Older Adults' Perceptions of E-Prescribing: Impact on Patient Care

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Abstract

Objectives: To describe older adult patients' perceptions and experiences with e-prescribing; and to explore the impact of e-prescribing on patient care, including patient-provider communication.

Methods: Seventy-five participants' aged 50 and older and living within one hour of Pittsburgh, Pennsylvania, completed a telephone survey that included items regarding basic demographics, general medication-taking behavior, and experiences with e-prescribing.

Results: A majority of participants expected e-prescriptions (84 percent) and preferred e-prescriptions to paper prescriptions (81 percent). Of the 57 participants whose doctors sent their prescriptions electronically, 93 percent reported being very satisfied with their doctor and 84 percent reported being very satisfied with their pharmacist in dealing with e-prescribed medications. Participants who received e-prescriptions reported more communication regarding medication-related topics with their doctor.

Conclusions: E-prescribing is generally preferred to paper prescribing, and participants who use e-prescribing are satisfied with the e-prescribing process. E-prescribing may influence patient medication-taking behaviors through increased convenience, increased patient-provider communication, and the perception of improved care compared to traditional paper prescribing.

Keywords: e-prescribing, patient/consumer satisfaction, health information technology, patient safety

Introduction

Electronic prescribing (e-prescribing) is the health information technology that enables prescribers to send prescriptions directly to pharmacies from the point of care. Within electronic health records (EHRs), e-prescribing systems can be linked to facilitate access to other electronic resources, such as pharmacy benefits information, patient medication histories,[1] clinical notes, laboratory results and orders, clinical decision support,[2] and fill-status notification.[3] Instant access to such information can help alert and inform prescribers regarding equally effective cost-saving alternative medications, changes from a patient's previous medication regimen, possible drug-drug interactions, increased susceptibility for adverse drug effects according to specific patient characteristics, and notifications of possible patient noncompliance.[4]

The 2003 Medicare Modernization Act (MMA) strongly recommended the adoption of e-prescribing[5] because this technology has been shown to reduce medication errors that result from misread or illegible handwriting.[6,7] Because of these and other perceived benefits of e-prescribing, multiple initiatives have attempted to foster the widespread implementation of e-prescribing systems.[8-10] As a result, the amount of prescriptions generated using e-prescribing systems and transmitted to pharmacies electronically has increased significantly. According to Surescripts, about 29 million e-prescriptions were sent to community pharmacies in 2007, and this number increased dramatically to 1.04 billion in 2013.[11] In addition, the number of prescribers using e-prescribing has risen from 7 percent of prescribers sending e-prescriptions in 2008 to 54 percent in 2012, and nearly all pharmacies (94 percent) now accept e-prescriptions.[12]

Though e-prescribing has multiple clinical benefits, certain drawbacks have been found in its use. For instance, initial implementation of an e-prescribing system can be difficult because of technical, cost, and/or regulatory barriers.[13-14] In

addition, medication errors specific to e-prescribing systems, such as those due to auto-population features, drop-down menus, and inadvertent entering of incorrect information, have emerged with e-prescribing.[15] Errors that occur in traditional prescribing systems, such as prescriptions being sent to the wrong pharmacy, duplicate prescriptions being sent, or prescriptions being sent for the wrong patient, may be exacerbated through the use of e-prescribing systems.[16] Though alerts in e-prescribing systems can help to identify potential errors, in some cases alerts can be unnecessary or inappropriate in e-prescribing systems, possibly leading prescribers to ignore the alerts.[17]

Although providers' perspectives on the benefits and drawbacks of e-prescribing have received some attention in the literature, patient perceptions of e-prescribing have received little attention. One study conducted in 2007 reported that 66 percent of geriatric patients who had used e-prescriptions had a mild preference for e-prescribing, while 85 percent of geriatric patients who did not receive e-prescriptions preferred paper prescriptions.[18] The objective of this study is to describe older adult patients' perceptions of e-prescribing. Specifically, we explore characteristics of patients that may contribute to differences in their perceptions of e-prescribing, including how e-prescribing compares to traditional paper prescribing.

