

Original Article

Impact of decentralized pharmacy technicians on medication delivery and nursing satisfaction

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Abstract. It is known that a positive relationship between pharmacy and nursing services is crucial to ensure timely medication delivery to patients within a large academic medical center. Northwestern Memorial Hospital in Chicago, Illinois, explored the impact of a decentralized pharmacy technician (DPT) model on nursing satisfaction with pharmacy as well as on the medication delivery process. During this two-week prospective study, two DPTs were assigned to service either an intensive care unit or a general medicine floor. Two parameters were implemented to assess the effectiveness of this model: 1) nursing satisfaction surveys were distributed at the beginning and end of the study period, and 2) the number of missing medication requests sent to the central pharmacy during the study period was monitored. The results of the study found a statistically significant ($p < 0.001$) increase in all five survey questions administered anonymously to nursing staff, measured on a Likert scale (1 = strongly disagree, 5 = strongly agree), representing an overall positive response to the DPT model. It was also noted that 74% of medications previously requiring physical pick-up by nurses at the central pharmacy were delivered to patient rooms by DPTs during the study period, thereby reducing nursing workload. However, the study did not find a significant decrease in the number of electronic missing medication requests (463 pre-intervention versus 453 during intervention). Overall, the DPT model shows promise in developing more timely and effective medication delivery system while also bridging the communication gap between pharmacy and nursing services. Further studies needed to evaluate the long-term effects of the DPT model.

Keywords: Pharmacy technician, decentralization, pharmacy services, hospital nursing, medication

Introduction

The value of pharmacists' intervention in reducing adverse drug events, unnecessary medication use, and overall treatment costs has been well established.¹⁻³ Furthermore, it has been reported that pharmacists intercept approximately 70% of all physician ordering and prescribing errors, illustrating the necessity of interdisciplinary relationships within the hospital.⁴ Numerous attempts have tried to target the issue of poor communication between nursing staff and pharmacy in an effort to improve the medication administration process and increase functionality of the nursing staff and pharmacy.^{5,6} At Northwestern Memorial Hospital, nurses send medication requests for missing or late medications to the central pharmacy, taking valuable time away from pharmacists and technicians in order to reconcile the request. This process also leads to an increase in the time for a patient to receive his or her medication. The use of a decentralized technician model has the potential to more quickly reconcile medication requests resulting in a decreased time to medication administration.

In order to combat these aforementioned issues,

Northwestern Memorial Hospital in Chicago, Illinois instituted a Decentralized Pharmacy Technician (DPT) program on a select number of their inpatient floors, targeting both intensive care units and general medicine. This new role allows two chosen technicians the opportunity to spend a majority of their day on patient floors, instead of spending their day solely in the central pharmacy. DPTs are entrusted to deliver medications directly to lock-boxes located in patient rooms and work alongside the nursing staff in an effort to decrease missing and late medications. These technicians are also responsible for restocking below-par medications and problem-solving any issues regarding the automated dispensing cabinets (ADCs) located on his or her assigned floor. DPTs serve as a face and voice for the pharmacy department to both the medical team and patients alike.

No recent literature has been published regarding the impact of a DPT model on institutional operations. As the relationship between pharmacy and nursing services is essential for ensuring timely medication delivery, it is crucial to continually evaluate current processes to ensure effective patient care. Within Northwestern Memorial

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Hospital, it is known that pharmacy team members can assist nurses by reducing the amount of missing medications and improving the efficiency of medication delivery. Enhancing both these processes will help minimize interruptions of the nursing workflow due to medication retrieval. The objective of this study was to assess the impact of a unique decentralized technician model on the medication delivery process as well as on nursing satisfaction with pharmacy services.

Materials and Methods

The trial design was a two-week prospective study during September and October 2015 with a one week lead-in period prior to data collection, allowing each study floor to serve as its own control. Two Decentralized Pharmacy Technicians (DPTs) were assigned to cover either a general medicine floor (60 patient beds) or two intensive care floors (46 patient beds) from 9:00 AM to 5:30 PM Monday through Friday. Their daily tasks included delivering both scheduled and first-time doses to patient rooms, assisting in locating and delivering missing medications, and restocking automated dispensing cabinets (ADCs). DPTs were also provided with mobile phones to allow for direct communication with nursing staff to answer any questions regarding missing medications or ADC issues.

