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RETRACTED: Pharmacist-Led Discharge Medication Counseling and its Corresponding Impact on Medication Adherence and Hospital Readmission Rates

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Abstract

Objectives: Pharmacists have been shown to reduce hospital readmission rates and improve adherence rates by providing discharge medication counseling and offering services such as a bedside delivery program.¹ Hospitals are now penalized by Medicare if patients are readmitted within 30 days of discharge, so implementation of these programs have the potential to be financially significant as well.² The primary endpoint of this study is to evaluate the impact of a pharmacist discharge medication counseling bedside delivery program on medication adherence rates within a six-week period following discharge. The secondary endpoint focuses on hospital readmission rates. The objective of this study is to increase collaboration between community pharmacies and hospitals in order to improve the quality of patient care. **Methods:** This study was designed as intervention versus control, whereas the intervention patients were those who received counseling from a pharmacist or pharmacist intern and control patients were those who did not within the same time period. Collected patient data (n=81) included patients' demographic data and all disease states, genders, and insurance coverage were encompassed by the included patients. Medication adherence was measured at follow-up intervals utilizing the proportion of days covered (PDC) equation, where a score of at least 80% is required for optimal therapeutic efficacy. Informed consent was obtained from all participants regarding a follow-up telephone call or retrieval of medication records through the pharmacy electronic medication records system and hospital electronic medical records system. Approximately 10-15-minute counseling sessions were performed at the time of discharge. Follow-up phone calls were conducted for the intervention group at four-weeks and six-weeks post-discharge to discuss medication adherence and side effects experienced. **Results:** There was a total of 81 patients enrolled in this study. There were 27 patients in the intervention group and 54 patients in the control group. The pharmacist-led discharge counseling sessions made a statistically significant difference in medication adherence rates ($p < 0.001$) as calculated using PDC, showing adherence rates of 84.4% in the intervention group and 62.8% in the control group. The pharmacist-led discharge counseling sessions made a statistically significant difference in hospital readmission rates ($p = 0.022$), with a 24% readmission rate in the control group and a 3% readmission rate in the intervention group. **Conclusion:** Pharmacist involvement in a bedside delivery program helps to improve medication adherence in patients being discharged from a hospital. A PDC of at least 80% is required for optimal therapeutic efficacy in most classes of chronic medication, and only the intervention arm reached this threshold.³ The findings also show a statistically significant reduction in hospital readmission rates for patients receiving a pharmacist-led discharge counseling session.

Keywords: Bedside Delivery, Specialty Pharmacy, Patient Counseling, Transitions of Care, Adherence, Follow-up Care, Hospital Readmission

Background

Medication adherence is a serious contributor to healthcare related issues¹⁻³. There is an association between non-adherence and adverse outcomes, increased hospital readmission rates, dissatisfied patients, and increased healthcare costs. Every dollar spent on improving medication adherence can save up to \$37 in direct and indirect future healthcare costs.⁴ Patient adherence to medication can be improved with direct pharmacist to patient counseling. A study found a statistically significant increase in medication adherence in an intervention group who received pharmacist counseling compared to a control group who did not receive counseling.⁵ Additionally, a study showed that participants who

receive patient education upon discharge have decreased hospital readmission rates as well.⁶

In a study by Fischer, et al. it was noted that almost 30% of recently discharged patients fail to pick-up prescriptions prescribed to them upon discharge from the hospital, proving poor medication adherence rates.⁷ Offering a hospital bedside delivery service can curb a large portion of this problem and can subsequently reduce hospital readmission rates. A hospital bedside delivery service is a program in which pharmacists, student pharmacists, and/or technicians deliver filled discharge medications from a retail pharmacy directly to the patient in their hospital room prior to being discharged. Other advantages of a bedside delivery service include increased patient satisfaction, increased assistance during transitions of care, and reduced hospital readmissions.⁸⁻⁹ Several studies have shown that pharmacist provision of counseling during this process can decrease hospital readmission rates to further reduce healthcare costs and improve the overall quality of healthcare.^{10,11}

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Based on the studies previously mentioned, a pharmacist's impact on discharge medication counseling can lead to an increase in medication adherence rates which in turn can improve a patient's quality of life and reduce overall healthcare costs.

