

Study of Drug Dispensing Process and Turnaround Time in Outpatient Pharmacy

By

Abhimanyu Sethi (PT)

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2017-2019



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Abhimanyu Sethi**, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **Rukmani Birla Hospital, Jaipur, Rajasthan** from **3rd February 2019** to **3rd May 2019**.

The Candidate has successfully carried out the study assigned to her during internship training and her approach to the study has been sincere, scientific and analytical.

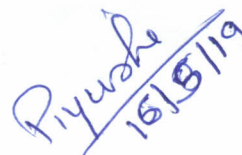
The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

A handwritten signature in blue ink, appearing to read 'Ashok'.

Col. (Dr.) Ashok Kaushik
Dean, Academics and Student Affairs
The IIHMR University, Jaipur

16 May 19

A handwritten signature in blue ink, appearing to read 'Veena'.

Mrs. Veena Nair Sarkar
Assistant Professor
The IIHMR University, Jaipur

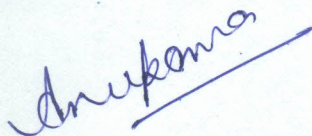
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Date:- 8th May 2019

To whom so ever it may concern

This is to certify that Mr. Abhimanyu Sethi has successfully completed his internship training in Operations department from 03th Feb. 2019 to 03 May 2019.

We found him sincere, punctual & hardworking. We wish him every success in his future and career.



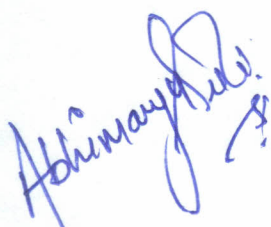
Anupama Sharma

Head – HR & Training

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **A Study of Drug Dispensing Process and Turnaround Time In Outpatient Pharmacy In Rukmani Birla Hospital, Jaipur** and submitted by **Dr. Abhimanyu Sethi** Enrollment No. **IIHMR-U/01/2017-19/0523** under the supervision of **Mrs. Veena Nair Sarkar** for award of **MBA in Hospital and Health Management** carried out during the period from **3rd February 2019** to **3rd May 2019** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.



Signature

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List of Abbreviations

FCFS- First Come First Serve	16
IPD-In-patient Department	18
MRN-Medical Registration Number	5
OPD-Out Patient Department	11
OP-Out-Patient	5
TAT-Turn-around Time	13
WHO-World Health Organization	4

1. Introduction-

Out-patient pharmacy is the critical support system in terms of monetary support and accomplishments. There are many support services in a hospital which carry out much of the "behind the scenes" work. So, to have competitive advantage, differentiation and to make excellent patient experience hospital pharmacy should eliminate non-value adding services, over processing, overproduction and maintain optimum inventory, manpower, service consistency. In-house pharmacy service must maintain optimum patient satisfaction and revenue. Good dispensing practices ensure that an effective form of the correct medicine is delivered to the right patient, in correct dosage and quantity with clear instruction and in a package that maintain the potency of the medicine.¹ Pharmacy professionals bridge the gap between the prescribers and patient and serve as gate keeper of medicine supply system.¹ Patient waiting time for healthcare services is identified by the WHO as one of the key measurements of a responsive health system.² Patient waiting time has been defined as the length of time from when the patient entered the pharmacy to the time the patient actually received his or her prescription and left the pharmacy'. Long waiting time has been given as a reason why some patients do not have their prescriptions filled in a pharmacy.³ Factors on which purchase decision of a client depend on are-Knowledge of the pharmacists, communication, affordability, short wait, availability ⁵

1.1 The objective of out-patient pharmacy of CKB :

1. To perform smooth outpatient drug dispensing.
2. To educate patients regarding good practices of administering.
3. To avoid ambiguity arising from sound-alike drugs.

Out scope: all pharmaceutical items dispensed from inpatient pharmacy.

Process prerequisite:

1. Computer
2. Printer
3. Adequate stationary
4. Enough manpower
5. Valid prescription of doctor

Drug dispensing prerequisite-

The pharmacy shall dispense the medications with the appropriate label indicating:

- I. Patient name and MRN
- II. Name of the drug & strength
- III. Expiry date
- IV. Batch number

Process: -

1. Doctor examines patient and prescribes medicine.
2. A patient comes to OP pharmacy with a doctor's prescription.
3. Prescription is checked by a pharmacist. Pharmacist checks for ambiguities.
4. If ambiguities are found he/she will contact the consulting doctor to clarify against doubts.
5. The pharmacist makes entry of the prescription into the system.
6. He/she will take out the medicines from the racks and will dispense according to as per the instruction is given in the prescription.
7. He/she will then hand over the bill and the medicines to the patient.
8. Also, he/she will educate the patient on administering the medicines in a proper way.

