Patient Awareness and Expectations of Pharmacist Services During Hospital Stay

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# Patient Awareness and Expectations of Pharmacist Services During Hospital Stay

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<th><em>Journal of Pharmacy Practice</em></th>
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<tr>
<td>Keywords:</td>
<td>patient awareness, patient expectations, pharmacy services, hospital, marketing</td>
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Abstract:

Background: There are insufficient data in the United States (US) regarding patient awareness and expectations of hospital pharmacist availability and services. Objective: The objective of this research is to assess patient awareness and expectations of hospital pharmacist services and to determine if a marketing campaign for pharmacist services increases patient awareness and expectations. Methods: Eligible inpatients were surveyed before and after implementation of a hospital-wide pharmacist services marketing campaign [12 items; Likert scale of 1 (strongly disagree) to 4 (strongly agree); maximum total score of 48] regarding awareness of pharmacist services. The primary outcome was the change in median total survey scores from baseline. Other outcomes included the frequency of patient requests for pharmacists. Results: Similar numbers of patients completed the survey before and after the campaign (intervention, n=140, vs. control, n=147). Awareness of pharmacist availability and services were increased (41 [IQR 36-46] vs. 37 [IQR 31-43]; p<0.001). Patients were seven times more likely to request a pharmacist following the marketing campaign implementation. Conclusion: Awareness among inpatients of pharmacist services is low. Marketing pharmacist availability and services to patients in the hospital improves awareness and expectations for pharmacist-provided care, and increases the frequency of patient-initiated interaction between pharmacists and patients. This could improve patient outcomes as pharmacists become more integrally involved in direct patient care.
Title Page

Patient Awareness and Expectations of Pharmacist Services During Hospital Stay
Abstract

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The objective of this research is to assess patient awareness and expectations of hospital pharmacist services and to determine if a marketing campaign for pharmacist services increases patient awareness and expectations.

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Similar numbers of patients completed the survey before and after the campaign (intervention, n=140, vs. control, n=147). Awareness of pharmacist availability and services were increased (41 [IQR 36-46] vs. 37 [IQR 31-43]; p<0.001). Patients were seven times more likely to request a pharmacist following the marketing campaign implementation.

Conclusion
Awareness among inpatients of pharmacist services is low. Marketing pharmacist availability and services to patients in the hospital improves awareness and
expectations for pharmacist-provided care, and increases the frequency of patient-initiated interaction between pharmacists and patients. This could improve patient outcomes as pharmacists become more integrally involved in direct patient care.

Keywords

Patient awareness, patient expectations, pharmacy services, hospital, marketing
BACKGROUND

In the United States (US), patients admitted to hospitals have an expectation for care from physicians and nurses, but seldom expect direct care from a pharmacist.¹ Patients or their families engage in conversation and discussion with nurses and physicians, commonly sharing problems and concerns, and asking questions to improve health knowledge and self-care. The lack of expectation of services from a pharmacist during hospitalization may be due to the substantial lack of awareness of pharmacists' presence within the health-system setting.¹ Since pharmacists provide an expertise in medications and medication therapy, unawareness of their presence and services may predispose the patient to medication-related problems, as the patient may not engage a pharmacist for medication-related questions or concerns, or health knowledge related to medication use. Although in some care settings pharmacists are physically present on hospital wards and interact with patients while involved in medical team rounding, this structure of practice is still not widespread, and the pharmacist on a medical team is commonly mistaken for another type of healthcare provider. Thus, potential harm may come from patient ignorance of pharmacist availability and services. Conversely, patients and families who regularly engage with pharmacists during an inpatient stay may be more likely to have a better understanding of their health and treatment, and more likely to have successful medication outcomes.

In his 2008 inaugural address, past American Society of Health-System Pharmacists (ASHP) president, Kevin Colgan, acknowledged there continues to be a “challenge for pharmacists to instill within patients the expectation of having a
pharmacist on their health care team.\textsuperscript{2} The full realization of the Pharmacy Practice Model Initiative (PPMI; also know as the Practice Advancement Initiative [PAI]) requires that patients have expectations of pharmacist-provided care during their hospitalization.\textsuperscript{3,4} This expectation must be associated with an understanding that pharmacists improve health outcomes, reduce costs, and increase the quality of the patient experience. Therefore, awareness of the pharmacist as an available medication expert in the hospital is a prerequisite for future patient expectation.