Objectives

This study utilizes a discharge medication bedside delivery counseling program within a community pharmacy located on the campus of an urban hospital. The bedside delivery program was within a corporate retail pharmacy rather than an internal pharmacy located in the hospital, setting this study apart from others conducted previously. The primary endpoint of this study is to evaluate the impact of a pharmacist discharge medication counseling bedside delivery program on medication adherence rates within a six-week period following discharge. The secondary endpoint focuses on hospital readmission rates.

Methods

The study received IRB approval and informed consent was obtained from all participants. This study involves patients receiving discharge medication counseling with the bedside delivery of their medications from a corporate retail pharmacy from June 1, 2019 through July 31, 2019. The process begins with a patient being discharged from the hospital. The community pharmacy receives discharge prescriptions via fax or while attending rounds. The community pharmacy employees contact the patient to obtain insurance, payment, and demographic information and then subsequently fill the prescriptions. A student pharmacist or pharmacist delivers the medications to the patient at bedside in the hospital within one hour of discharge and offers counseling. The control patients in this study are those who receive their discharge medication delivery from a pharmacy technician and do not receive counseling from a pharmacist. The intervention patients in this study are those who have a pharmacist or student pharmacist personally deliver the medication(s) and provide bedside counseling. Patients participating in the study were randomly assigned to intervention and control groups. The patient receives a follow-up phone call from the pharmacy within 4-6 weeks following discharge.

The data collected was analyzed using an intervention (pharmacist and student pharmacists provided counseling) versus control (pharmacy technicians delivered the medications and no counseling was provided) design, and included patients' multiple disease states, gender, and insurance information. Exclusion criteria included women who are pregnant, in labor, or nursing due to the typical medications prescribed for this population being acute, as well as patients who are under 18 years old. The primary outcome of this study is to observe the impact of pharmacist delivered discharge medication bedside counseling on medication adherence measured using the proportion of days covered (PDC) equation (See Figure 1).^{3,12} PDC is a ratio that calculates the number of days covered by a medication compared to the total number of

days in a period. The secondary outcome of this study is to determine if pharmacist led discharge medication bedside counseling decreases hospital readmission rates within the study's host health system. Either a follow-up telephone call or retrieval of medication records through the pharmacy electronic medication records system and/or the hospital electronic medical records system was conducted at four-weeks and six-weeks post-discharge to monitor medication adherence using the PDC equation. These databases were also accessed to determine if the patient was readmitted to the hospital during this same time period. Approximately 10-15-minute counseling sessions were performed at the time of discharge. Another 10-15-minute follow-up telephone call took place four-weeks and six-weeks post-discharge to discuss medication adherence and side effects experienced. Statistical analysis included a one-sided t-test for the primary endpoint and a Chi-square calculation and relative risk reduction for the secondary endpoint.

Results

There was a total of 81 patients included in the study; 27 patients were included in the intervention arm and 54 patients were included in the control arm (See Figure 2). Patients included were in all units of the hospital and had variable durations of admission and medical histories. A total of 34 patients received short term medications (antibiotics or pain medications): eight in the intervention arm and 26 in the control arm. These patients total period used to calculate PDC were only as long as the acute medications were prescribed. A total of 47 patients received long term maintenance medications: 19 in the intervention arm and 28 in the control arm. For the primary endpoint, using the proportion of days covered equation for only long-term medications, 62.8% of days were covered in the control arm and 84.4% of days were covered in the intervention arm. Adherence rates of 80% or more are needed for optimal therapeutic efficacy, and only the intervention arm reached this threshold.³ These results are statistically significant with a p-value <0.001 using a one-sided t-test (See Figure 3). For the secondary endpoint, hospital readmission rates, the intervention arm experienced a 3% (1/27) readmission rate and the control arm experienced a 24% (13/54) readmission rate with a p-value of 0.02 using a Chi-square calculation. The relative risk reduction is 15.4% (See Figure 4).

Discussion

These results are both statistically and clinically significant as the difference in percent of patients readmitted was quite large, and hospital readmission rates are an important factor in hospital quality ratings and reducing healthcare costs. Limitations of this study include difficulty following-up with patients via a telephone call. This is likely due to the fact that this patient population is rather transient given the low average income of the patients in this health system. Potentially, an email address or contact information for a follow up primary care physician could have been gathered early in the study

during the initial in-person interaction to ensure more patients could be reached for follow-up care. The use of many short-term medications such as antibiotics and analgesics also made the four-week and six-week follow-up intervals and PDC calculations more complicated since patients typically only take these medications for 7-10 days post-discharge. Excluding short-term medications may be an option for future iterations of this study to remedy this particular limitation. Future iterations of this study should be conducted over a longer period of time, in an effort to increase the overall sample size.