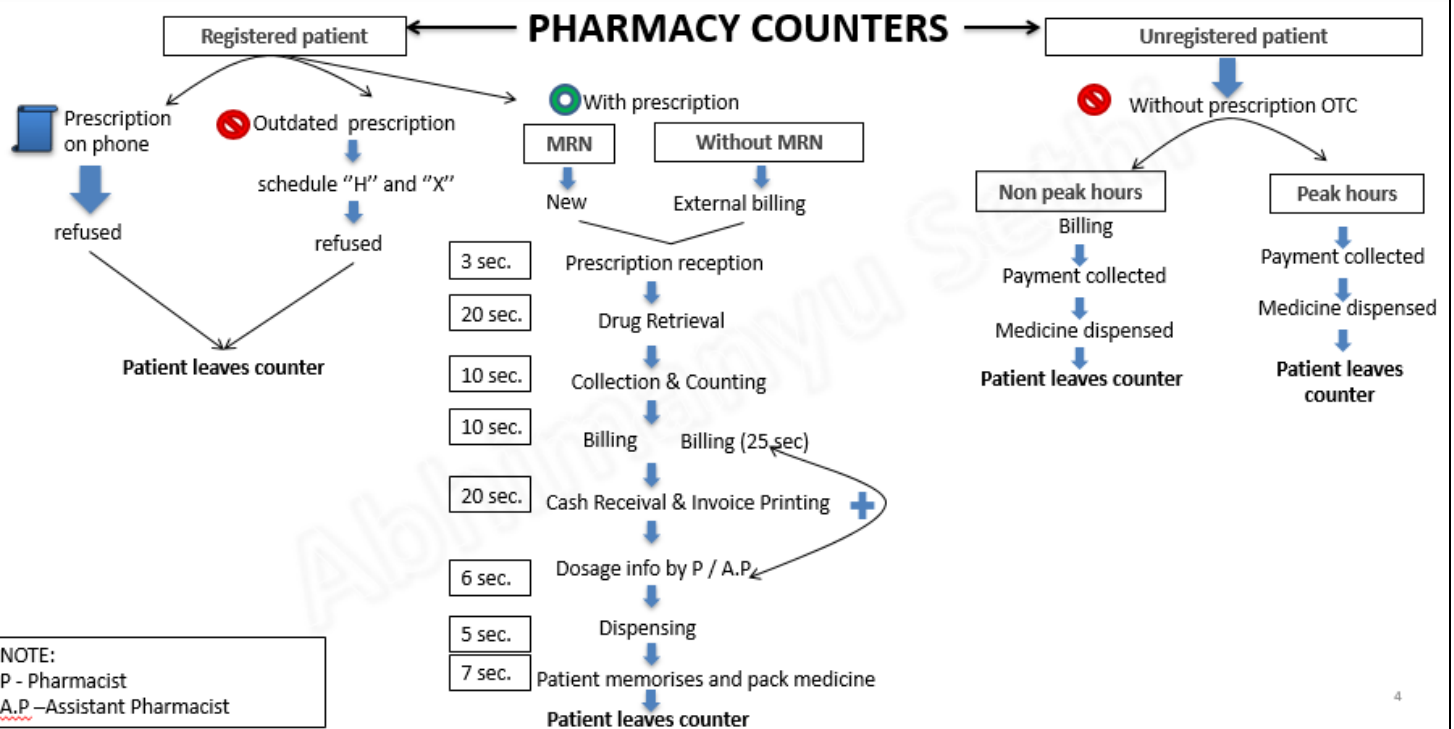


Figure 1. Type of prescriptions received at the pharmacy counter

1.2 Problem statement-

Delay in prescription processing

1.3 Research question-

How does the current prescription processing relate with waiting time in OP pharmacy in tertiary care hospital?