Methods

Procedures

Participants completed a telephone survey that took an average of 16 minutes to complete. The main topics of the survey items included basic demographics, general medication-taking behavior, use of e-prescribing, and preferences in the prescribing process. Additional details regarding the survey are provided in the measures section. Surveys were administered with the use of computer-assisted telephone interviewing (CATI) by trained interviewers at the University of Pittsburgh University Center for Social & Urban Research (UCSUR).

Sample

Potential participants were part of UCSUR's research registry and had previously agreed to be contacted for participation in research studies. Eligibility requirements included being 50 years of age or older, taking at least one prescription medication, and living within one hour of Pittsburgh, Pennsylvania. A total of 181 participant telephone numbers were attempted for interviews, with 75 resulting in a completed survey. Of the telephone numbers attempted but not resulting in a completed survey, 12 potential participants refused the survey, 13 respondents were ineligible to participate, and 81 telephone calls resulted in no human contact or wrong numbers.

Measures

Survey items were developed to collect information on basic demographics, general medication-taking behavior, and experiences and preferences regarding the prescribing process. Some survey items were adapted from previously reported items in a study of patient perceptions of e-prescribing by Lapane and colleagues.[19] General medication-taking items asked for details about the number of prescription and over-the-counter medications currently being taken, management of medications, and pharmacy use. Use of e-prescribing items included knowledge of e-prescribing, expectations of the prescribing process, e-prescribing problems, communication with healthcare professionals when using e-prescribing, and preferences related to e-prescribing. The survey was piloted and revised accordingly to improve the clarity and usefulness of items prior to data collection.

Data Analysis

Bivariate descriptive statistics related to demographics, knowledge and expectations of e-prescribing, and satisfaction with e-prescribing were calculated. Patient-physician communication items were reported by participants who do and do not use e-prescribing. Analyses between users and non-users of e-prescribing were limited because of the small subgroup size of participants who did not use e-prescribing. Comments from open-ended items were grouped according to pertinent variables. Analyses were conducted using SPSS (IBM SPSS Statistics for Windows, version 22.0).

Results

Individuals who participated in the study were over 50 years old, currently taking at least one prescription medication, and living within an hour of Pittsburgh, Pennsylvania. Almost two-thirds of study participants were women (64 percent). The average age of the participants was 66.9 ± 9.3 years, 96.0 percent had at least a high school education, 46.6 percent had at least a bachelor's degree, and 54.7 percent were married. Study participants were 85.3 percent Caucasian, 12.0 percent African American, and 1.3 percent American Indian or Alaskan Native; 2.7 percent refused to provide their race; and 1.3 percent of participants identified as both African American and American Indian or Alaskan Native. As shown in Table 1, most participants had seen more than one doctor in the previous year. More than half of study participants reported taking four or more prescription medications daily, with about 20 percent of participants taking six or more prescription medications. In addition, about 84 percent of participants were also currently taking at least one over-the-counter medication.

Table 1: Characteristics of Participants (*n*=75)

Characteristic	Percentage
Age	
50-59	21.3
60-69	37.3
70-79	28.0
80+	13.3
Female	64.0
Marital status	
Married/living as married	54.7
Divorced	12.0
Widowed	14.7
Single, never married	18.7
Race	
White/Caucasian	85.3
Black/African American	12.0
American Indian or Alaskan Native	1.3
Asian or Pacific Islander	0
Refused	2.7
Hispanic ethnicity	0
Education	
Some high school	2.7
High school graduate/GED	10.7
Some college or associate's degree	38.6
Bachelor's degree	22.7
More than bachelor's degree	23.9
Refused	1.3
Income	
<$25,000	24.0
$25,000-$49,999	28.0
$50,000-$74,999	13.3

$75,000-$99,999	6.7
$100,000-$149,999	12.0
$150,000+	5.3
Refused/Don't know	10.7
Seen >1 doctor in previous year	80.0
Number of prescription medications currently taking	
1-3	44.0
4-6	36.0
6+	20.0
Number of over-the-counter medications currently taking	
0	16.0
1-3	53.3
4-6	22.7
6+	8.0

Table 2 shows results pertaining to participants' knowledge, expectations, and satisfaction with e-prescribing. A little more than half (53.3 percent) of study participants with completed interviews reported having heard of e-prescribing. Participants who had never heard of e-prescribing tended to be older than those who had heard of e-prescribing. Participants typically (64.0 percent) expected only e-prescriptions, while 10.7 percent of participants expected only a paper prescription and 20.0 percent expected both a paper prescription and an e-prescription. Approximately 80 percent of participants preferred e-prescriptions to paper prescriptions, and only 8 of 73 (10.7 percent) reported a preference for paper prescriptions. Of the 10 individuals who did not receive e-prescriptions, nine still reported a preference for e-prescriptions.

