

Analytical Study on Extent of Drug Shortages in Deendayal Pradhan Mantri Jan Aushadhi Stores in Saurashtra Region, Gujarat

By

Piyush Tripathi

*Dissertation submitted for the partial fulfillment of the
MBA Pharmaceutical Management*

Academic year, 2015-2017



The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: www.iihmr.edu.in

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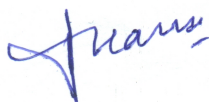
TO WHOM IT MAY CONCERN

This is to certify that **Piyush Tripathi**, student of **MBA-Pharmaceutical Management** from The IIHMR University, Jaipur has undergone dissertation at **Gujarat Medical Services Corporation Limited, Gujarat** from February 01, 2017 to April 30, 2017.

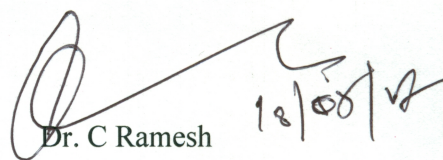
The candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The dissertation is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.



Dr. Ashok Kaushik
Dean, Academic and Student Affairs
The IIHMR University, Jaipur


18/08/17

Dr. C Ramesh
Professor and Dean
School of Pharmaceutical Management
The IIHMR University, Jaipur



GUJARAT MEDICAL SERVICES CORPORATION LIMITED

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The certificate is awarded to

Mr. PIYUSH TRIPATHI

In recognition of having successfully completed his Internship in the department of

LOGISTICS & SUPPLY CHAIN

and has successfully completed his Project on

**“An Analytical Study on the Extent of Drug Shortages in Deendayal Pradhan
Mantri Jan Aushadhi Stores in Saurashtra Region, Gujarat”**

From 1st February to 30th April, 2017

AT

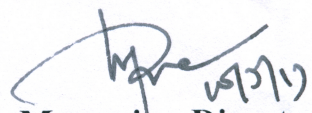
GUJARAT MEDICAL SERVICES CORPORATION LIMITED (GMSCL)

Gandhinagar, Gujarat

He comes across as a committed, sincere & diligent person who has
a strong drive & zeal for learning

We wish him all the best for future endeavors




Managing Director
GMSCL
Gujarat Medical Services Corporation Ltd.
Gandhinagar

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled '**An Analytical Study on Extent of Drug Shortages in Deendayal Pradhan Mantri Jan Aushadhi Stores in Saurashtra Region, Gujarat**' submitted by **Piyush Tripathi**, Enrollment No. **IIHMR-U/02/2015-17/0042** under the supervision of **Dr. C Ramesh**, Professor And Dean, The IIHMR University, Jaipur for award of MBA in Pharmaceutical of the University carried out during the period from February 01, 2017 to April 30, 2017 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

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled 'An Analytical Study on Extent of Drug Shortages in Deendayal Pradhan Mantri Jan Aushadhi Stores in Saurashtra Region, Gujarat.'


Signature of student

[PIYUSH TRIPATHI]

MBA-PM (07 BATCH)

ABSTRACT

The Gujarat Medical Services Corporation Ltd. (GMSCL) is a Govt. Company started functioning in the state of Gujarat in July, 2012 replacing the ‘The Central Medical Stores Organization’ (CMSO) established under the Health & Family Welfare Department working since 1978 in Gujarat.

With the changes in the healthcare arena there was a felt need of developing new as well as upgrading the existing functioning and processes of CMSO, and consequently develop an institution supported with necessary infrastructure to make the system responsive to meet the objectives of the universal health coverage. With the view to match the changing demands and pace of development in the sector, CMSO was transformed into “**Gujarat Medical Services Corporation Limited**” (GMSCL) as an autonomous body and was incorporated under companies act, for systematic procurement, inventory management, Management information system and to infuse professional management with establishment, development and strengthening the use of information technology in medical store organization.

GMSCL was established primarily to look after the procurement and supply of medicines and other hospital requisites for the government health care facilities in the state. The working of GMSCL during the first 3 years of its existence was studied and critically analyzed in the study. The situation prior to the establishment of GMSCL for a period of Four years was also studied and evaluated. The study finds that GMSCL could improve access to medicines in the state during the study period. The quality and availability of medicines in government hospitals also increased considerably. GMSCL could introduce many innovations in its functioning and make the procurement scientific and transparent. Preparation of Essential drug list, modernization of warehouses is other progressive steps of GMSCL. The utilization of information technology in a unique manner helped to bring transparency in functioning and reduce unethical practices remarkably. It also helped to make its services fast in many aspects. GMSCL also establish a market intelligence wing for conducting studies and evaluate its functioning, programmes, policies and other related activities that will further strengthen its functioning. The manner in which GMSCL is improving its functioning in the four years of its origin shows that the Gujarat model of Drug Policy is one of the best policies among all Indian states.