1.4 Objectives of the study

1. To study and map out the pharmacy functioning
2. To study steps of current prescription processing
3. To capture waiting time
4. Identification of the bottleneck responsible for delay (if any) in prescription processing
5. To suggest measures to minimize prescription processing time

2. Literature review-

Authors	Title	Research design	Result
1. Ashalatha Muppur, Sridevi Kandavalli	Study of Dispensing Practices at Pharmacy Settings in Kadapa	A cross-sectional study was conducted for 3 months i.e. from October to December ,2016	About 25% of pharmacists checked for all the like details of patient, date of prescription, name of the drug, dosage schedule, signature and register number of doctors in the prescription before dispensing the drug
2. Jing Sun, Qian Lin, Pengyu Zhao	Reducing waiting time and raising outpatient satisfaction in a Chinese public tertiary general	longitudinal study for filling prescriptions between 1 March 2015 and 28 February 2017	the waiting times for filling prescriptions ranged between 24.91–42.52 min during March 2015–January 2016, which went

	hospital-an interrupted time series study		down to a range of 14.99–28.77 min during February 2016–February 2017.
3. Meena Kumari K1, Somu, Mohan Amberkar,Nandit P.B	Patients' Response to Waiting Time in an Out-Patient Pharmacy at a Tertiary Care Hospital	It was an observational study done on customers attending hospital pharmacy for a period of two months. 2012	Majority of the time was consumed in billing after placing the prescription on the dispensing table. It was seen that in the morning session the waiting time for the various components of processing were less compared to the afternoon, except for the processing of the transaction time by the cashier is more in the morning (38.34±34.66) sec compared to (28.42±25.67) sec.
4. Nanda Surya Febrianta, Sri Sundari ,Dwi Pudjaningsih	Waiting Time Analysis of Pharmaceutical Services with Queue Method In PKU Muhammadiyah Hospital Bantul	This research is a quantitative research with descriptive observational research method from samples taken and to support this approach, 2016	While the result of direct observation of waiting time of pharmacy service of special outpatient of prescribed concoction known mean waiting time is 41,22 minutes, with the longest service time reach 54,08 minutes

			The process of service delay at the time prior to delivery of the drug is the most contributing greatly affecting service time.
5. Danyelle Thomas	Determination of Barriers to In-House Pharmacy Utilization	The survey was developed by combining questions from the current patient satisfaction phone questionnaire, questions from previous research on community pharmacy satisfaction and free answer fill in the blank questions to assess patient opinions (The subjects the survey addressed were current pharmacy, number of prescriptions, overall health, wait times. 2014	Most of the wait times were between 0 -20 minutes for both groups (kent and federal ways). The Kent location had the highest number of patients waiting 10-20 minutes for an average of 3.75 medications
6. Margaret O. Afolabi and Omoniyi Joseph	Managing Pharmacy Operations with	Book	Pharmacists would be more satisfied at their jobs if they were able to

Ola-Olorun	People and Technology		dispense what they consider to be a 'comfortable' number of prescriptions per hour that would enable them to counsel patients properly and attend to other clinical practice contributions to patient care. Other strategies that could significantly speed the process of service delivery in the pharmacy include the adoption of new technologies such as electronic payment and computerisation of some of the pharmacists' activities.
7. Jharna Bajpai, Nirmal k Gurbani	Gap analysis between patients' expectations and services provided by pharmacy store of a tertiary care hospital	Cross-sectional (2 months April 2013-June 2013)	Not many respondents responded positively for waiting time to get the drugs. This should be aimed to attain maximum satisfaction as no customer likes to wait in the service industry and the hospital is no such exception
8. Jasleen Kaur, j.s. Sapna, nilakantha	Management of hospital	Random convenient sampling (3 months	Out of the total 70 patients replied,

bhoi, and o.p. Singh	pharmacy In the private sector	February 2004- April 2004)	maximum that is, 40 percent said that all the medicines prescribed by the doctor should be made available at the Pharmacy, 13 percent said that full strips should be cut and as many tablets as needed should be offered to patients; 18 percent were against the substitution of prescribed drugs; 11 percent of patients complained Regarding the waiting time at the counter of outpatient pharmacy
9. T. P. G. M. De vries R. H. Henning H. V. Hogerzeil D. A. Fresle	Guide to good prescribing A practical manual	Book	

3. Research methodology

Descriptive and Observational

(descriptive- because data is used to describe a situation, behaviour, phenomenon in the pharmacy department)

(Participant observational research- acting as a member of the pharmacy team aimed at observing behaviour that otherwise would not be observed)

3.1 Methods

The study was carried out between February and April 2019 at Rukmani Birla Hospital out-patient pharmacy in Jaipur, Rajasthan.

It was an observational study done in the out-patient pharmacy. It is open to patients from 8 A.M. to 10:30 P.M., but the peak hours for the out-patient transactions is from 1:00 P.M. to 3:00 P.M. daily on weekdays.