**Literature Review**

There are ample data available describing patients’ perceptions of pharmacist services in non-hospital environments, yet similar data from the hospital setting are limited (Table 1).\textsuperscript{1,5-10} Schommer et al assessed the manner in which patients evaluate pharmacists’ services through weekly inpatient education clinics taught by pharmacists and found patients’ evaluations of pharmacists to be favorable. Morecroft et al. demonstrated that patients in the United Kingdom (UK) were surprised to learn that pharmacists were available in the hospital to provide services. Also in the UK, Wilcock et al found that there was a general ignorance among both inpatients and outpatients regarding the pharmacist’s availability to provide pharmaceutical services and medication education.\textsuperscript{8}. In Canadian analyses, Gould et al demonstrated that hospitalized patients identified pharmacists as providers of medication information, and Doucette et al found that, while most patients did not recall speaking to a pharmacist during a recent admission, they would have liked to speak to a pharmacist if one was available.\textsuperscript{6-7} Slack and Ing found that only 20.9% of patients surveyed two months after
discharge from a health system in Canada recalled ever speaking with a pharmacist during their hospitalization. 

This small body of literature suggests that hospitalized patients do not have a clear understanding of the participation of pharmacists in their care, or the availability and types of services pharmacists provide. Much of the available research in this area has focused on the perception of pharmacists, and not the expectation or perceived need for pharmacist services in inpatient settings. Therefore, the objective of this study is two-fold: 1) to assess, under usual care, the initial understanding of hospitalized patients of the availability and services of pharmacists in the hospital, and 2) to determine if marketing the pharmacist as a care provider can increase the awareness and expectations (i.e. demand) for pharmacist availability and services from patients.

STUDY METHODS

Study Design

The study site was a 319-bed academic medical center affiliated with colleges of nursing, pharmacy, medicine, and allied health professions. This exploratory, prospective, single-center cohort study assessed patient awareness and expectations of pharmacist availability and services during the hospital stay. A survey was created and validated to measure the patient’s understanding of pharmacist availability and services. Survey responses and request for pharmacist services from those patients not exposed to any special marketing of pharmacist services (September) were compared to responses and requests from those patients exposed to an institution-wide marketing campaign regarding pharmacist services (October). Marketing campaign materials were
provided by ASHP (see Intervention). This study was approved by the university Institutional Review Board.

Study Participants

Participants were screened for survey distribution from those patients admitted to the hospital over a two-month period. Control group patients were screened during month one (September) and the intervention group was screened during month two (October). Inclusion criteria for the trial included patients aged 18 or older, admission within the previous 48 hours, expected hospital stay greater than two days, and voluntary agreement to participate in the study. Exclusion criteria included those patients admitted to an intensive care unit (ICU), admitted to the inpatient rehabilitation unit, admitted as observation status, unable to communicate using the English language, with evidence of neurological instability compromising the patient’s ability to make independent decisions and complete the survey (e.g., medical record documentation of recent stroke, acute altered mental status, dementia, Alzheimer’s, head trauma, acute psychosis, etc.), and previous participation in the trial.

Treatment Assignment

All hospitalized patients were either not exposed or exposed to the intervention, however, only a subset of patients were actually provided a survey. This was accomplished through daily screening for survey eligibility throughout the two-month period. Those meeting enrollment criteria were invited to participate in the survey in a standardized, one-on-one manner by one of the study investigators. The study investigator provided the patient with the survey to be completed in private to minimize the potential for bias. A blank envelope was left with the patient who was instructed to
seal the survey inside the envelope, which would later be returned to the pharmacy by the patient’s nurse. All patients to whom a survey was provided during the first month constituted the control group (see Standard-of-care), while all patients to whom a survey was provided during month two constituted the intervention group.

Standard-of-care

Standard-of-care provided through the hospital’s inpatient pharmacy department involved a number of potential patient interactions with pharmacy personnel (including clinical or decentralized pharmacists, pharmacy residents, pharmacy interns, and pharmacy technicians). All patients underwent prospective drug utilization review and approval by a pharmacist. A comprehensive medication review was performed for each patient in the hospital every 48 hours, and for each patient, drug therapy-related problems were identified and communicated with the appropriate medical team for resolution. The majority of patients who received a new medication during the hospitalization or at discharge interacted with a pharmacist or pharmacy intern prior to discharge through a structured medication education process. Patients receiving certain high-risk medications, such as anticoagulants, received targeted education to facilitate the safe and effective use of the medication upon discharge. Furthermore, patients with high-risk disease states, such as heart failure, myocardial infarction, and diabetes, received special, targeted education and services to ensure patient understanding of the disease and medication regimen prior to discharge. These practices were targeted to reduce the likelihood of re-hospitalization within a 30-day period of discharge. Interaction with pharmacists may also have occurred through medical team rounding.
Intervention

The intervention consisted of implementing the “Let’s Talk Medications” campaign developed and provided by ASHP. Materials were customized for the institution, including the addition of the institutional logo and inpatient pharmacy contact information (i.e., direct phone extension number to the central inpatient pharmacy).