ACKNOWLEDGEMENT

I would like to express my gratitude towards GMSCL for giving me an opportunity to work as an Intern in the organization.

I would like to sincerely thank **Dr. Vipul Aggarwal (IPS)**, Managing Director, Gujarat Medical Services Corporation Limited and **Mr. Dheeraj Sonkhiya**, Procurement Consultant, GMSCL for sharing their valuable expertise all through the completion of this project and providing the best working environment.

For the successful completion of my work, I am extremely thankful to all pharmacists for their valuable time who are working in Deendayal Prime Minister Jan Aushadhi Stores. Without their interest, this project would not have materialized.

I would like to express my deep sense of gratitude for my academic mentor **Dr. C Ramesh**, Professor and Dean, School of Pharmaceutical Management, The IIHMR University for providing his valuable advice and supportive attitude at all stages of the study.

Eventually, I would also like to sincerely thank all the Regional Executives in GMSCL who either directly or indirectly contributed towards completion of the project with patient cooperation.

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SCOPE OF THE PROJECT

Throughout the past several months, the Deendayal Pradhan Mantri Jan Aushadhi Stores have raised an increasing number of reports and complaints in regards to drug shortages, directly affecting patients care in the whole Gujarat. However, any reliable reporting is not there with the system that shows there was no clear understanding of the extent of drug shortages, nor specific impact or scope of drug shortages on store in-charges, pharmacists & patients as well.

As a part of my MBA curriculum, I decided to conduct a survey in order to make a very clear understanding of the scope and extent of medicines shortages in all Deendayal Stores located in Saurashtra region of Gujarat.

The Govt. of Gujarat has already opened 52 generic stores named 'Deendayal Pradhan Mantri Jan Aushadhi Stores' and planning to inaugurate more 150 stores in different regions in Gujarat. So, the research findings of the study can effectively help in opening of these stores & the implementation of this project with chances of less shortages.

INTRODUCTION

Over the last decade, India has developed its productivity in manufacturing quality generic and branded medicines in almost all the therapeutic categories. The Indian pharmaceuticals market increased from US\$ 6 billion in 2005 to US\$ 36.7 billion in 2016 and is still expected to expand to US\$ 55 billion by 2020. However, these medicines are available at very low prices as compared to the prices of the same or equivalent medicines in other countries. India is a developing country where a majority of the population cannot afford expensive medicines for their treatment. Accordingly, 'ensuring availability of quality medicines at affordable prices to all', has been a key objective of the Government of India. The steps have been taken are –

A. Price Control of Scheduled Drugs through the NPPA: NPPA is a National Pharmaceutical pricing authority comes under the DPCO, 1995 has been given official permission to control and redesign the MRP of a gamut of medicines / listed bulk drugs in accordance with well-defined criteria that is related to production cost and marketing.

B. Price Regulation of Non Scheduled Drugs: Not only scheduled drugs while the NPPA has also planned to monitor the prices of scheduled drugs under Drug Price Control Order, 1995. NPPA has regulated that the price variation in scheduled drugs should not be more than 10 per cent per annum. This step by the Government of India has further helped in maintain the stability and affordability of medicines.

C. Uniform VAT of 4% on medicines: Government of India has fixed a low and uniform rate of 4 per cent VAT on medicines in the whole nation. Almost all the states in India has successfully adopted this policy and reduced the incidence of sales tax on drugs.

D. Reduction in Excise duty from 16% to 6%: The Government of India has also reduced the excise duty on drugs from 16 per cent to 6.18 per cent. This has been further reduced to 6 per cent as the government has exempted pharmaceuticals from the levy of Education Cess & Secondary & Higher Education Cess, that result into a decrease of excise duty from 6.18 per cent to 6 per cent, NPPA said in notification. This step has acted as a very crucial role in keeping the prices at very low and reasonable level for almost all the drugs required. The Government of India has still not satisfied with all

these already implemented regulatory and financial process for ensuring greater availability of drugs at affordable and low prices to all so the government has decided to implement a project in the country named Jan Aushadhi Campaign.

