

Decision Making in Analysis of Hospital Dispensary Pharmacists Performance Using Failure Mode and Effect Analysis; A Case Study in Jordan

T. AlBqur, Royal Medical Services, Jordan; N. Alraggad, Royal Medical Services, Jordan; B. Alshahwan, Institute of Biomedical Technology, Jordan; I. Maaitah, Zarqa Military Hospital, Jordan

Abstract

The evaluation of performance of hospital dispensary druggist is a key factor in determination the overall evaluation of overall hospital performance. As a part of the study that aims to evaluate and improve the analysis of hospital dispensary performance, Failure Mode and Effects Analysis (FMEA) was applied on the analysis process of hospital dispensary druggist performance to highlight the fields within druggist administrated dispensaries needing improvement. FMEA was applied through distribution of threshers in the dispensaries of Prince Hamza Hospital (PHH). Information was analyzed with a method adapted from FMEA. The outcomes taken out from this threshold indicate that druggists are acting their tasks at a satisfactory level during each druggist-patient call. No item accomplished a product score high enough to be considered as needing improvement based on FMEA methods. The results will help us improving the performance of hospital dispensary druggist.

Key words: Failure Mode and Effects Analysis (FMEA), Hospital dispensary druggists' performance, Prince Hamza Hospital (PHH)

Introduction

The recognition of druggists as healthcare suppliers in recent Medicare legislation is a crucial stage in the expansion and acceptance of clinical apothecary services [1]. There is widespread interest in improving dispensary druggists' performance, particularly in the hospital setting. Numerous suggestions have been made as to how this should be done, but there is a paucity of data demonstrating the effectiveness of any of the interventions that have been proposed [2]. The aim of this research is to evaluate the performance of Prince Hamza Hospital (PHH) hospital dispensary druggist using Failure Mode and Effect Analysis (FMEA).

There were a lot of researches investigating the performance of pharmacists through FMEA, for instances; Vincent et al, 2013 applied FMEA through a survey adapted for use in pharmacist-managed clinics. Patients completed the survey following regularly scheduled pharmacist appointments. Data were analyzed with a method adapted from HFMEA. Product scores could range from five to 25. A product of five indicates that pharmacists are doing a good job on the items that patients place the most value on, while a product score of 25 indicates that pharmacists are doing a poor job. A score greater than or equal to ten was used to identify areas for improvement [1].

Ryan, 2012 used FMEA by a multidisciplinary team to identify key failures in the original medication incident reporting system. The likelihood of the failure occurring, the severity and delectability of the failure if it occurred were agreed by the team and used to calculate the Risk Priority Number (RPN) of each failure mechanism. Potential failures with an RPN of greater than 45 were targeted in an FMEA action plan which was produced and implemented with the aim of reducing these priority risks. This action plan included the introduction of a new medication incident report form, a new database to record and analyze incidents for trends, a new medication safety newsletter for staff and the production of a key performance indicator to feedback information to management [3].

Sunderland et al, investigated the failure-mode and effects analysis in improving a drug distribution system. In his research, (FMEA) was applied to the ward stock system was studied. In the ward stock system of a large teaching hospital in Western Australia, bulk drug packs were stored in cupboards on the wards, and drug products were transferred to drug trolleys before dose administration by nurses.

A pharmacist used the disguised-observer technique to determine the error rate in the ward stock system for a medical ward and a surgical ward.

The errors and each step in the system were studied by FMEA. A unit supply individual-patient dispensing (USIPD) system was formulated to respond to the failure modes identified. In this system, a five days supply of medication was dispensed for each patient from a satellite pharmacy close to the ward.

Medication charts were reviewed by a pharmacist, and drugs were dispensed in labeled vials that were placed in a locked drawer at the patient's bedside.

The error rate under the USIPD system was determined. Problem areas in the ward stock system identified by FMEA included drug availability, review of orders, drug selection, patient-related issues, and use of nurses' time.

The percentage of opportunities during which any error occurred was significantly lower under the USIPD system on both wards. FMEA was used to identify deficiencies in the ward stock system that led to medication errors in an Australian hospital. An alternative drug distribution system designed to address the problems identified was associated with fewer errors [4].

EloudaiI et al conducted a research in analysis of the pharmaceutical supply chain by the FMEA method: Case hospital Ibn Sina child-Rabat. He optimized the medicament circuit in the hospital using the Failure Mode and Effects Analysis (FMEA) method that is widely used in many industries who wish to assess the reliability of a process and the inherent risks.

His work is structured as follows: The first part of this article presents the interest of hospital logistics and supply chain pharmaceutical the second part presents the results of the methodology and its impact on the performance of the medication to the children hospital [5].

Villafrance et al , used FMEA to analyze the preparation and dispensing of neonatal PN from the perspective of the pharmacy service in a general hospital. A process diagram was drafted, illustrating the different phases of the neonatal PN process.

Next, the failures that could occur in each of these phases were compiled and cataloged, and a questionnaire was developed in which respondents were asked to rate the following aspects of each error: incidence, detectability, and severity. The highest scoring failures were considered high risk and identified as priority areas for improvements to be made [6].

