239	266
		% within profession	10.2%	89.8%	100.0%
		% within threatened	32.1%	66.8%	60.2%
PA	PA	Count	57	119	176
		% within profession	32.4%	67.6%	100.0%
		% within threatened	67.9%	33.2%	39.8%
Total	Total	Count	84	358	442
		% within profession	19.0%	81.0%	100.0%
		% within threatened	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	34.023(b)	1	.000		
Continuity Correction(a)	32.593	1	.000		
Likelihood Ratio	33.513	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	33.946	1	.000		
N of Valid Cases	442				

a Computed only for a 2x2 table

b 0 cells (.0%) have expected count less than 5. The minimum expected count is 33.45.

Abstract

Objective: To examine PA attitudes toward and practices regarding health information on the Internet and patients who wish to discuss Internet-obtained information.

Method: A web-based survey was sent to 1020 PAs. 176 completed surveys were eligible for inclusion.

Results: Ninety-two percent of PAs feel availability of health information via the Internet is good or very good. Sixty-two percent rarely or never feel challenged by patients who wish to discuss medical information they find on the Internet. Eighty-two percent rarely or never change their diagnosis or plan based on patient-provided Internet information. Eighty-eight percent agreed that the PA role includes answering patients' questions about Internet information.

Conclusion: PAs look favorably on availability of health information on the Internet and are open to discussing Internet information with patients. Many PAs provide Internet resources to patients and most feel that interpreting Internet information is part of their job as patient educators.