Table 2: Participants' Knowledge, Expectations, Satisfaction of E-Prescribing (*n*=75)

Response	Percentage
Participant has previously heard of e-prescribing	53.3
When you go to the doctor, do you expect an electronic prescription, paper prescription, or both?	
Electronic	64.0
Paper	10.7
Both	20.0
Don't know	5.3
What do you prefer? an electronic prescription or a paper prescription?	
Electronic	81.3
Paper	10.7
Don't know	5.3
Refused	2.7
Does you doctor electronically send prescriptions to a community pharmacy of your choice?	
Yes	76.0
No, but would like them to be	5.3
No, and would not like them to be	8.0
Don't know	10.7

Reasons given for the preference for e-prescriptions were typically related to convenience through saving time, reducing the number of trips to the doctor and pharmacy, and preventing lost or destroyed prescriptions. Below are specific comments from study participants during the telephone interviews.

"When I get there it's ready. Otherwise I have to sit there and wait or come back."

"I don't have to worry about losing the paper, and, to me, it's faster."

"Because I spilled iced tea on a prescription [paper prescription] one time, and the pharmacy accused me of changing the amount of refills from the smearing of the ink."

The eight participants who preferred paper prescriptions gave reasons related to feeling more in control, being interested in their medications, and not getting medications filled right away as reasons they preferred paper. Their comments included the following:

"I feel like I have more control over it [prescription]."

"I see what I'm getting. With electronic [prescription] I wouldn't be aware until I pick it up."

"Usually when it's done electronically it's there immediately, and I may not need it immediately. I may not need it for a month. In the case of the mail-in prescription they sent me the refills a month before it's needed. There's too much medication on hand."

Six of the eight participants who preferred paper prescriptions still had prescriptions sent electronically. Half of those six participants reported being very satisfied with their doctor in sending prescriptions electronically, and all six participants reported being at least somewhat satisfied with their pharmacy in dealing with prescriptions sent electronically.

Electronic prescribing seemed to be the primary method for filling prescriptions for study participants, as 76 percent reported that their prescriptions were sent electronically to a community pharmacy of their choice. Of the 10 participants who were not having their prescriptions electronically sent to a community pharmacy of their choice, six reported that they would like them to be. Of the 57 participants who reported that their doctors electronically sent their prescriptions (see Table 3), a great majority (92.9 percent) reported being very satisfied with their doctor sending their prescriptions, and 84.2 percent of participants reported being very satisfied with their pharmacy in dealing with electronically prescribed medications. Only about 6.7 percent of participants reported experiencing delays at the pharmacy when prescriptions were electronically sent.

Table 3: Responses of Participants Whose Doctors Electronically Send Prescriptions (*n*=57)

Response	Percentage
Experienced delays at pharmacy when prescriptions electronically sent	6.7
How satisfied are you with your doctor sending your prescriptions electronically to your pharmacy?	
Very satisfied	92.9
Somewhat satisfied	3.6
Neither satisfied nor dissatisfied	0
Somewhat dissatisfied	3.6
Very dissatisfied	0
How satisfied are you with your pharmacy in dealing with your electronically prescribed medications?	
Very satisfied	84.2
Somewhat satisfied	12.3
Neither satisfied nor dissatisfied	1.8
Somewhat dissatisfied	1.8
Very dissatisfied	0

How do you know that the medication at your pharmacy is what the doctor electronically prescribed?	
Doctor gives list	22.8
Doctor tells you and you remember	40.4
You don't know that the medications at the pharmacy are what was prescribed	5.3
You trust that the prescription has been filled correctly	50.9
You are aware of all you prescriptions	57.9
It's written on bottle when you pick it up	63.2
Pharmacy tells you	35.1
Other	26.3

Participants most often reported that they ensured that the medications they received at the pharmacy were what the doctor actually electronically prescribed by being aware of their medications, trusting that their prescriptions were filled correctly by the pharmacy, and checking the name of the medication written on the bottle when it is picked up. About 20 percent of participants reported that their doctor gave them a list of the medications that were electronically prescribed, and 5.3 percent reported that they did not know that the medications at the pharmacy were what the doctor electronically prescribed.