To assess the impact of the DPT program on the nursing staff, satisfaction surveys were anonymously collected from nurses located on the study floors. Surveys were distributed prior to and immediately following the intervention period. In addition, the number of medication requests sent to the central pharmacy as well as the number of medications requiring nursing staff pick up were recorded. These parameters play a vital role in ensuring patients receive their medications in a timely and effective manner.

Results

Implementation of a Decentralized Pharmacy Technician (DPT) model at Northwestern Medicine Hospital resulted in several significant findings. Prior to the DPT program, nurses would complete a medication request through the electronic medical record for missing medications. This request was then sent to the central pharmacy to be accepted, filled, and delivered through the pneumatic tube system. However, as narcotics and larger medications are unable to be delivered this way, nurses would need to leave the patient care area and physically pick up these medications at the central pharmacy window. This process is time-consuming and removes the nurse from his or her floor, drawing away from the ideal patient-centered care model. During the two-week intervention period, 74% of medications (25 of 34 total medications) that previously required physical pick up from the central pharmacy were delivered directly to the patient room by the DPT (Figure 1). At the end of the two-week intervention period, satisfaction surveys were distributed to nurses regarding the newly implemented DPT model. Nurses ranked their scores on a Likert scale with 1 indicating strongly disagree to 5 indicating strongly agree.

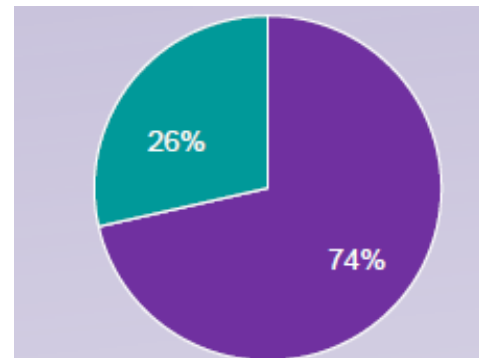


Figure 1: Percentage of medications delivered by a decentralized technician.

Post-intervention, the mean scores for each question were significantly higher than that observed during the pre-intervention period (Figure 2). All nursing satisfaction survey responses were statistically significant ($p < 0.01$). The results of the pre-intervention survey versus post-intervention survey were as follows:

1. Pharmacy staff is helpful with medication procurement: 3.55 vs. 4.67
2. Routine medications for my patients are always available on the floor within 2 hours after being ordered: 2.45 vs. 4.19
3. I rarely have to contact the pharmacy for missing medications: 1.82 vs. 3.88
4. My workflow is rarely interrupted by picking up medications from the pharmacy: 2.68 vs. 4.12
5. Pharmacy responds to missing medication requests in a timely manner: 2.45 vs. 4.25

Discussion

Overall, implementation of Decentralized Pharmacy Technicians (DPTs) within Northwestern Memorial Hospital significantly improved nursing satisfaction with pharmacy services. A decrease of nearly 75% in nursing workflow interruptions due to medication retrieval was observed during the intervention period. The delivery of medications that nurses previously had to pick up at the central pharmacy resulted in a reduced number of phone calls to central pharmacy and likely decreased time to patients' receiving their medications. Delays in medication administration are shown to result in higher rates of morbidity and mortality.⁷ Decreased medication turnaround time then provides potential patient benefits, further illustrating advantages of the decentralized technician model.