Methodology

This research was conducted through a questionnaire distributed at three hospital dispensaries within the PHH. It

took four weeks in April 2012. The basic criterion of selecting the dispensaries was having a diverse group of patients so for that reason we choose out patients' dispensary, Surgery dispensary and orthopedics dispensary. We implemented FMEA to differentiate the cause and effect nexus to minify medication errors. It can supply a useful menstruation to develop dispensary services by differentiating areas with the greatest effectuation based on what the patient values as significant.

Thresher Constructing:

The thresher was written by a committee of biomedical engineers and druggists through conducting interviews with expertise of the Pharmaceutical sector and through asking the patients about their opinion in the drug delivery service. The thresher included 13 multiple choice questions with simple language taking in consideration the variety of educational levels of the interested sample. The number of questions was chosen not to be long because if the thresher was long, the respondents will feel bored and they will not give realistic answers.

Thresher Distribution:

The thresher was distributed in three dispensaries within the PHH after Distracting recipes from the doctors. 150 thresher forms were distributed and 110 forms (more than 75 %) were collected with full answers within 4 weeks. The percentage allowed us to adopt the returned forms number. The sample included both males and females all of them were more than 18 years old.

Data Analysis:

In this research, norm adjectival statistical methods were utilized to inspect quality enhancements results and FMEA has been implemented to accumulate weight to the significance of results by expressing it in numerical values. Ebiling said that FMEA is a bottoms-up, iterative approach for analyzing a design of a product or process in order to determine what could wrong, how badly it might go wrong and what needs to be done to prevent it.

The FMEA is a bearable speculation providing a process for placing weights on upshots (i.e.: assigning a value to the importance of different components of patient schooling based on what the patient perceives is most crucial. This permits for upshots to be preferred and easy determination of fields for development based on numerical marking. For this dissection, product markings could range from a score of five to 25, with a product value of 5 indicating that apothecaries are performing a good deed on the items that patients place the most importance on while a product score of 25 would indicate that apothecaries

are doing a poor deed on the items that patients feel are most important.

The specific procedure utilized for calculating the FMEA marks include calculating each thresher component to be estimated, then multiplying corresponding components from sections 1 and 2 of the thresher to pinpoint an overall product score for that item. Traditionally; a product greater than 1/2 of the highest mark is utilized to point out the necessity for development during FMEA procedure. To preserve matchmaking with prior published procedures, a conservative final score greater than or equal to 10 was used to identify fields for development across the druggist administrated hospital dispensary sites.

Results:

Table 1: Patient statistical information according to the population and particular groups within it

Mean age in years (Standard deviation)	45 (10%)
Gender:	
Male	56 (50.7%)
Female	54 (49.3%)
Number of hospital dispensary calls*	
3	20 (27.3%)
4-5	30 (29.8%)
6-8	17 (14.2%)
9-12	22 (15.8%)
>12	21 (13.9%)
Recipe medication encasement ***	
Medical Insurance	49 (45.3%)
Charity treatment	32 (28.6%)
On his account	10 (8.6%)
Cash/no third party	19 (17.5%)
Overall mean number of medicaments per patient	13.5 (9.5%)
mean number of medicaments administered by druggist per patient	7 (6.5%)
Druggist administered illness situation*	
Diabetes	51 (60.5%)
treatment of thrombosis administration	30 (40%)
Hypertension	46 (57.4%)
Stop smoking	5 (7%)
atherosclerosis	65 (70.1%)
Other	7 (9.2%)
Period of druggist administrated	10 (10.6%)

illness position in years	
* n=110 ** n=110 ***	
**** Total is greater than 100% due to patients having multiple druggist administrated illness states	

As shown in the table above, total of 110 patients completed threshers during the information gathering duration. Around 50% percent of thresher respondents were male, with a mean age of 45±10 years (Table 1).

Table 2. Thresher Results' mean product

Thresher Item	Mean Product
1. Telling you the name of each of your medications and what they are used for	7.81
2. Explaining the efficiency of your medication	7.87
3. Instructing you on the medication drug dealing way	7.85
4. Stating the likely side effects of your medications	9.08
5. Giving information about your medical problems and the advantages of treating them	8.33
6. Discussed goals of treatment for each of your medical problems	8.03
7. Discussing with you about the next stages in administrating your medical problems	8.09
8. Answering your questions fully	7.65
9. Agitating the exchequers available to aid you with your medicaments	6.35
10. Predestine a lot of time with you	7.71
11. Speaking with you in an understood way	7.43
12. Remediying you with regards and kindness	7.56
13. Total classification of your dispensary calls	8.03

Of the all components assessed, no item achieved a mean product of greater than or equal to 10 (Table 2). Thresher item 4, "Stating the likely side effects of your medications," had the highest overall mean product at 9.08.

When affording the thresher responses based on the specific illness state administrated by the druggist, the patients' with

diabetes had the highest mean product for thresher item 4 with a product score of 9.08.

Thresher item 5, "Giving information about your medical problems and the advantages of treating them", had the second highest overall mean product score at 8.33. Thresher item 9, "Agitating the exchequers available to aid you with your medicaments", had the lowest overall mean product score at 6.35.