At the time of this study number of pharmacists working in the service area of the pharmacy was 5, one associate and one attendant.

Signed prescription indicates the drug is prescribed for a patient for a definite period. Attendants/patient carry their prescription to the pharmacist who checks the prescription for validity, dosage, ambiguity and drug interactions.

Due permission was taken from relevant authorities to carry out this study at out-patient pharmacy of Rukmani Birla hospital.

Turnaround time- data was captured using stopwatch with lap time function on three counters of the pharmacy in which prescription receiving, drugs retrieval, collection and counting, billing, dispensing and packing time was noted.

Prescription audit-data was captured using guidelines laid by WHO check for bounce medicine rate, MRN in a manual prescription for computerized prescriptions bounce medications, MRN and printing errors were captured. The random prescription was audited as of convenience throughout the day to cover various specialties from 9:00 am- 5:30 pm

3.2 Study Design

- **Study design:** Quantitative study
- **Setting:** out-patient pharmacy, Rukmani Birla Hospital
- **Total population:** 6038 clients who have visited OP pharmacy in March 2019
- **Inclusion criteria:** clients arriving at the OP pharmacy counter in OPD hours
- **Exclusion criteria:** clients arriving after OPD hours, Sunday, holidays, clients before 9:00 A.M.
- **Duration of study:** 3 months (3rd February 2019- 3rd May 2019)
- **Sample size:**
 - a) 357 for turnaround time (population-5074 excluding outliers)
 - b) 457 prescription audits
- **Data collection method**

The data was collected using both primary data collection methods as well as secondary sources.

 1. **Primary data**– Real-time data from clients arriving at the pharmacy counter, pharmacists, assistant pharmacists, head of the department pharmacy
 2. **Secondary data** – Information gathered from the hospital information system.

3.3 Method of sampling:

- **Sampling technique:** random convenience sampling

The technique used for conducting the study was

- Simple random sampling (2 samples from every counter)
- Simple random sampling (Every 4th Prescription arriving at retrieval desk)

4. Results and discussions

The specific tasks of the project were-

1. Observe prescription processing elements and write out details using checklist (Table 1).
2. Map-out a flow chart of dispensing process in OP pharmacy (Figure 2)
3. Measure specific metrics for the processing elements (Table 2) taking an average of observations for one month
4. With the help of flow chart and observer metrics identify the bottle-necks in the dispensing process.
5. Give appropriate suggestions to improve scenario

Prescription Processing Elements	Time in minutes.
1. Prescription receiving and validation	
2. Drug retrieval by the assistant pharmacist	
3. Billing of medicines by the pharmacist	
4. Provide dosage information to the client/Patient	
5. Cash receiving by the pharmacist	
6. Invoice handover by the pharmacist	
7. Patient packs the medicines and leaves counter	

