



Stressors in the Pharmacy: An Observational of Interruptions in Pharmacy

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Abstract

Errors in the healthcare field are a significant problem. Interruptions leading to distractions can cause errors as these interruptions can distract the pharmacy workers from their tasks. Hence it is important to study interruptions, their types, how they are caused, where they come from, when they occur, how long they last, and how pharmacists and technicians feel about them.

The objectives of this observational study were to:

- 1) classify interruptions based on the type of interruption and cause, time, location, and duration,
- 2) identify differences in interruption types, duration and frequency across days of the week or time of day, and

The analysis of these stressors can aid in improving the processes and increasing safety within the pharmacy.

Introduction

There have been numerous advancements in medical and information technology in recent years, yet error rates are high in health care delivery systems. These errors lead to serious consequences for patients (Knudsen, Herborg et al. 2007). Some errors can even lead to a patients death, medication-related deaths are approximately 9,000 per year (Phillips, Christenfeld et al. 1998).

Methodology

Observers recorded the type, time and duration of interruptions by using a stopwatch and a standardized observation chart. Each length of observation was approximately 2 hours long with a total of the 20.5 hours of observation. During each observational period there were one to three observers present. Data mining was used for analysis of the data that was found.

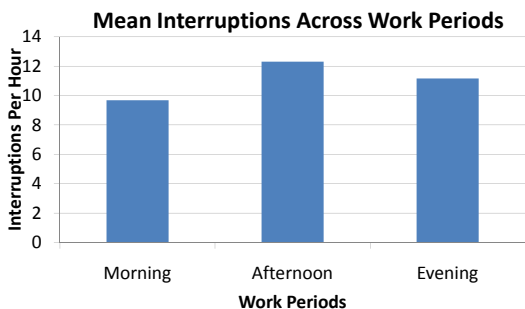


Figure 1: The mean number of interruptions across different time periods.

Results

Table 1: Descriptive statistics for Interruption types across observation sessions.

Type	Mean (SD) Duration (Min.)	Overall Frequency	Relative Frequency (%)
In. Phone/Clarify Meds	1.31 (1.08)	33	15%
In. Phone/Transfer Call	0.97 (1.45)	18	8%
In. Phone/Missing Info	0.78 (.52)	10	4%
In. Phone/Confirm Order	0.62 (.49)	16	7%
In. Phone/Check up Order	1.64 (1.30)	22	10%
In. Phone/Change Medication	0.98 (.79)	20	9%
In. Phone/Personal	2.88 (3.27)	2	1%
In. Phone/Hurry up Calls	1.59 (1.28)	13	6%
In. Phone/Unknown	0.62 (.38)	12	5%
Outgoing Phone	1.03 (.44)	11	5%
Outgoing/Confirm Orders	0.58 (.24)	3	1%
Outgoing/Check up Orders	0.98 (.40)	2	1%
Outgoing/Change Medication	2.02 (1.53)	2	1%
Outgoing/Personal	0.59 (.00)	1	0%
Outgoing/Hurry Up Calls	1.25 (.00)	1	0%
Outgoing/Unknown	0.97 (.63)	8	4%
Discussion	0.85 (.76)	30	13%
Window	2.31 (2.48)	12	5%
Door	0.33 (.15)	5	2%
Hands on Task	1.07 (.99)	6	3%

During the 20.5 hours that were observed there were a total of 227 interruptions; the average number of interruptions was 11.04 per hour. In this study, incoming phone calls to clarify orders were the most frequent interruptions (15%), and incoming phone calls in general comprised 65% of all observed interruptions. While these were the most frequent interruptions, they were not always longest in duration.

A tree classification method was performed to identify interactions between time of day, day of the week, and types of interruptions. Time of day was the most significant predictor. The types of interruptions that occur at different times during the day were significantly different:

- Mornings are likely to have general discussions and check up on specific orders;
- Afternoons are likely to have clarifying medications and transfer calls;
- Evenings have clarifying medications and "hurry up" calls.

As shown in Figure 1, the time of day with the highest number of interruptions is the Afternoon.

Discussion

Human factors research has long established that interruptions, particularly those that disrupt the primary task and require divided attention, are a root-cause of human error, including error in healthcare environments (Flynn, Barker et al. 1999; Yates, Hochman et al. 2004; Brixey, Robinson et al. 2005; Subramoney 2009). Previous researchers have also identified taxonomies of interruptions in the Pharmacy (Brixey, Walji et al. 2004); however, the taxonomies have not analyzed data to identify patterns between the types of interruptions, when they occur (time of day and day of week) and how long they last (duration). Further, the prevalence of interruptions in the form of incoming phone calls points to the importance of a broad systemic view in understanding errors in medication processes beyond just the pharmacy.

Conclusion and Future Work

All of the data that was observed and all of the findings are being presented to the pharmacy practitioners to help them understand interruptions and other stressors in order to better design/change work systems. A survey is currently being conducted, which will gather practitioner perspectives of stressors. Additionally, by analyzing the pharmacy workers' perceptions of workload and stressors we may be able to further understand the causes and implications of interruptions and other stressors in order to better target process improvement and work system redesign efforts and improve quality.

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