THE ROLE OF PHARMACISTS IN PATIENT SAFETY

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Abstract

This research was developed in order to identify factors contributing to medication non-adherence in congestive heart failure patients. In a pilot study completed at a community pharmacy in a small midwestern town, pharmacists completed paper surveys regarding their consultations with congestive heart failure patients. Information noted by the pharmacists included patient questions, drug-related problems discovered, patient gender, refill versus new prescription, and patient age. Questions asked most frequently involved cost or financial concerns (15.4% of patients, $n = 4$) and dosage amount (11.5% of patients, $n = 3$). All patients obtaining a new prescription had questions as compared to 42.9% of patients ($n = 11$) refilling a prescription. Future developments may include surveys seeking more descriptive accounts of consultations, researcher interviews with pharmacists, and extension of the study to additional pharmacy sites.

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Mentor

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Keywords

adverse drug events, community pharmacy, congestive heart failure, information alignment, medication adherence, medication error, patient safety, tacit information, near-miss

THE ROLE OF PHARMACISTS IN PATIENT SAFETY:

An Analysis of Patient-Pharmacist Interactions in Community Pharmacy Consultations

Natalie Benda, Industrial Engineering

INTRODUCTION

Fear depends on how a person perceives risk. For example, it seems that everyone has a friend who is afraid of flying. Perhaps that friend is you. In a sense, fear of flying is completely rational; nothing violates the perception of safety quite like catapulting through the sky in a metal tube at speeds reaching 600 miles per hour. In contrast, there are also individuals who panic at the thought of receiving a shot, donating blood, or going to the emergency room after an accident. This type of fear seems entirely irrational. Health care, hospitals, and visits to the doctor are supposed to improve a person's health and safety. How could an individual perceive engaging in health and wellness behaviors as a risk?

What researchers have uncovered is that a person's perception of risk is not always accurate. Figure 1 shows

the relative risk of various industries, categorized by lives lost per encounter each year (Kalra, 2011). As shown, health care has a risk comparative to bungee jumping. Kalra points out, "Because of the complexity of health care and the current rate of adverse events, it must be mentioned that it cannot be compared with other high-risk industries, such as aviation and nuclear energy, both of which boast lower levels of risk" (2011, p. 3). Health care, in other words, is so much riskier and more complex than other high-risk industries that it should not even be included in the comparison.

The Institute of Medicine (IOM) released a report that estimated between 44,000 and 98,000 people die in hospitals each year due to medical errors (Kohn, Corrigan, & Donaldson, 2000). This report underscored the need to redesign our health care system in a way that would promote error prevention. Over a decade later, it is still unclear if efforts to improve health care safety have succeeded. When comparing the current health care system to the health care system at the time of the IOM report, Robert Wachter (2010) gives patient safety progress an overall grade of B-minus.

Medication errors are one of the primary contributors to deaths related to medical errors. According to research highlighted in the IOM report, nearly 2% of hospital admissions had issues with preventable adverse drug events (Bates et al., 1997, as cited in Kohn, 2000). Medication errors are frequently attributed to communication breakdowns between care providers. The patient care communication mechanism can be thought of as a triangle (Figure 2) between patient, provider, and pharmacist (Benedict & Caldwell, 2011). When this

Figure 1. Comparison of risk in health care and other industries (Kalra, 2011).

Figure 2. Patient care communication triangle (Benedict & Caldwell, 2011).

triangle of communication is incomplete or missing information, medication errors are more likely to occur. However, little research has been done to analyze the pharmacist's role in the care regimen. For example, in 2001, the National Institutes of Health awarded 37% of their extramural budget to clinicians and 1.2% to pharmacists (Fagan et al., 2006). Simply put, "If we wish to further improve patient care, we need to examine the patient-pharmacist interaction" (Guirguis & Chewning, 2005).

The goal of this study was to analyze the interaction between the patient and pharmacist in routine consultations at a community pharmacy. In order to highlight the complexity of the medication care regimen, congestive heart failure (CHF) was chosen as a target condition for this study. CHF can be an increasingly

difficult disease to manage due to the relatively advanced age of the population it afflicts and the propensity for these patients to suffer from additional diseases that worsen their health.

METHOD

To begin this effort, the author created a project protocol and study questionnaire. A collaborative relationship was then developed with the Medication Safety Research Network of Indiana (Rx-SafeNet). Rx-SafeNet is a research network within Purdue University's College of Pharmacy comprised of various pharmacies throughout the state of Indiana. They aim to improve medication safety and enhance collaboration within community pharmacies (Purdue University, College of Pharmacy, 2012).