Table 1. Prescription processing elements checklist

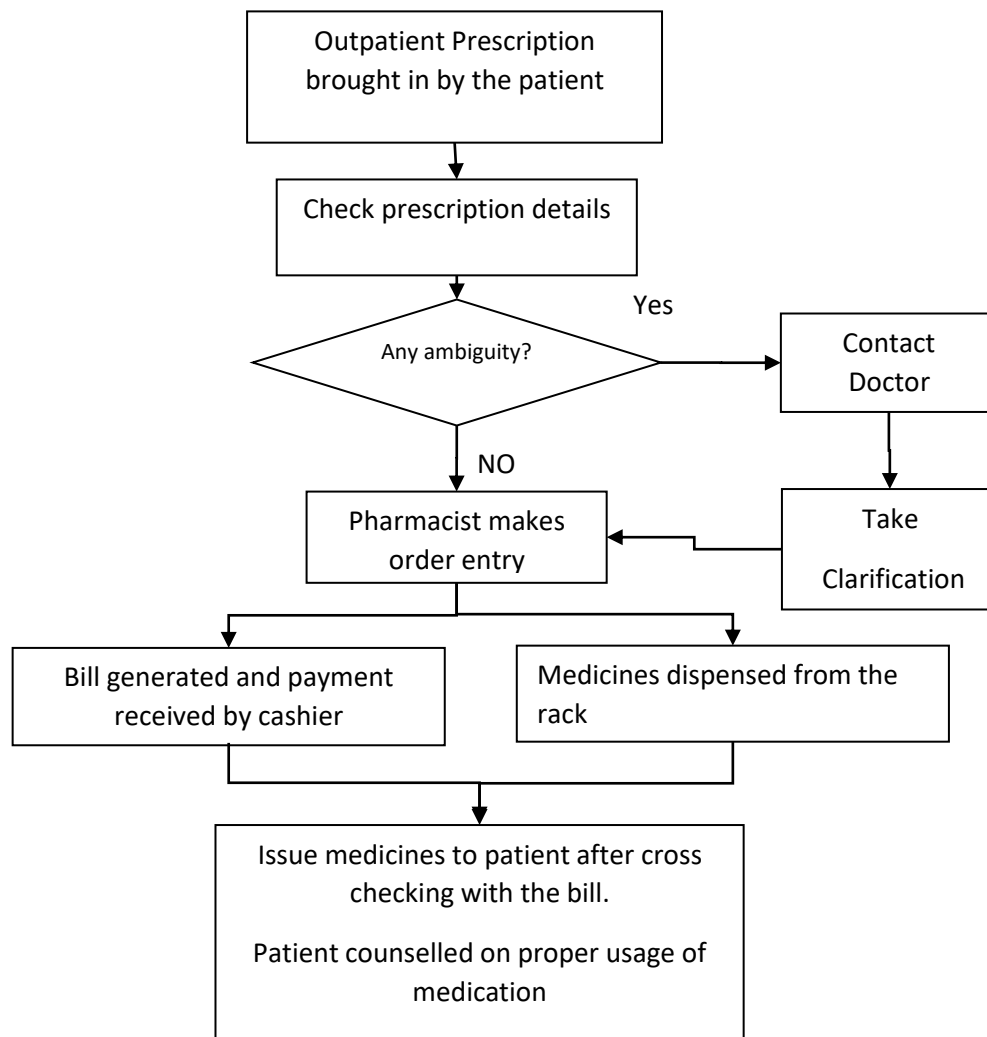


Figure 2. Flow chart of dispensing process in OP pharmacy

Based on the observations of outpatient pharmacy, several components and average TAT to process prescription is 10:43 sec. can be seen in the table below-

Components category	Activity	Fastest time	Longest time	Average waiting time	% contribution in TAT
1	DRUG RETRIEVAL + COUNTING	0:00:03	0:09:12	0:04:37	43%
2	BILLING + DOSAGE	0:00:10	0:06:19	0:03:15	30%
	CASH + INVOICE PRINTING	0:00:05	0:03:07	0:01:36	15% 45%
	PATIENT PACKS	0:00:00	0:02:30	0:01:15	12%
	Total average overall			0:10:43	

Table 2. Metrics of prescription processing elements

Here component 1 has only one activity which contributes 43% in overall TAT but component 2 has several activities adding 45% of the contribution thus becoming bottleneck of the dispensing process. So, to decrease the TAT activities at the component 2 can be shared.

Furthermore, after dispensing of medicines patient packs medicine by own, blocking counter space for next patient thus creating crowd at the counter, Placement of some fast-moving drugs in back shelves increase drug retrieval time.

During data analysis of 6038 invoices in month of March (Figure 3.) it was observed that in 57% (3465) of the invoices MRN was not mentioned which also increase data entry time at billing desk. It takes 10-15 seconds for data entry of new patient so $[12.5 \times 3465 = 43312.5]$ seconds can be saved or 12-man hours.