As shown in Table 4, participants who used e-prescribing reported more communication with their doctor at their most recent doctor appointment, including higher rates of their doctor discussing the importance of taking medications, potential side effects of medications, and the cost of medications. Both users and non-users of e-prescribing reported that their doctor had an accurate listing of their current medications. Least discussed in both groups was the cost of medications, with 14.3 percent of patients using e-prescriptions discussing cost and no patients using paper prescriptions discussing cost with their doctor.

Table 4: Perceptions of Patient-Physician Communication at Most Recent Doctor Appointment

Response	**Percentage of Participants Whose Physicians Send E-prescriptions (*n*=57)**	**Percentage of Participants Whose Physicians Do Not Send E-prescriptions (*n*=10)**
At most recent doctor appointment ...		
doctor discussed importance of taking medications	56.1	30.0
doctor told you about potential side effects of your medications	26.3	20.0
doctor had an accurate listing of current medications that you are taking	100.0	90.0
you discussed the cost of medications with your doctor	14.0	0.0

Table 5 describes participants' perceptions of their communication with healthcare providers and how e-prescribing might change their care. Individuals who used e-prescribing mostly perceived equal communication with their doctor, nurse, or pharmacist whether prescriptions were sent electronically or paper. The majority of participants (68.4 percent) who used e-prescribing believed that e-prescribing had improved care they receive from their doctor or nurse at least a little. In addition, 63.6 percent of participants believed that e-prescribing improved the care they receive from their pharmacists at least a little. A different trend was seen in adherence to medications, as about 67 percent of participants thought that e-prescribing had not improved their adherence to their medication regimen. Approximately three-fourths of participants reported being equally likely to pick up electronic and paper prescriptions, while 17.5 percent reported being more likely to pick up e-prescriptions and 7.0 percent were more likely to pick up paper prescriptions. Most participants reported that they would tell their doctor if they did not want a prescription that was to be electronically sent to their pharmacy, and about 18 percent reported sometimes

forgetting to pick up a prescription that was electronically sent to their pharmacy. Only 10.5 percent of participants reported that having a paper prescription helps them to remember to get their medications from the pharmacy.

Table 5: Comparison of Electronic Prescribing and Paper Prescription Regarding Communication with Provider and Medication-Related Tasks among Participants Whose Physicians Send E-prescriptions (*n*=57)

Response	Percentage
Does your doctor or nurse discuss your medicines with you more:	
When your prescriptions are sent electronically to the pharmacy	1.8
When you receive a paper prescription	0
Both the same	91.2
Refused/Don't know/Missing	7.0
Does you pharmacist discuss your medications with you more:	
When your prescriptions are sent electronically to the pharmacy	1.8
When you receive a paper prescription	0
Both the same	93.0
Don't know/Missing	5.3
In your opinion, to what extent has e-prescribing improved the care you receive from your doctor or nurse?	
Not at all	31.6
A little	12.3
Somewhat	22.8
Very much	28.1
Refused/Don't know	5.3
In your opinion, to what extent has e-prescribing improved the care you receive from your pharmacist?	
Not at all	36.4
A little	12.3
Somewhat	19.3
Very much	29.8
Don't know	3.5
In your opinion, to what extent has e-prescribing improved your adherence to medications?	
Not at all	66.7
A little	5.3
Somewhat	7.0
Very much	17.5
Don't know	3.5
Does having a paper prescription help you remember to get your medications from the pharmacy?	
Yes	10.5
No	86.0
Don't know/Missing	3.5
Would you tell your doctor if you did not want a medication that is to be electronically sent to your pharmacy?	
Yes	76.4

No	23.6
Don't know/Missing	3.5
Do you ever forget to pick up your prescription that was electronically sent to the pharmacy by your doctor?	
Sometimes	17.5
Never	82.5
Which are you more likely to pick up?	
Paper-prescribed medication	7.0
Electronic-prescribed medication	17.5
Equally likely	71.9
Don't know	3.5