The partnership with Rx-SafeNet provided clinical pharmacy knowledge as well as data collection sites. Rx-SafeNet helped adapt the protocol to be feasible for a community pharmacy setting. They also assisted in selecting appropriate drugs to aid in targeting CHF patients. Rx-SafeNet faculty made additional suggestions that allowed questionnaire data to be collected without identifiable patient information, greatly reducing patient confidentiality concerns.

The questionnaire contained six questions regarding aspects of pharmacist interactions with patients in a community setting. Topics specifically addressed were: the type of drug(s) being filled for the prescription, patient questions, drug-related problems identified by the pharmacist, whether it was a new prescription or a refill, patient gender, and patient age.

Figure 3. Graphical flow for data collection.

After receiving approval from the Purdue University Institutional Review Board, the protocol was sent to potential data collection locations within Rx-SafeNet. Pharmacies within the network self-selected based on feasibility and interest in the project. One community pharmacy in a small midwestern town elected to participate in the study. Members of the Rx-SafeNet team conducted an on-site visit to ensure the feasibility of the study design. Once the authors had completed human subject research training modules, the inaugural project of the Rx-SafeNet was launched.

The duration of the project was four weeks. Within the given time frame, when a prescription containing any of the previously tagged CHF medications was filled, the pharmacist would confirm a diagnosis of CHF and that the person picking up the drugs was the person listed on the prescription being filled. Then the pharmacist would complete one of the previously developed questionnaires regarding the patient consultation. Special markers were placed near the CHF medications to signal to the pharmacist or pharmacy technician that the pharmacist must complete a questionnaire. Completed questionnaires were kept in a locked cabinet and mailed to the first author on a weekly basis. Figure 3 provides a graphical representation of the project workflow.

RESULTS

Of the 26 questionnaires received, the population was split fairly evenly between male (46.2%, *n* = 12) and female (53.8%, *n* = 14). A large majority of the patients were between the ages of 60 and 79 (73.1%, *n* = 19).

Question Type and Frequency	
Question Type	Frequency
No questions	12
Cost/financial concerns	4
Dosage amount	3
Special instructions	2
Basic instructions	1
Refills	1
Drug side effects	1
What is the drug supposed to do?	1
Dosage frequency	1

Table 1. Question type and frequency.

The prescriptions filled most frequently were Lisinopril (21.4%, *n* = 6), Hydrochlorothiazide (14.3%, *n* = 4), and Furosemide (14.3%, *n* = 4). Note, the number of medications encountered in this study was actually 28, as two patients questioned were filling prescriptions for two of the specified medications.

Furthermore, all patients obtaining a new prescription had questions for the pharmacist. By contrast, 42.3% (*n* = 11) of patients obtaining a refill asked the pharmacist questions.

Overall, the pharmacist recorded that over half of the patients (53.8%, *n* = 14) studied had questions regarding their prescription. The questions asked most frequently were regarding cost and financial concerns (15.4%, *n* = 4) and dosage amount (11.5%, *n* = 3). Table 1 shows a breakdown of all questions asked to the pharmacist throughout the course of the study.

A Kolmogorov-Smirnov Z-test was conducted to determine if gender or new versus refill prescription had an effect on whether or not the patient asked the pharmacist a question, and a Mann-Whitney U-test was conducted to determine if age had an effect on whether or not the patient asked the pharmacist a question. None of the associations proved to be statistically significant. The results indicate that patient information, such as age, gender, and type of prescription, did not significantly affect his or her likelihood of asking the pharmacist questions.

Lastly, one of the most alarming findings was that, throughout the course of the study, two potential drug therapy problems were recorded in the questionnaires. In one instance, the pharmacist identified a potential adverse drug reaction, and the other event was regarding inappropriate compliance.

DISCUSSION

Although no statistically significant interactions were found, a few points can be taken from this pilot study. These points become even more telling considering this was a small pilot study conducted at a community pharmacy. The frequency of drug therapy problems given the relatively small sample size is of particular concern.

As previously noted, 26 questionnaires contributed to the dataset for this study, and these questionnaires were sent to the author on a weekly basis. Unfortunately, the final set of data, which contained over ten additional questionnaires, was lost in the mail. The possible effect of this missing data on the overall outcome is unknown.

This study was also conducted at one pharmacy in a small midwestern community. The study would provide more complete results if a larger or more varied sample had been taken. Unfortunately, only one site was deemed suitable for data collection at the time this study was performed.

The last and probably most unsettling point is the two drug therapy problems that were noted. Although actual adverse events or severe patient outcomes were not observed, both events represented significant risks to patients. The occurrence of two such events within one month at a single community pharmacy highlights the importance of the pharmacist role in the CHF patient care regimen. Further research should be undertaken to clarify the true rate of near-miss events where pharmacist interventions are required to avoid potentially hazardous drug events.