During the intervention month, all hospitalized patients were exposed to the intervention by providing a brochure (primarily by pharmacy residents and interns) describing the pharmacist services provided (as mentioned above under Standard-of-Care) and other ways pharmacists provide care to patients. The brochure was brought to the patient’s room, a process that ensured early connection to pharmacists. In addition, large posters with a similar message (e.g. “Pharmacists are an important part of your healthcare team”) were displayed outside elevators of every hospital floor, at main entrances, and other high-traffic areas. Other similar marketing materials, such as table-top tents and video monitor displays were used throughout the entire medical center and the campus, including the outpatient pharmacy and outpatient clinics. All pharmacy personnel wore a lapel button bearing the statement “Let’s Talk Medications.” During routine pharmacist-provided education, patients were provided with greeting cards, which described several examples of situations in which a patient may request to speak directly to a pharmacist, and contained the direct phone extension line to the inpatient pharmacy. Therefore, multiple avenues for marking pharmacist services were utilized to ensure all hospitalized patients were adequately informed.

Patient-initiated requests for pharmacist services (referred to as patient requests for education) were primarily handled by one of nine pharmacy residents, as appropriate.
Depending on specific patient requests, focused education was provided and/or attempts were made to resolve any medication-related issues identified with the appropriate medical team. Any requests were handled similarly during the control month. All hospitalized patients were eligible to request a pharmacist’s services, regardless of their eligibility to receive the survey.

Survey Instrument

The 12-item survey instrument was developed based on historical survey instruments identified in the literature, and was evaluated by an expert in survey-based research (Appendix). Internal reliability was tested by Cronbach’s alpha. In addition to basic demographic information, the instrument included twelve questions on a four-point, Likert-like scale (strongly disagree=1 to strongly agree=4), in which patients rated their agreement with each item (maximum total survey score of 48 with higher scores being desirable). A free text area was provided for patients who wished to leave any additional comments.

Study Outcomes

The primary outcome was the effect of the intervention on patient awareness and expectations of pharmacist services, as determined by the change in median total survey score following intervention. Secondary outcomes included the change in median itemized survey scores and the frequency of patient requests for pharmacy education.

Statistical Analysis

It was determined that 133 patient surveys would be needed per study group to achieve 90% power for the primary outcome. This was based on the assumption of
continuous data for mean survey scores, using a two-tailed student’s t-test with alpha of 5%, beta of 10%, a confidence interval of 95%, and setting Cohen’s d (effect size) to 0.4 (mild-to-moderate). The primary outcome of median total survey scores was analyzed using the non-parametric Wilcoxon Rank Sum test. This was also used for the comparison of median scores for each individual survey item. Inter-quartile ranges (IQR) are provided to demonstrate the distribution of the middle 50% of values for a given measurement. Scores were assessed using basic demographic information. The change in frequency of patient requests for education was determined by use of the Chi-square test.

RESULTS

Over the two-month duration of the study period, 1,931 patients were admitted and 1,548 patients were screened for eligibility. Five-hundred eighty-nine were excluded over the two-month period. Reasons for exclusion included admission status (e.g. observation, ICU, etc.), and documentation of altered mental status on admission, including stroke or transient ischemic attack, and other neurological reasons. Out of 959 eligible patients, a total of 580 surveys were ultimately distributed based on patient availability (i.e. patient was awake and in room), 259 to the control group (month one), and 351 to the intervention group (month two). Surveys were returned by 147 (56.8%) of control group participants and 140 (39.9%) of intervention group participants, with an overall survey response rate of 47.0% (Figure 1), which is consistent with survey response rates found throughout the literature.
Patient characteristics are shown (Table 2). The majority of patients were female, Caucasian, and between the ages of 50 to 59 years old. There were no significant demographic differences between study groups.