Discussion

Studies with healthcare professionals have shown that e-prescribing can reduce medication errors[20,21] and enable convenient access to electronic prescribing resources.[22-24] However, since the vast increase in utilization of this technology, only very limited studies have explored patients' perspectives regarding the effects of e-prescribing on the quality of care they receive. In a 2007 study by Lapane and colleagues, only 53 percent of geriatric patients reported ever receiving an e-prescription.[25] Seven years later, e-prescribing has been firmly established as a prescribing method,[26,27] and 76 percent of the individuals who participated in our study are currently using e-prescribing. Our survey suggests that e-prescriptions have quickly gone from the exception to the expectation; nearly six times as many study participants expected only e-prescriptions than expected only paper prescriptions. Study findings also showed that participants heavily preferred e-prescribing over paper prescriptions. The preference for e-prescribing was not as significant in the study conducted by Lapane and colleagues, in which 42 percent of all participants mildly preferred e-prescriptions.[28] This difference in preference could be due to the increased use of e-prescribing and acceptance of e-prescribing as a prescribing method, as e-prescribing experience seems to be associated with positive perceptions of e-prescribing. Participants who received e-prescriptions were typically satisfied with both their doctor and their pharmacy in dealing with prescriptions electronically sent to their pharmacy, even in the subgroup of participants who reported that they preferred paper prescriptions to electronic.

The increased convenience of e-prescribing may be advantageous to patients, but perhaps the more important factor to consider is the impact of e-prescribing use and perceptions of e-prescribing on patient-provider communication and trust in healthcare providers, considering the potential positive impact on medication-taking behaviors.[29-32] Patient-provider communication has been found to be associated with patient satisfaction,[33] compliance with medication regimens,[34] and healthcare utilization,[35,36] and any effect of e-prescribing on patient-provider communication could have important implications for quality of care. A recent study on patient-provider communications regarding medication cost has shown great potential for improvement in that fewer than half of older patients reported having discussions related to the cost of medications with their physicians, even though more than 75 percent of patients felt that these discussions were important.[37] Lapane and colleagues reported that patients using e-prescribing had somewhat increased communication with their doctor regarding adherence issues than patients who did not receive e-prescriptions, and had more frequent checking of current medication use by their clinicians, although differences were modest, and little to no difference was reported in communication regarding cost issues, actual intention to pick up prescription, and side effects.[38] We found that participants who use e-prescribing reported having discussions with their doctor on the importance of taking medications, potential side effects of medications, and the cost of medications more frequently than did participants who received paper prescriptions, and a majority of participants believed that e-prescribing had improved their care. Despite these positive findings regarding patient-provider communication and patient perceptions of care, most participants did not believe that e-prescribing had improved their adherence to medications, and most believed that they were equally likely to pick up an e-prescription as they were to pick up a paper prescription. Though results from other survey items show higher reported satisfaction, greater preference, and more-frequent medication-related discussions with providers, participants did not seem to believe that these qualities have an impact on how they respond to paper versus electronic prescriptions.

Limitations

Participants were limited to those living within an hour of Pittsburgh, Pennsylvania, and may not be representative of the older adult US population. Participants mostly identified as white/Caucasian, also limiting generalizability. Participants were limited to those over 50 years of age, thus representing older adults but not a geriatric population. Unlike a previous study conducted in 2007,[39]s who did not use e-prescribing reported communication with their doctor at their last doctor appointment, chi-square tests could not be run, and results concerning differences in communication reported were not statistically significant. Patients who did not use e-prescribing were not asked questions regarding perceptions of communication with providers because these questions asked participants to compare care received when using e-prescriptions versus paper prescriptions.

Conclusion

The widespread implementation of e-prescribing in the past decade might not have been successful without acceptance of this relatively new health information technology by patients. This study shows that nearly all patients are satisfied with their prescriber and pharmacy in sending and dealing with e-prescriptions, and e-prescribing is now preferred by a majority of older adults over paper prescribing because of the added convenience to the patient. E-prescribing may also influence medication-related behaviors through patient perceptions of increased convenience, an increase in reported discussions about medication with providers, and patient perception of improved quality of care. The individuals who did prefer paper prescriptions to e-prescriptions tended to want more control over their prescription process. Future research could identify strategies to encourage patient and caregiver engagement in the e-prescribing process as healthcare professionals use this health information technology in routine patient care. This would enable patients perceive a sense of control and led to their increased confidence in the e- prescribing process.

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