The Jan Aushadhi Campaign for Ensuring Access to Quality Medicines and Health Care for all

We all know about the high prices for branded medicines available in the market. These medicines are sold by pharmaceutical manufacturers at extremely high prices in compare to generic or unbranded substitutes which are equivalent in safety and efficacy and give same results in its therapeutic value. Every patient will get benefited in case if pharmaceutical manufacturers provide the required medicines at low prices with greater availability in the market. Seizing this opportunity, the Pharmaceutical Advisory Forum in its meeting held on 23rd April, 2008 under the Chairmanship of Shri Ram Vilas Paswan, Hon'ble Union Minister of Chemicals & Fertilizers and Steel, decided to launch a Jan Aushadhi Campaign. This was an important initiative under the Jan Aushadhi Campaign that involves the planning to start Jan Aushadhi Stores, where generic quality drugs would be sold at very low prices but are same in potency to branded drugs.

Jan Aushadhi Campaign: Key Objectives

1. Ensure the quality of drugs and its availability in India, by making access to required drugs through the Central Procurement & Supplies Unit supplies and through Good Manufacturing Practices (GMP) compliant pharmaceutical manufacturers in the private sector.
2. In spite of all the constraints of annual budget in the Central and State governments that is extending coverage of generic drugs which would decrease and redesign the unit cost of treatment per patient.
3. Develop a concept which can be replicated in other developing as well as developed countries nearby with a goal to improve accessibility of generic drugs at low prices for all.

4. The Jan Aushadhi campaign is for all citizens in India. Since quality generic substitutes are available for almost all the expensive branded drugs, the Jan Aushadhi campaign would provide access to any OTC or prescription drug.

5. Create awareness through publicity and education among all so that the meaning of quality is not related to high prices. This results in the availability of more drugs and obviously a great number of patients will be benefited.

6. Be a part of programs related to the Central and State Governments, Private Sector, Non-Governmental Organizations and Cooperative bodies and so on.

7. Create a demand for quality generic drugs with the concept 'By All for All' by enhancing access to greater healthcare services through low treatment costs and easy availability wherever required in all therapeutic categories.

Implementation of the Jan Aushadhi Campaign

The Jan Aushadhi initiative provides a gamut of quality generic drugs at very low prices through dedicated pharmacy stores selling generic quality medicines that are equivalent to branded drugs in safety and efficacy. Some comparative prices are:

Name of Salt	Dosage	Pack	Jan Aushadhi Price	Market Price
Tab. Ciprofloxacin	250mg	10	12.89	54.79
Tab. Ciprofloxacin	500mg	10	24.99	125.00
Tab. Cetirizine	10mg	10	2.75	20.00
Cough Syrup	110ml	Liquid	13.30	33.00
Tab. Diclofenac	100mg	10	4.20	60.40
Tab. Paracetamol	500mg	10	3.03	09.40

Tab Nimesulide	100mg	10	3.16	39.67
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DEENDAYAL PRIME MINISTER JAN AUSHADHI STORE GOVT. OF GUJARAT