Primary Endpoint

Compared to the control group, significantly higher total median survey scores (maximum score of 48) were observed in patients after the marketing intervention [41 (IQR 36-46) vs. 37 (IQR 31-43); p<0.001]. Results for the primary endpoint of change in median total survey scores are shown (Figure 2). The survey instrument proved to have robust internal reliability (Cronbach’s alpha=0.91). By multivariable linear regression, it was found that patient age most strongly influenced total survey scores compared to gender or ethnicity (beta=0.77, 0.08, 0.05, respectively; $R^2=0.91$; p<0.05).

Secondary Endpoints

Full results for secondary endpoints are shown (Figure 3). Eight of the twelve survey items were significantly improved after the intervention. The remaining four itemized scores also increased after intervention, but were not statistically significant. An example of a survey item significantly changed by the intervention included agreement with the statement, “Pharmacists are available for me in the hospital,” for which 57.2% of patients agreed or strongly agreed in the control group compared to 92.0% exposed to the intervention (Figure 3A). When asked if a patient expected a pharmacist to provide care in the hospital, similar to nurses and doctors, 70.1% of patients agreed or strongly agreed in the control group compared to 78.6%, but this was not statistically significant (p=0.108). Nearly all patients (greater than 90% agree or strongly agree) felt that pharmacists were important members on the healthcare team.
during both the control and intervention month (p=0.759). A significantly greater proportion of patients (82.9% agree or strongly agree) exposed to the intervention felt that pharmacists frequently communicated with hospital doctors and nurses about medications compared to those not exposed (66.7% agree or strongly agree; p=0.010).

While 42.5% of patients in the control group disagreed or strongly disagreed that pharmacists educate patients about medications in the hospital, this belief was reduced by nearly half to 22.8% in the intervention group (p<0.001) (Figure 3B). Many patients (80.9% agree or strongly agree) in the control group did identify pharmacists as providers of expert medication advice in the control group, which was further increased in the intervention group (92.9% agree or strongly agree; p=0.025). A large proportion of patients agreed or strongly agreed with the identification of pharmacists as the providers of medications at baseline (87.8%), which was essentially unchanged with the intervention (90.5%; p=0.178). Regarding the belief that pharmacists assisted doctors with choosing medications for specific patients in the hospital, 31.8% disagreed or strongly disagreed with this statement in the control group compared to only 23.5% for those exposed to the intervention (p=0.043).

In terms of patient satisfaction with pharmacist interactions, there was significant improvement, from 68.2% for the control group to 85.7% for the intervention group (agree or strongly agree), (p=0.003) (Figure 3C). Compared to 80.3% of patients in the control group who agreed or strongly agreed with the statement, “Pharmacists improve the quality of my care,” 88.6% demonstrated a similar, but numerically higher belief in the intervention group, though this was not statistically significant (p=0.134). While more than one-third (36.8%) of patients in the control group disagreed or strongly disagreed
that speaking to a pharmacist in the hospital was convenient, this number was
substantially reduced (11.5%) in the intervention group (p<0.001). Finally, 76.9% of
patients in the control group agreed or strongly agreed with the statement, “Pharmacists
help me get back to good health while in the hospital,” a proportion that was significantly
increased in the intervention group (90% agree or strongly agree; p=0.042).

In addition to specific survey items, patients were also given the opportunity to
provide free text comments. These comments were fairly consistent across both groups.
Regardless of the study phase, a high number of patients indicated that they did not
realize pharmacists provided any services other than the dispensing of medications,
with a few patients believing that pharmacists did not exist in the hospital but that there
were automated medication dispensaries for nurses and doctors to use as needed.
Other patients stated that they felt pharmacists were “always in the background.” One
patient’s response adequately summarized a common theme:

“If pharmacists want to be more available to patients, they need to make an effort
to introduce themselves and let patients know of the services provided.”

The frequency of patient requests for education (based on total number of
eligible hospital admissions per study month and regardless of completion of the
survey) was significantly higher during the intervention phase compared to the control
phase [63/1097 (5.74%) vs. 7/834 (0.84%); OR 7.2; 95% CI, 5.6 to 9.2] (Table 3). These
data suggest that for every 21 patients exposed to a marketing campaign such as this,
one patient would be expected to initiate a request for pharmacist services. Though
specific information was not systematically documented for each patient encounter, anecdotal reports identified a wide range of questions and service needs from pharmacists. Some common examples included the following:

- whether a recent medication change in the outpatient setting was the cause for the patient’s current hospital admission;
- whether the pharmacist could help address an acute problem that the medical team had not yet resolved (e.g. concerns of constipation, diarrhea, nausea, drowsiness, medication side effects, pain control);
- questions about new medications being started and available alternatives after hospital discharge;
- correction of home medication regimens being incorrectly administered in the hospital.