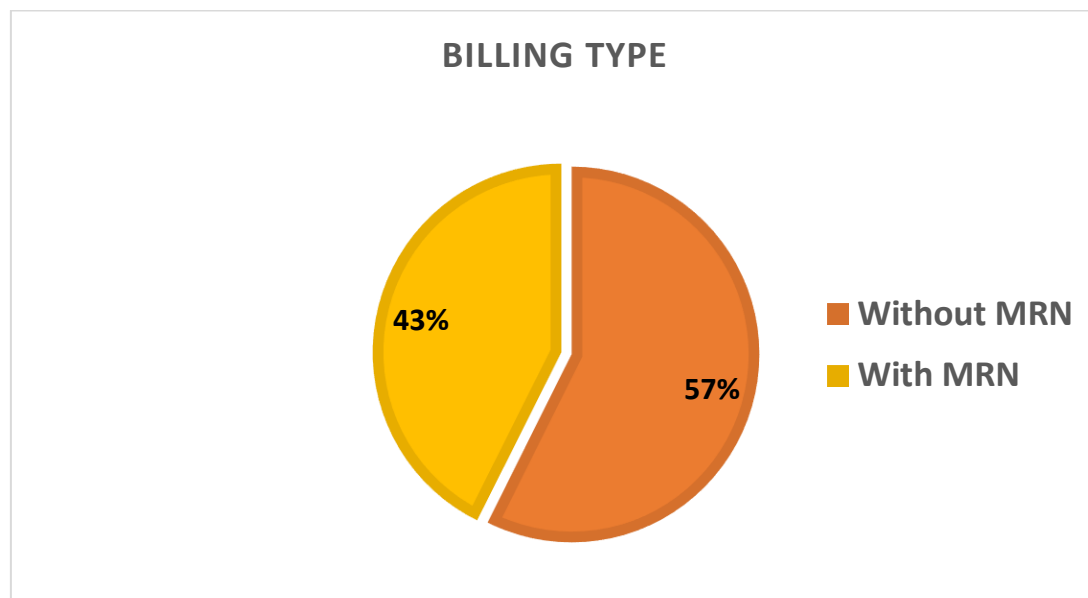


Figure 3 Billing type

In prescription audit it was found out that large number of medicines were not available at the pharmacy due to which pharmacist called the primary consultant to substitute the medicine which further increases dispensing time.

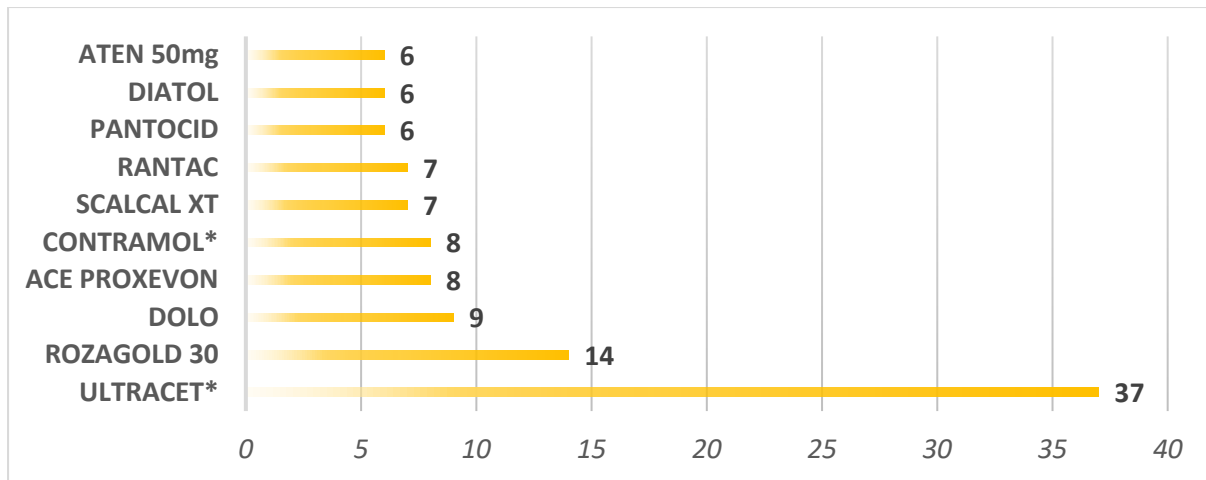


Figure 4 Top 10 bounce medicines

TOTAL MEDICINE BOUNCE-405
TOTAL COUNT- 180
AVERAGE BOUNCE PER DAY-~31

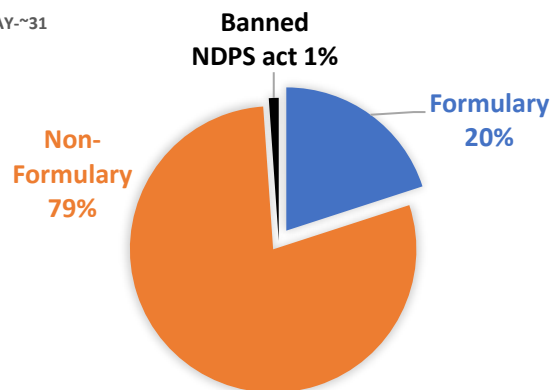


Figure 5 Bounce medicines category wise

The average waiting time depends on the average rate of service. The queuing process is a process associated with the arrival of a customer at a service facility, then waits in a row (queue) if all the service providers are busy, and finally leaves the facility⁴. That is why study of queuing model is important.