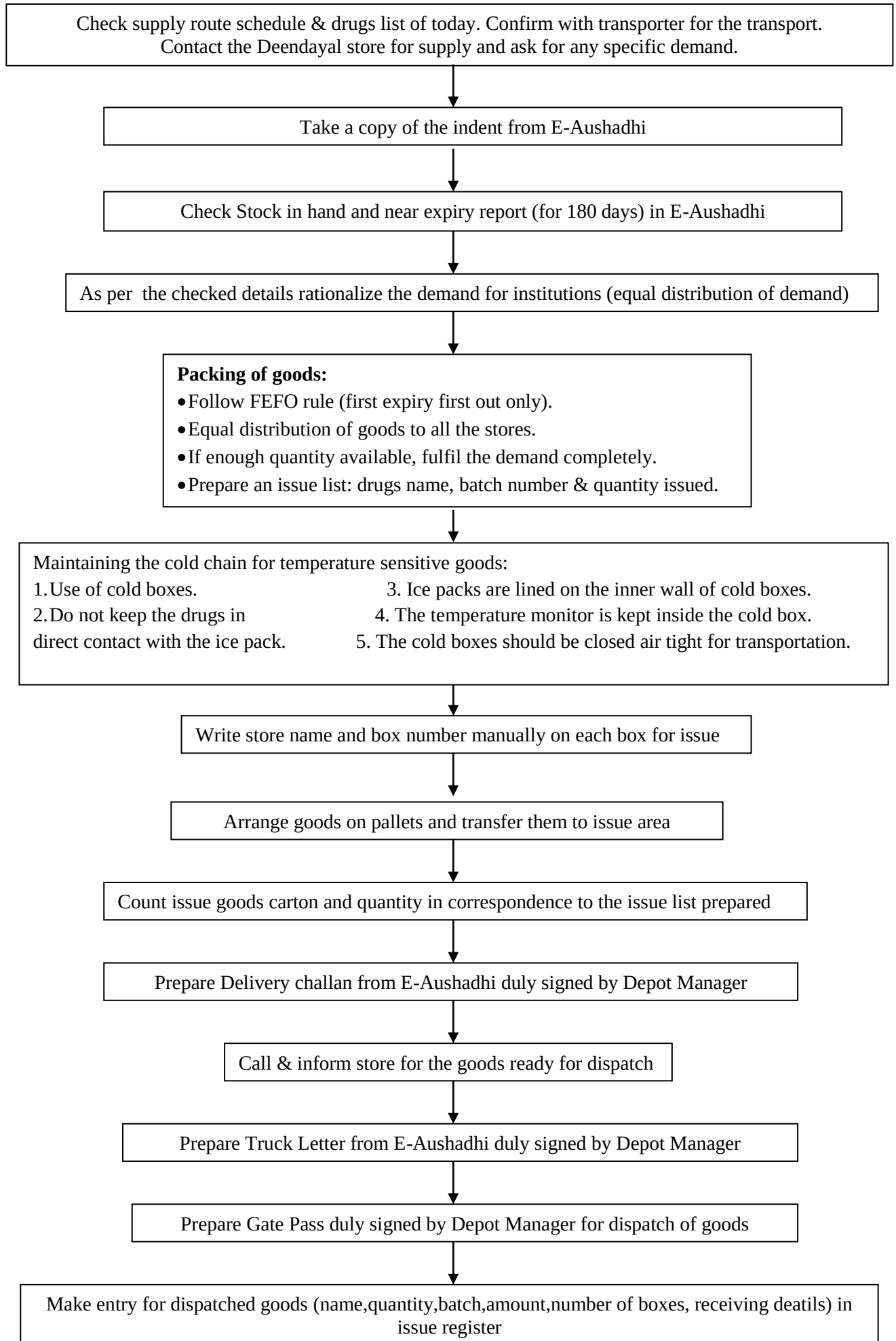
Deendayal Prime Minister Jan Aushadhi Store (DPMJAS) is an ambitious program conceived and implemented by Govt. of Gujarat with the partnership and administration of HLL Lifecare Limited, a Government of India owned corporation based in Kerala that manufactures healthcare products to provide generic medicines at affordable prices. Deendayal Prime Minister Jan Aushadhi Stores (DPMJAS) reflect Govt. of Gujarat's powerful commitment to decrease the cost of treatment or out of pocket expenditure for the patients. Deendayal Prime Minister Jan Aushadhi Stores will be providing quality generic drugs, branded drugs and over the counter drugs at very affordable and low prices. Patients can purchase drugs at up to 80 % cheaper than the market price from Deendayal Prime Minister Jan Aushadhi Stores.

Deendayal Prime Minister Jan Aushadhi Store would sell medicines at effective discount on the market rates, based on the prescriptions from physicians not only to patients in Government / District / Civil hospitals but to the patients availing treatment at other hospitals as well. These Deendayal Prime Minister Jan Aushadhi Stores will be established in Government hospital premises or if any Government space is available in the first phase.

Drug stores operated under this scheme shall have the following products:

- Generic drugs
- Specialized drugs for tertiary care
- Over the counter drugs
- Surgical items
- Hospital consumables

Activity Layout of Issuing Drugs to Deendayal Stores



G-DAWA APP

Generic - Drug Awareness for Wider Acceptability (G-DAWA) is an innovative, free medical mobile application launched by Government of Gujarat to create social awareness about quality generic medicines.

Almost all the medicines that doctors write on the prescriptions are generally quite expensive. Patients who cannot afford costly drugs may not know that there are cheaper equivalent substitutes of the same drug so this mobile application is a generic medicine search engine, which lists down the names of all types of branded costly drugs and their equivalent molecule – generic medicines with market retail prices. This mobile application provides information about the searched drug, its molecules & comparative prices of several brands of same composition, marketed or manufactured by various Indian pharmaceutical companies.