Conclusions

Appropriate counseling from pharmacists and/or student pharmacists (to include medication use, potential side effects, what to expect, etc.) upon hospital discharge increases medication adherence rates and, presumably, therapeutic efficacy. The involvement of a pharmacist and/or student pharmacist can also decrease hospital readmission rates. The clinical significance of this study also highlights the potential for reduced healthcare costs due to a decrease in hospital readmission rates when patients receive discharge bedside counseling and follow-up from a pharmacist and/or student pharmacist.

Conflicts of Interest: None

Treatment of Human Subjects: IRB review/approval required and obtained.

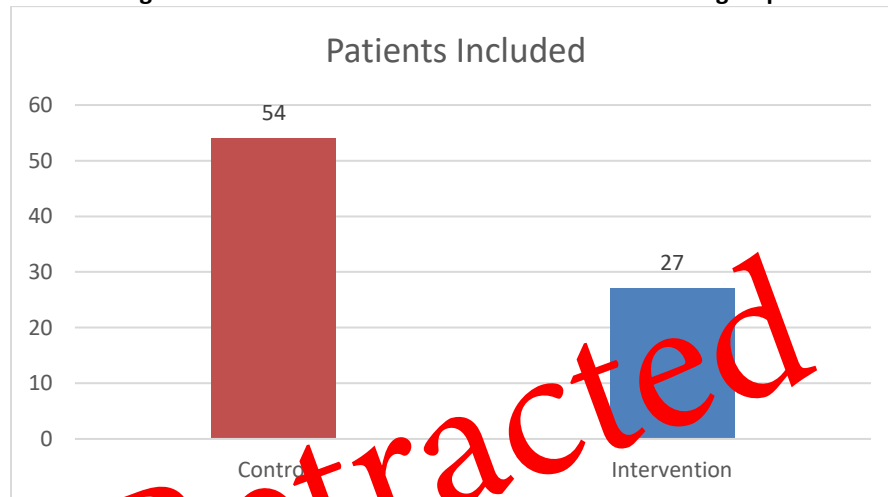
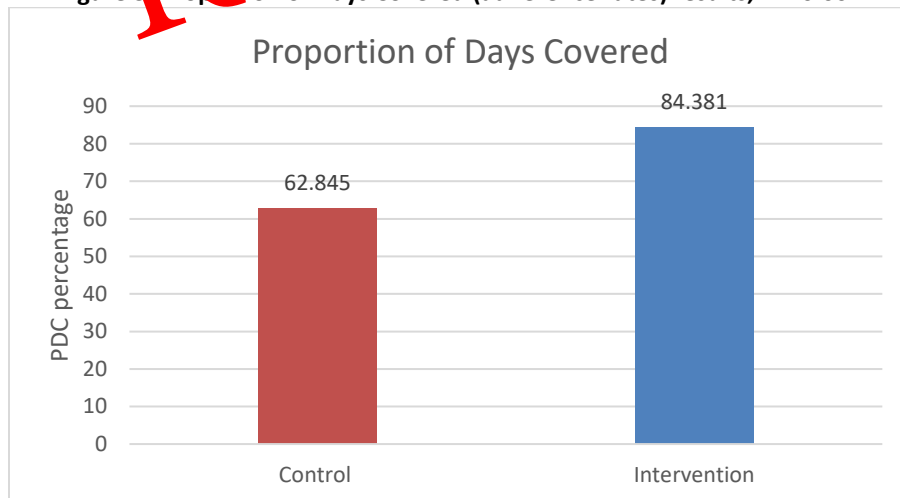
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Figure 1: Proportion of Days Covered Equation

$$\text{PDC} = (\text{Number of days in period "covered" by medication} / \text{Number of total days in period}) * 100$$

Figure 2: Patients included in Control vs. Intervention groups

Figure 3: Proportion of Days Covered (adherence rates) results, $P < 0.001$ Figure 4: Hospital readmission rates results, $P = 0.022$ 