Improvement in nursing satisfaction after implementation of the DPT model was noted in the survey, both quantitatively and qualitatively. In addition to the Likert scale responses, the survey also included a free-text response comment section. Overall, nurses felt very positively about the decentralized technician model. Quotes included, "Wonderful experiences-meds were great here the last 3 weeks," "Please continue the program, highly recommended," and "Makes things smoother, meds are on time." Since the implementation and continuation of

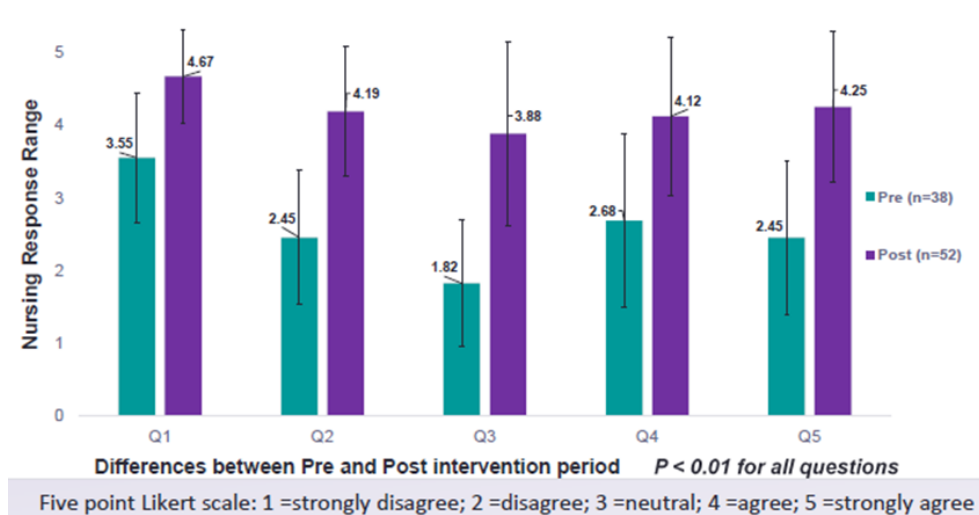


Figure 2. Nursing satisfaction survey responses.

this program, one of the DPTs also received a patient care award representing his dedication to the service.

In addition, DPTs conducted daily audits of automated dispensing cabinets (ADCs) in order to reduce medication stock-out occurrences. Throughout the intervention period, DPTs became increasingly familiar with the medication habits on their assigned floors. As a result, they were able to appropriately adjust par levels for medications that previously would stock out on a frequent basis due to high demand. By ensuring that ADCs were always adequately stocked, DPTs improved medication access, leading to enhanced patient care. DPTs also reported increased satisfaction from nursing staff as nurses did not have to contact the central pharmacy as often to request stocked-out medications.

However, one major limitation of the decentralized technician model was recognized during the intervention period. While on the floors, DPTs were consistently approached by nursing staff regarding missing or late medication requests. Without any way to decentrally approve these requests, the central pharmacy continued to receive these medication requests and fill them appropriately. This phenomenon was represented in the lack of a statistically significant reduction in electronic medication requests during the intervention period for the floors serviced by a DPT. Electronic requests sent, in addition to contacting the DPT to resolve a missing or late medication, was not the intent of the intervention and may have resulted in duplicated work for the central pharmacy. A possible solution would be to provide DPTs with an electronic device (laptop, tablet, etc.), providing them with the means to process medication requests from the nursing staff while on the floor.

Finally, the length of intervention was likely too short to see the full, long-term effect of the decentralized technician model. Despite education, all nurses may not have been aware of DPT responsibilities; therefore, the DPTs may not have been fully utilized during the intervention period. This lack of awareness was illustrated by the fact that 26% of medications requiring physical pick

up from the central pharmacy were still picked up by nurses, rather than utilizing the service of a DPT. It is anticipated that DPTs will reach maximum utilization once nursing staff has adequate time to adapt their workflow to having this pharmacy resource on their floor. Future directions for research should include evaluation of impact of the decentralized technician model over a longer time period.

Conclusions

The decentralized pharmacy technician (DPT) model significantly reduced nursing workflow interruptions and improved nursing satisfaction with pharmacy services. As the pharmacy practice model continues to evolve, DPTs may be increasingly relied upon in order to fulfill the additional medication-related needs of nursing staff without interruption to the central pharmacy workflow. This novel model holds promise in bridging the communication barrier between nursing and pharmacy staff as well as enhancing overall patient care.

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Conflict of Interest

The authors declare no conflicts of interest.

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