DISCUSSION

In this study, awareness and expectations of pharmacists for education, answering medication-related questions, and resolution of medication-related problems was low among hospitalized patients. A marketing campaign that focused on increasing the visibility of pharmacists and pharmacist-provided services demonstrated success in increasing patient awareness and understanding of pharmacist services from baseline, and in generating requests for those services among patients.

Medication-related admissions, readmissions, and morbidity remain common despite the known ability of pharmacist services to reduce these outcomes.\textsuperscript{14} Patients who are hospitalized may not have an understanding of the availability of a pharmacist to speak with them and to help answer questions and identify medication-related
problems. This knowledge deficit may lead to adverse medication-related outcomes that affect individuals as well as the healthcare system. Providing education to patients and their families about the presence and roles of pharmacists in the institutional setting is important for the improvement of patient care. Patients may be more likely to seek pharmacist services if they have a baseline awareness and expectation of those services. Direct patient care provided by pharmacists has been shown to improve patient care and even reduce overall health care costs.\textsuperscript{14}

Erstad et al used a 12-item questionnaire to assess the effect of greater pharmacist contact (compared to usual care) on patient awareness and satisfaction with pharmacists in a hospital setting.\textsuperscript{12} Patients on general surgery and internal medicine services were seen at least once daily by an assigned pharmacy resident, independent of medical team rounding. Patients were also provided with contact information specific for the pharmacist. The investigators found a significant increase in awareness of and satisfaction with pharmacy services. Patients who received visits from the pharmacy residents noted surprise in a visit from a pharmacist but expressed appreciation for the services the pharmacist provided. The authors summarized that in order to create an opportunity for the pharmacist-patient relationship, pharmacists must first inform patients of their availability to provide care.

The marketing campaign in the present study was multi-faceted, and targeted all hospital visitors, not just patients. Careful use of posters and monitor displays throughout the hospital, in addition to brochures provided to patients, were the communication vehicle. Other healthcare team members (e.g., nurses, physicians, respiratory therapists, etc.) were also exposed to the campaign, and may have also
provided messaging to patients about pharmacist services. Because this was not
directly measured in this study, it is not known to what extent, if any, patients were
influenced outside of the campaign itself. Future studies should compare the differences
in improving patient awareness with early face-to-face pharmacist contact alone versus
marketing materials alone (and no pharmacist, i.e., material distributed by non-
pharmacists) versus a combination of face-to-face pharmacist contact and marketing
material distribution by pharmacists. This approach in a future study could help to
identify a preferred marketing strategy in a given setting.

It is telling that patient-initiated requests for a visit from a pharmacist rose from
seven in September to 63 in October after implementation of the marketing campaign.
Patients were more than seven times more likely to request a pharmacist following the
marketing intervention. In turn, the need for additional pharmacy services increased the
workload of pharmacists and pharmacy residents, and should be a caveat for future
campaigns. Patient response to any marketing campaign may vary widely from
institution to institution and even across hospital units within an institution. This should
be carefully considered before any institution-wide marketing campaign implementation.

Strengths

To our knowledge, this is the first study in the US that evaluated inpatient
awareness and expectations of pharmacist services, and assessed the effects of an
institution-wide marketing intervention on patient awareness and expectations of
pharmacist services. While Erstad et al used pharmacy resident business cards to be
more accessible to patients, the “marketing” aspect of this intervention did not travel
outside of individual patient rooms, minimizing the effect of an institution-wide campaign
on anyone else in the hospital’s facilities. Moreover, this was a fairly small study with roughly 65 patients. Schommer et al did not utilize any marketing campaign, whatsoever. In contrast to non-US studies that used one-on-one, semi-structured interviews to gather information from patients (which could potentially introduce bias) our study used anonymous surveys that patients completed without any external influence. Furthermore, the number of patients included in our study represents a larger population than that found in previous literature. Lastly, our study was prospective with easily reproducible methodology.

Limitations

There are several notable limitations to this present work. The short duration of the marketing campaign and data collection lead to the question of continued demand for pharmacists after a marketing campaign ends. The types of information requested by patients from pharmacists and the outcome of those encounters was not directly captured, but future work should examine the nature and impact from the pharmacist-patient interaction. A cost analysis of pharmacist intervention for patients also was not performed, but could be explored in future work to determine the financial implications of increased patient demand for pharmacist interactions.