RATIONALE

Shortages of medicines are causing a serious concern in all over the world including India to a greater extent because of low management and less production, supply and ineffective distribution. However, the problem is far wider; affecting the health of patients and disruption of their continuity of medication. Medicines shortages have also been noted in Generic stores, opened in Gujarat named Deendayal Pradhan Mantri Jan Aushadhi Stores.

In the absence of any reliable reporting, there was no clear understanding of the extent of drug shortages in all the Jan Aushadhi Stores in Gujarat. In simple terms, there is a need to make all the essential drugs available to the patients anyhow and keeping in mind the following intentions to choose this topic for the research study:

1. Are we focused on the patients' healthcare?
2. Do we have an idea about the extent of satisfying the patients through providing the prescribed medicines?
3. Are we doing things right in the supply chain management?
4. Do we have the right talent aligned with our pharmacists, the right support resources and processes in place?
5. What has changed externally in our markets or with our stakeholders?

RESEARCH OBJECTIVES

- To identify the real causes behind drug shortages in Deendayal Pradhan Mantri Jan Aushadhi Stores.
- To analyze the extent of drug shortages in Deendayal Pradhan Mantri Jan Aushadhi Stores.
- To look for the possible solutions to prevent the drug shortages in Deendayal Pradhan Mantri Jan Aushadhi Stores.

RESEARCH METHODOLOGY

Sample Design

The research conducted was descriptive research.

Sampling Method

The sampling method was Purposive Sampling (Total Population).

Sample Population

The number includes Junior Pharmacists, Senior Pharmacists and Store In-charges.

Sample Size

Sample size for the study was 16. In whole Gujarat, there are a total of 52 Deendayal Pradhan Mantri Jan Aushadhi Stores but because only 16 stores come under Saurashtra region of Gujarat, the study was concluded with all these 16 stores.

Sample Selection

Deendayal Pradhan Mantri Jan Aushadhi Stores in Saurashtra region in Gujarat.

Data Collection

Primary Data – The primary data for this project was gathered through survey using a structured questionnaire.

Research Instrument (Tools and Techniques)

Research instrument is a structured questionnaire consisting of closed-ended as well as open-ended questions, designed within the scope of the given objectives.

The information was collected through direct interviews and emails to all the pharmacists and store in-charges. Hence some data was collected with the help of informal talk with the chemists&in-charges.

Data Analysis

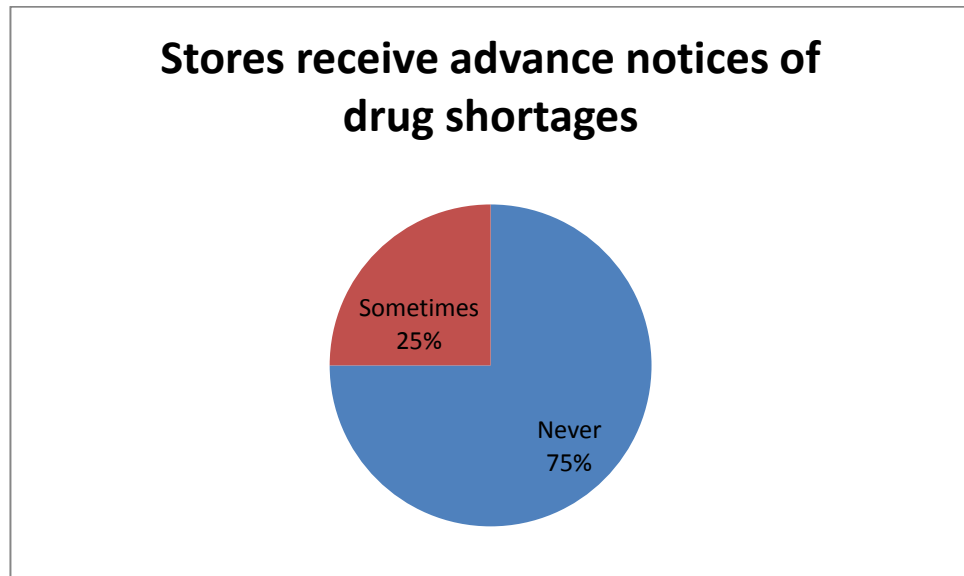
Microsoft Excel

Study Duration

3 months (1st February to 30th April 2017)