POTENTIAL FOR FUTURE RESEARCH

As this was only a pilot study, the potential avenues for future research are valuable outputs of the project. Potential points of expansion stemming from the pilot data are described as follows:

Study Sites

New studies should attempt to gather data from multiple pharmacies. This will not only allow analysis of different types of pharmacies (e.g., in-hospital pharmacy vs. community pharmacy), but also different geographical locations (e.g., metropolitan vs. rural areas). As a whole, varied locations will give a more accurate picture of the general population and help limit any biases.

Additional Diseases

Using a similar rationale as the expansion to multiple locations, additional work could also target patients with diabetes in addition to patients with CHF. Adding another disease will provide an opportunity for comparison and add the possibility of examining patients who may suffer from more than one chronic disease. Diabetes would be a good fit due to its prevalence in the United States at this time and because it afflicts patients of a more varied age group than CHF.

Adverse Drug Events

Due to the alarming frequency of drug therapy problems in previous research, more data should be gathered to better understand why these events occur and how they are handled in hopes of improving methods of prevention. Studies should attempt to find the root causes of these events, possibly through additional interviews with pharmacists following drug therapy problem detection.

Nonnative English-Speaking Populations

In a project completed for another course, the author spoke with adults who were students in a beginner-level English course regarding how they obtain and understand prescription medication. Their initial responses were worrisome. Two said they buy over-the-counter medicines and receive prescriptions in English. While one said he relied on his English skills to ask the pharmacist to explain the instructions, the other consulted an online dictionary to translate the instructions into her native language. Both of these pose potentially unreliable solutions to a high-risk situation (as even the adult relying on his English skills was a student in a beginner-level English course).

Given the severity of the risk associated with misunderstanding medication instructions, it also would be advantageous to focus efforts on understanding how better health care access can be given to nonnative English speakers. Further studies could be performed with English as a second language (ESL) populations in order to find out how they obtain and understand prescription medication, what types of resources are available to them, how often they obtain prescription medication, and if language barriers have ever deterred them from getting or filling prescriptions. Additionally, pharmacists could document interaction with nonnative English speakers.

Tacit Information Discovery

Recent work in the area of health care information coordination addresses the differences between explicit, implicit, and tacit information. In order to better understand the processes associated with this sector of health care delivery, it would be beneficial to interview

participating pharmacists. The aim is to uncover tacit information associated with this work domain. Although many may synonymize tacit and implicit knowledge, the distinction can be made in that “tacit knowledge is information that is part of an expert’s internalized body of knowledge” (Vallette & Caldwell, 2012, p. 1).

Another way of saying this would be that tacit knowledge is the pharmacist’s internal or learned knowledge. For example, a pharmacist may notice instructions for drug “x” are often a source of confusion, so the pharmacist asks each patient who obtains drug “x” to explain his or her understanding of said instructions. The tacit part of this knowledge is that drug “x” often causes confusion in patients. This is information that may not be known by a pharmacist who does not often see prescriptions for drug “x.”

Pharmacists’ use of tacit knowledge, and expert translation of tacit knowledge to explicit information, might be especially valuable in handling and prevention of adverse drug events. While pharmacy training develops relevant domain knowledge, improved knowledge sharing between pharmacists regarding patient adherence communication difficulties can help improve translations from domain knowledge to safe patient practice.

One way knowledge sharing could be facilitated is through the creation of a software tool that would allow pharmacists within a network to tag potentially problematic drugs and include suggestions for how to prevent issues. Obviously, these entries would need to be screened by an internal administrator to ensure legitimacy and accuracy. These warnings or recommendations would then be displayed on all computers in the network when a patient came to the pharmacy to obtain one of the tagged drugs. Although this is merely of an example of how tacit knowledge may be converted to explicit information and then disseminated, it demonstrates how knowledge sharing can aid in delivering more efficient, safer care. Ultimately, through collaboration, the hope is to create a system that is better at preventing and handling the occurrence of adverse events.

CONCLUSIONS

In conclusion, regardless of the study’s sample size, there are a few significant takeaway messages. The majority of the patients had questions regarding their prescriptions, and there was (surprisingly) more than one drug therapy problem detected. Both of these serve as important indicators of the critical role that the pharmacist plays within the triangle of patient-physician-pharmacist communication.

As previously mentioned, this pilot study has served to highlight areas of this topic of patient-provider communication that deserve further exploration. Crucial elements to further research include the addition of multiple, diverse study sites, expansion of diseases studied, and a special focus on the root causes of potential adverse drug events.

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