Conclusion

A hospital-wide campaign to highlight pharmacist availability and services to inpatients improved patient awareness of those services and increased patient requests for pharmacist consultations by seven fold. Increased direct patient care by the pharmacist may reduce medication-related problems and improve patient outcomes.
Footnotes

References


Appendix

Survey Instrument

SURVEY

Please answer the following questions to the best of your ability. If you do not want to answer certain questions, you may leave those questions blank. You will NOT be penalized in any way.

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<thead>
<tr>
<th>Please rate the following statements on a scale of 1 to 4</th>
<th>Rating (circle one)</th>
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<tr>
<td>Pharmacists are available for me in the hospital</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Similar to nurses and doctors, I expect a pharmacist to take care of me in the hospital</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Pharmacists are an important member on my healthcare team</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Pharmacists frequently talk with my hospital doctors and nurses about my medications</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Pharmacists educate patients in the hospital about their medications</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Pharmacists provide expert advice about medications</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Pharmacists provide the medications I receive while in the hospital</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Pharmacists help doctors select the best medications for me</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>I am satisfied with my interactions with pharmacists at the hospital</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Pharmacist improve the quality of my care</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Speaking to a pharmacist in the hospital is convenient</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Pharmacists help me to get back to good health while in the hospital</td>
<td>1 2 3 4</td>
</tr>
</tbody>
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Age (years): □ 18 – 29 □ 30 – 39 □ 40 – 49 □ 50 – 59 □ 60 – 69 □ 70 – 79 □ ≥ 80

(If you are NOT at least 18 years old, please do NOT participate in this research)

Gender: □ Male □ Female □ Prefer not to answer

Race/Ethnicity: □ Caucasian/White □ Hispanic □ African-American
□ Asian/Pacific Islander □ Native American □ Prefer not to answer
□ Other: ________________

If you would like to provide any additional comments, please write them in the space below. Please do NOT include any information that can be used to identify you.

Comments:
Tables

Table 1

Comparison of Previous Literature

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<thead>
<tr>
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<th>Design/Setting</th>
<th>Patients</th>
<th>Objective</th>
<th>Outcome/Conclusion</th>
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<tbody>
<tr>
<td>Morecroft et al</td>
<td>One-on-one semi-structured</td>
<td>N=74</td>
<td>To determine expectations and experiences of hospital pharmacy services</td>
<td>43% expected to see pharmacists; all who saw one were surprised pharmacists were involved</td>
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<td>2013; United Kingdom</td>
<td>interviews at 3 hospitals</td>
<td>Mean age 73 yrs [19-86]</td>
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<tr>
<td>Gould et al</td>
<td>Telephone questionnaire</td>
<td>N=325 (703 statement responses)</td>
<td>To analyze open-ended questions to determine content analysis of responses, i.e., patient preferences of hospital pharmacy services</td>
<td>Global categories identified with % of each: 1) Medication information (63.3%); 2) Pharmacy services (7.7%); 3) Self-disclosure (i.e., satisfaction) (23.8%); 4) Information source (5.3%)</td>
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<td>2013; Canada</td>
<td>using open-ended questions of recently discharged patients from Horizon health-system</td>
<td>Mean age 66.7 yrs [19-94]</td>
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<tr>
<td>Authors</td>
<td>Study Type</td>
<td>Participants</td>
<td>Methods</td>
<td>Results</td>
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<tr>
<td>Doucette et al(^7); 2013; Canada</td>
<td>Telephone questionnaire of random patients within 5 to 7 months after discharge from Horizon health-system</td>
<td>N=399</td>
<td>To determine percentage of patients who recall interaction with hospital pharmacist after discharge</td>
<td>46.1% recalled speaking with a pharmacist; 83.2% stated that if offer was available, they would have liked to speak with a pharmacist</td>
</tr>
<tr>
<td>Wilcock et al(^8); 2011; United Kingdom</td>
<td>Descriptive cross-sectional study using inpatient versus outpatient questionnaires regarding experiences with pharmaceutical services</td>
<td>N=91 outpatients N=126 inpatients</td>
<td>To investigate inpatient and outpatient need for medication information and extent this need was addressed</td>
<td>Majority of both inpatients and outpatients agreed they were receiving appropriate pharmaceutical care; profile of pharmacy team needs to be raised regarding medication information to patients</td>
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<td>Slack and Ing(^10); 2009;</td>
<td>Post-discharge telephone follow-up of</td>
<td>N=397</td>
<td>To determine baseline percentage of patients who recall interaction with hospital pharmacist after discharge</td>
<td>20.9% recalled speaking with a pharmacist;</td>
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<td>Country</td>
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<td>Canada</td>
<td>patients discharged from a health system</td>
<td></td>
<td>satisfaction was favorable, overall</td>
<td></td>
</tr>
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<td>Schommer et al; 2002⁹</td>
<td>Weekly one-hour classes (classroom and one-on-one) taught by pharmacists for patients suffering from headaches at inpatient treatment program at single site</td>
<td></td>
<td>Evaluations of pharmacists were favorable; four factors emerged about patient conceptions of pharmacist services: 1) Performance (how it was performed); 2) Disconfirmation of expectations (immediate short-term effects); 3) Equity (fairness); 4) Self-efficacy (long-term outcomes)</td>
<td></td>
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<tr>
<td>Erstad et al(^2); 1994; United States</td>
<td>Questionnaire evaluating increased pharmacy contact versus usual care in an inpatient setting</td>
<td>N=65</td>
<td>To determine if increased pharmacist contact positively effected awareness and satisfaction</td>
<td>Statistical improvement in awareness, satisfaction, and total score; patients desire and appreciate regular pharmacist visits</td>
</tr>
</tbody>
</table>
Table 2