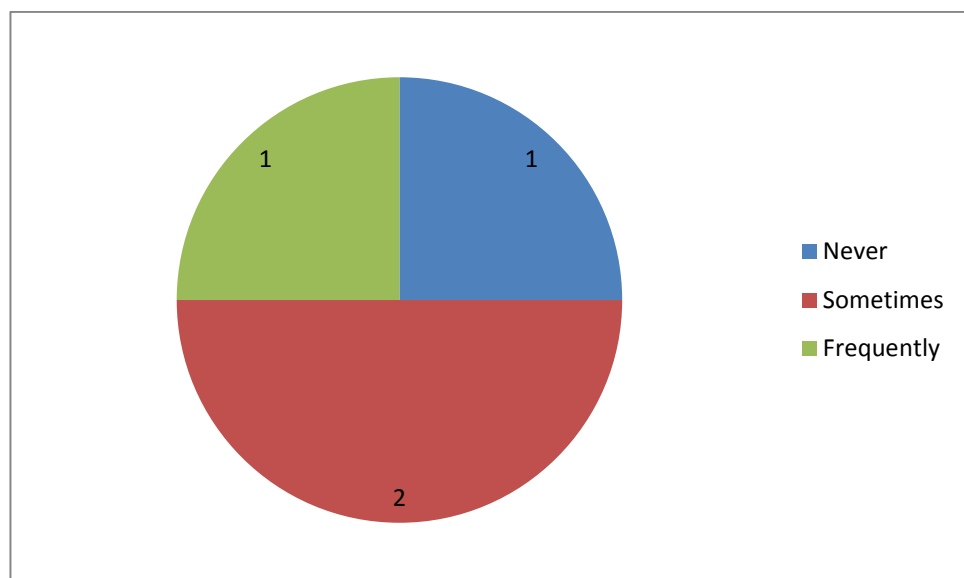
FINDINGS AND INTERPRETATIONS

1. Do you receive advance notices of shortages?



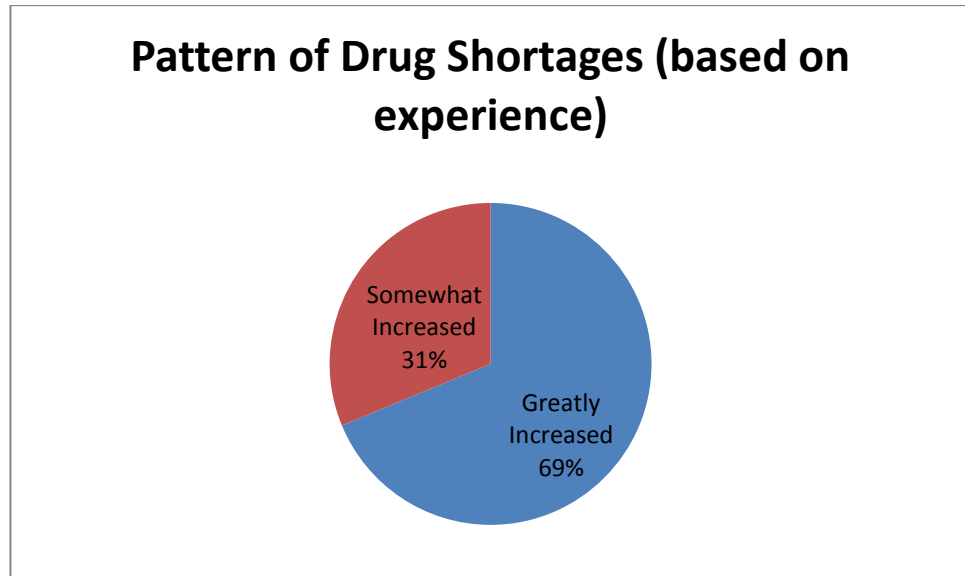
It was found that about 75% pharmacy stores do not receive advance notices in any case.