The final non-demographic thresher question asked patients to state three items they most crucial. Of the 110 patients that responded, those items listed usually were "Told you the name of each of your medicaments and what they are used for", "Answered your questions fully", and "Illustrated your medications effects".

The males' specific frequencies of response of thresher items can be shown in table 3. The frequency of the most valued educational components was compared between males/females as shown in figure 1. Males rated thresher items 1 and 2 as most valued more often than females; females rated thresher items 12 and 13 as most valued more often than males.

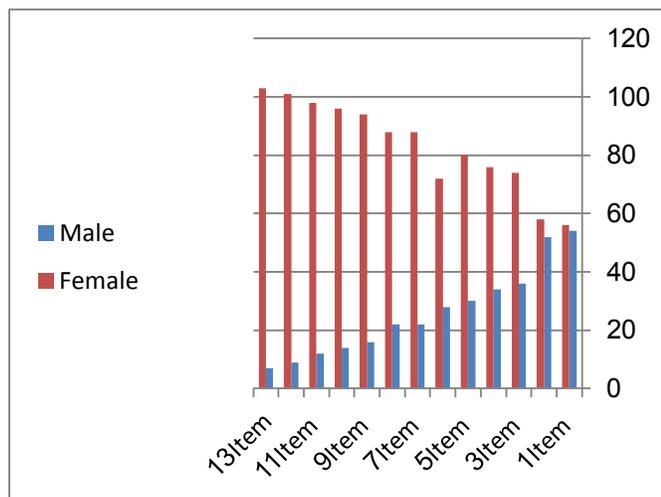


Figure 1: Survey responses for male and female

Table 3: Thresher responses frequencies

Thresher Item	Frequency
1. Telling you the name of each of your medications and what they are used for	54
2. Explaining the efficiency of your medication	52
3. Instructing you on the medication drug dealing way	36
4. Stating the likely side	34

effects of your medications	
5. Giving information about your medical problems and the advantages of treating them	30
6. Discussed goals of treatment for each of your medical problems	28
7. Discussing with you about the next stages in administrating your medical problems	22
8. Answering your questions fully	22
9. Agitating the exchequers available to aid you with your medicaments	14
10. Predestine a lot of time with you	14
11. Speaking with you in an understood way	12
12. Remedying you with regards and kindness	4
13. Total classification of your dispensary calls	2

Conclusions:

The outcomes taken out from this thresher indicate that druggists are acting their tasks at a satisfactory level during each druggist-patient call. No item accomplished a product score high enough to be considered as needing improvement based on FMEA methods.

Estimating the individual product scores has highlighted fields on which to focus future quality improvement efforts. For instance, describing the possible side effects of each medicament. These results, found that the individual response most commonly related to a score of greater than or equal to 10 related to the argument of potential medicament side effects.

This may indicate that druggists working in hospital dispensary sense it is more crucial to emphasis on total disease administration state and perhaps propose that the druggists dispensing the prescription will educate the patient on the medication itself. In addition to the previous; side effects may have been discussed when medicaments were distracted but not concentrated on each patient call if no medicaments changes were being made.

When having a view at the items frequently marked as being the most valued by patients overall, the product scores implies that dispensary druggists are satisfying patients' expectations across



a variety of druggist administrated dispensary settings. On the other hand, when having a view at particular patient populations there are some variations in what is valued most highly through an appointment with a dispensary druggist.

Male participants more strongly valued interaction in a way that could be easily understood and that fully replied questions than the female participants. The female participants ranked remedying you with regards and kindness and Speaking with you in an understood way more did the male participants.

These differences among patient inhabitances demonstrate the necessity for progressive lore on the role of the dispensary in druggist administrated dispensary to ensure that each patient is getting the most out of their individual appointment by inclosing components that are most likely to be highly valued.

The outcomes obtained in this research are consistent with the previously published qualitative information on druggist patient interactions and shoring the idea that disease state administrated by druggists is a successful expansion of care for chronic diseases.

Time limitations in primary care often limit the employs provided by physicians. Not only are druggists able to spend increased time with patients, but they are also able to perform it in a way that often exceeds patient anticipations of a patient-healthcare provider communication.

The use of FMEA as a dispensary process development tool is a novel concept that can be utilized to all sides of pharmaceutical care, not just in the druggists' administrated dispensaries. It is a crucial tool that can help druggists to determine fields of success as well as fields in necessity of development. An additional weal of utilizing the FMEA model is its implementation as a crucial learning tool to help enhancing druggists' efficacy and patient care.

The low number of total participants in these researches highlights a larger dare presented to druggists' administrated dispensary, the number of patients that do not keep their scheduled appointments.

FMEA is intended to be utilized as a tool for process development. Each apothecary process may not be the same, introducing variables into the analysis. However, the items evaluated by this thresher are a part of each druggist –patient encounter and are similar across a variety of druggist administrated dispensary settings.

The results show that illustrative components provided through druggist administrated dispensary appointments are

aligned with patients' requirements and clinic based druggists are able to successfully involve the components that patients value highly in a patient-healthcare supplier communication.

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