Patient Characteristics

<table>
<thead>
<tr>
<th>Total Surveys Distributed / Total Hospitalized Patients – no. / no.</th>
<th>Control (n=259) / (N=834)</th>
<th>Intervention (n=321) / (N=1097)</th>
<th>p-value&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveys Returned of Total Distributed – no. / no. (%)</td>
<td>147 / 259 (56.8)</td>
<td>140 / 321 (43.6)</td>
<td></td>
</tr>
<tr>
<td>Median Age Range, yrs (IQR)</td>
<td>50-59 (40-69)</td>
<td>50-59 (40-79)</td>
<td>p=0.94&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>18-29 yrs – no. (%)</td>
<td>6 (4.1)</td>
<td>8 (5.7)</td>
<td></td>
</tr>
<tr>
<td>30-39 yrs – no. (%)</td>
<td>11 (7.5)</td>
<td>14 (10.0)</td>
<td></td>
</tr>
<tr>
<td>40-49 yrs – no. (%)</td>
<td>23 (15.6)</td>
<td>21 (15.0)</td>
<td></td>
</tr>
<tr>
<td>50-59 yrs – no. (%)</td>
<td>44 (29.9)</td>
<td>33 (23.6)</td>
<td></td>
</tr>
<tr>
<td>60-69 yrs – no. (%)</td>
<td>30 (20.4)</td>
<td>26 (18.6)</td>
<td></td>
</tr>
<tr>
<td>70-79 yrs – no. (%)</td>
<td>21 (14.3)</td>
<td>24 (17.1)</td>
<td></td>
</tr>
<tr>
<td>≥ 80 yrs – no (%)</td>
<td>12 (8.2)</td>
<td>14 (10.0)</td>
<td></td>
</tr>
<tr>
<td>Male – no. (%)</td>
<td>68 (46.3)</td>
<td>48 (34.3)</td>
<td>p=0.14</td>
</tr>
<tr>
<td>Caucasian – no. (%)</td>
<td>114 (77.6)</td>
<td>112 (80.0)</td>
<td>p=0.61</td>
</tr>
<tr>
<td>African-American – no. (%)</td>
<td>20 (13.6)</td>
<td>19 (13.6)</td>
<td>p=0.99</td>
</tr>
<tr>
<td>Other race/ethnicity – no. (%)</td>
<td>13 (8.8)</td>
<td>9 (6.4)</td>
<td>p=0.44</td>
</tr>
</tbody>
</table>

<sup>a</sup>Chi-square unless otherwise noted

<sup>b</sup>Wilcoxon Rank Sum
Table 3

Secondary Outcomes for Change in Patient Requests for Pharmacy Education

<table>
<thead>
<tr>
<th>Hospitalized patients</th>
<th>Control (N=834)</th>
<th>Intervention (N=1097)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Requests for Education&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>7 / 834 (0.84)</td>
<td>63 / 1097 (5.74)</td>
</tr>
</tbody>
</table>

<sup>a</sup>Includes both patient-initiated phone calls to the inpatient pharmacy and those identified by pharmacy students during routine patient education. The denominator for patient requests for education represents all patients admitted during each period, whether or not these patients were also eligible for survey completion.