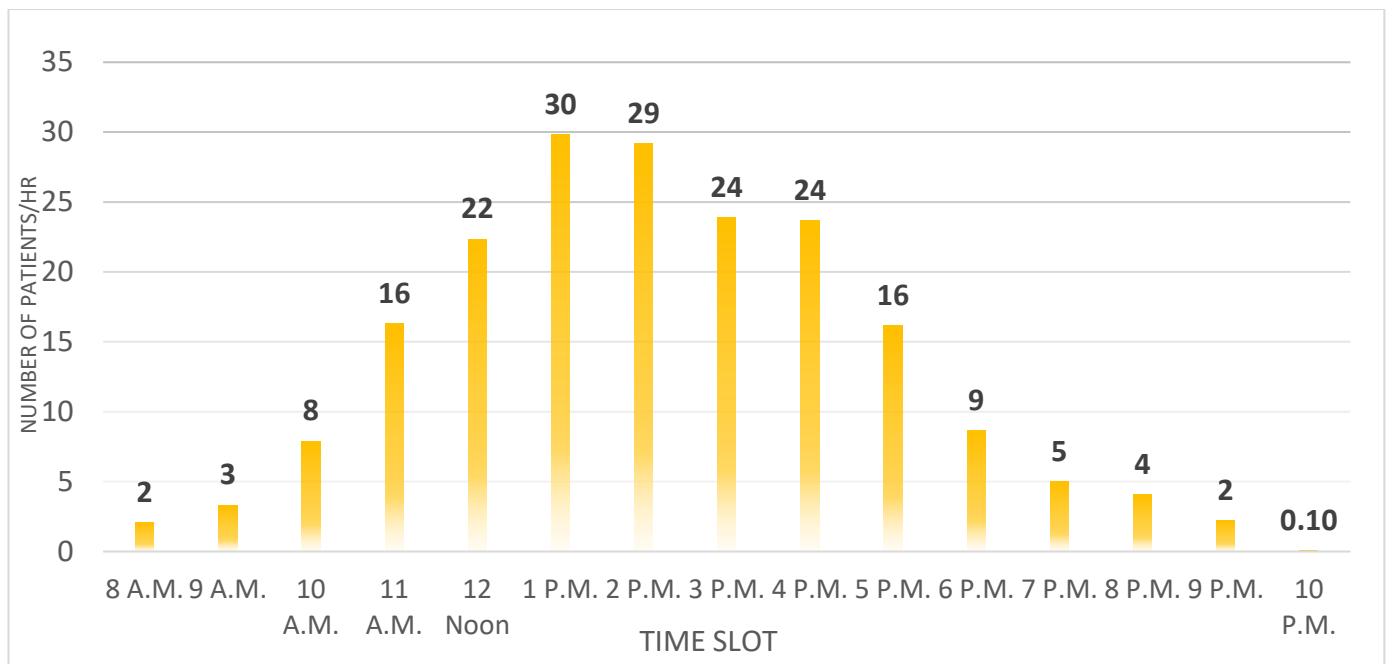


Figure 6 Average number of patients arriving per hour per day

OP pharmacy has infinite source model which assume steady state conditions, Poisson arrival rate and exponential service time $M/M/s > 1$

Queue discipline maintained in OP pharmacy is FCFS

Here, average arrival rate (λ) per day is 8.13

average service rate (μ) is 31.88

Waiting Lines Results					
(untitled)					
Parameter	Value	Parameter	Value	Minutes	Seconds
M/M/s		Average server utilization	.08		
Arrival rate(λ)	8.13	Average number in the queue(L_q)	0		
Service rate(μ)	31.88	Average number in the system(L_s)	.26		
Number of servers	3	Average time in the queue(W_q)	0	0	.1
		Average time in the system(W_s)	.03	1.88	113.04

Table 3 Queuing formulations by POM-QM for windows

Based on the observation's
average server utilization of pharmacy is 8%
average time in the system is 2.28 sec.

5. Conclusions-

Process maps provide a visual representation of the process and this offers an opportunity for improvement through inspection.⁶