<sup>b</sup>Chi-square; (OR 7.2, 95% CI: 5.6 - 9.2); p<0.001
Figures

Figure 1: Patient Eligibility and Enrollment
(see attached)

Figure 2: Change in Median Total Survey Scores
(see attached)

Figure 3: Change in Individual Survey Items
(see attached)
Figure Captions

Figure 1

Patient Eligibility and Enrollment

Patients were screened for inclusion and subsequent survey administration across two
months, the control month and the intervention month. AMS=altered mental status;
CVA=cerebral vascular accident; TIA=transient ischemic attack; ICU=intensive care unit.

Figure 2

Change in Median Total Survey Scores

Of patients completing the survey, a statistically significant increase in median total
survey scores was seen from the control month compared to the intervention month.
Maximum total score was 48 based on 12 items on a 4-point Likert scale. Wilcoxon
Rank Sum using median and inter-quartile range comparisons; significant if p<0.05.
Cohen’s d=0.53 (SEm=1.68). Mean substitution used for missing data; (2.9% of all data).
IQR=inter-quartile range; SEm=standard error of the mean.

Figure 3

Change in Individual Survey Items

Of patients complete the survey, results for each survey item on a 4-point Likert scale
[strongly disagree=1, disagree=2, agree=3, strongly agree=4] are shown on the x-axis
in panels 3A through 3C. For clarity, results are displayed as percentages of
respondents selecting a given Likert scale rating on the y-axis. However, Wilcoxon
Rank Sum is used for median and IQR statistical comparisons; significant if p<0.05.

Mean substitution used for missing data; (2.9% of all data). IQR=inter-quartile range.
Patient Eligibility and Enrollment: Patients were screened for inclusion and subsequent survey administration across two months, the control month and the intervention month. AMS=altered mental status; CVA=cerebral vascular accident; TIA=transient ischemic attack; ICU=intensive care unit.

Figure 1
254x190mm (72 x 72 DPI)
Change in Median Total Survey Scores: Of patients completing the survey, a statistically significant increase in median total survey scores was seen from the control month compared to the intervention month. Maximum total score was 48 based on 12 items on a 4-point Likert scale. Wilcoxon Rank Sum using median and inter-quartile range comparisons; significant if \( p<0.05 \). Cohen’s \( d=0.53 \) (SE\( m=1.68 \)). Mean substitution used for missing data; (2.9% of all data). IQR=inter-quartile range; SE\( m=\)standard error of the mean. 

Figure 2

254x190mm (72 x 72 DPI)
Change in Individual Survey Items: Of patients complete the survey, results for each survey item on a 4-point Likert scale [strongly disagree=1, disagree=2, agree=3, strongly agree=4] are shown on the x-axis in panels 3A through 3C. For clarity, results are displayed as percentages of respondents selecting a given Likert scale rating on the y-axis. However, Wilcoxon Rank Sum is used for median and IQR statistical comparisons; significant if p<0.05. Mean substitution used for missing data; (2.9% of all data). IQR=inter-quartile range.

Figure 3A
254x190mm (72 x 72 DPI)
Change in Individual Survey Items: Of patients complete the survey, results for each survey item on a 4-point Likert scale [strongly disagree=1, disagree=2, agree=3, strongly agree=4] are shown on the x-axis in panels 3A through 3C. For clarity, results are displayed as percentages of respondents selecting a given Likert scale rating on the y-axis. However, Wilcoxon Rank Sum is used for median and IQR statistical comparisons; significant if p<0.05. Mean substitution used for missing data; (2.9% of all data). IQR=interquartile range.

Figure 3B

254x190mm (72 x 72 DPI)
Change in Individual Survey Items: Of patients complete the survey, results for each survey item on a 4-point Likert scale [strongly disagree=1, disagree=2, agree=3, strongly agree=4] are shown on the x-axis in panels 3A through 3C. For clarity, results are displayed as percentages of respondents selecting a given Likert scale rating on the y-axis. However, Wilcoxon Rank Sum is used for median and IQR statistical comparisons; significant if p<0.05. Mean substitution used for missing data; (2.9% of all data). IQR=interquartile range.

Figure 3C
254x190mm (72 x 72 DPI)