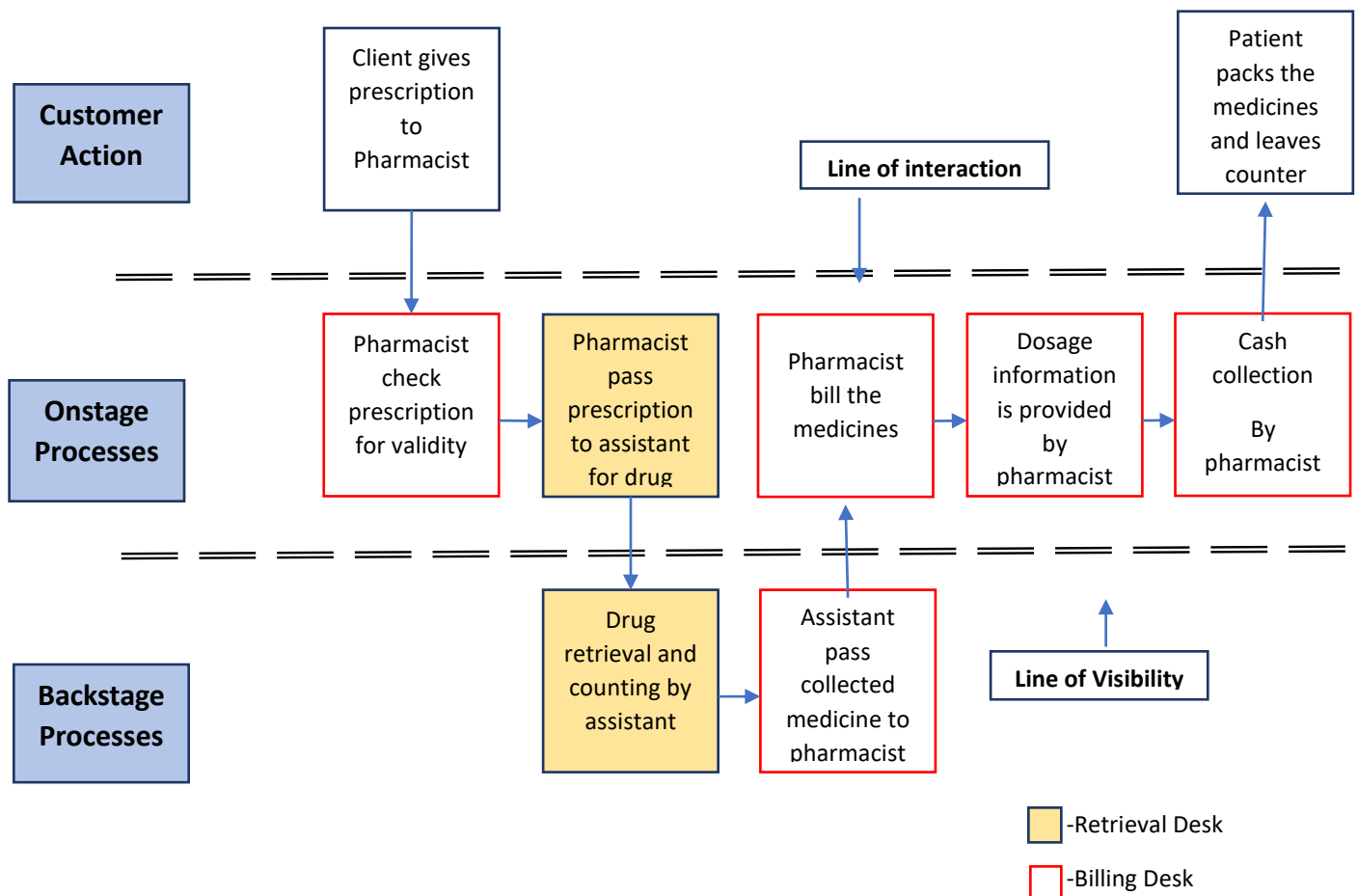


Figure 7. Service Blueprint

Activities in red outline box are performed by one staff at billing desk while activities in yellow are performed by retrieval desk. Clearly sets of activities are more on the billing desk which can be shared by additional nursing staff.

The application of modern technology in cash transactions and accounting records may help to speed the process; for instance, the adoption of new technologies such as electronic payment and computerised recording system may relieve the delay caused by manual operations⁶. So, token System can be introduced to relieve the over-crowding in peak hours, an express counter can be introduced which will reduce TAT for the clients having medicines equal to three or less than three medicines in there prescription and deployment of security guard during the peak hours to manage the attendants/ display that only one person per prescription should be in the queue as an average of 2 clients stand at the counter, which leads to chaos and violent situations. Also, to reduce retrieval time Replace slow moving general items in front shelves with fast moving items

Mandate the MRN writing on the prescription as it will save around 12-man hours which are consumed during data entry on billing desk or electronic prescription can be introduced and Attach patient details sticker in OPD files, like that of IPD

Adherence to hospital formulary list while prescribing drugs as it will save medicines bounce rate which is >30 per day and save the potential revenue loss.