2. If yes, do you get informed the expected delay in drug supply or shortages?



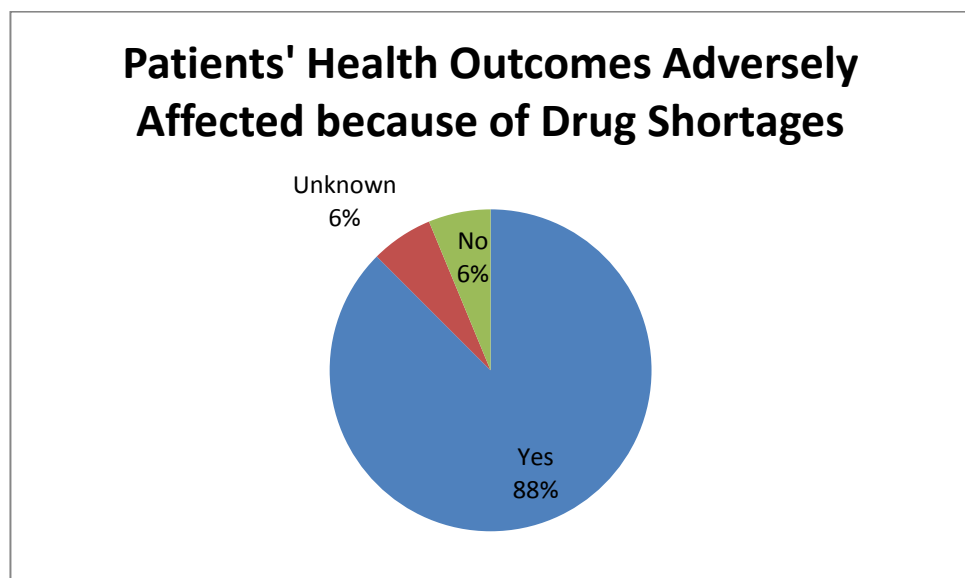
Out of 25% pharmacy stores which sometimes receive advance notices of drug shortages, only 1 store get informed the expected delay of supply of required medicines.

3. Based on your experience, over the past 6 months, have drug shortages -



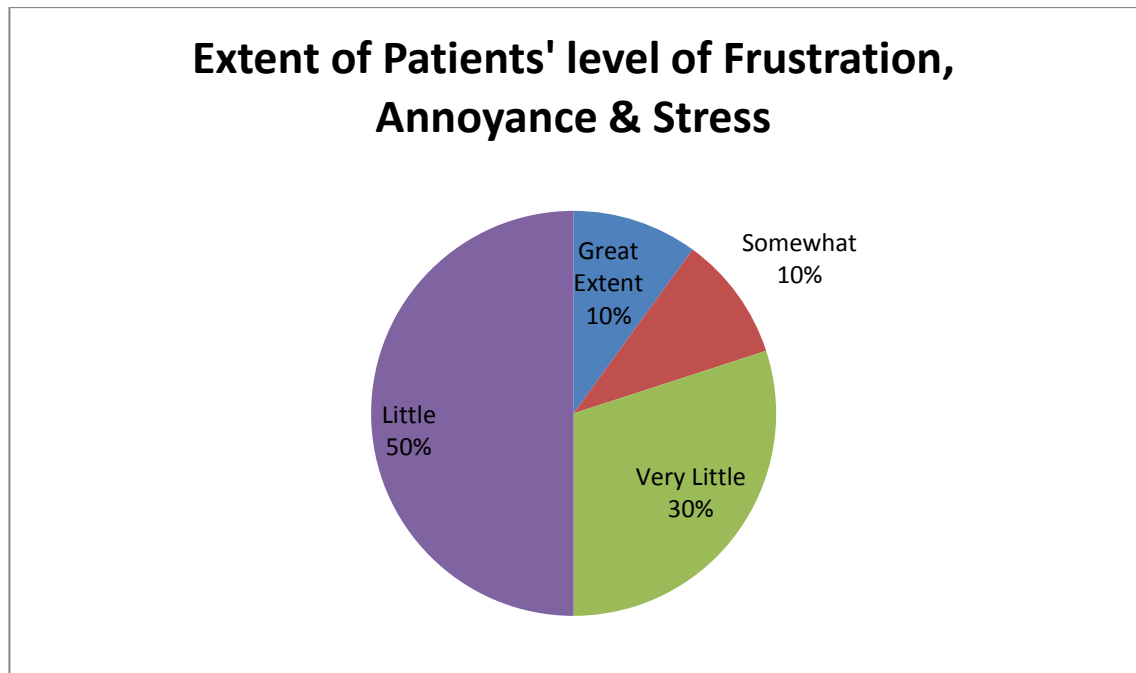
It was found that about 69% of pharmacists believe that drug shortages in all the pharmacy stores have greatly increased over the last 6 months.

4. Do you think your patients' health outcomes have been adversely affected because of drug shortages?



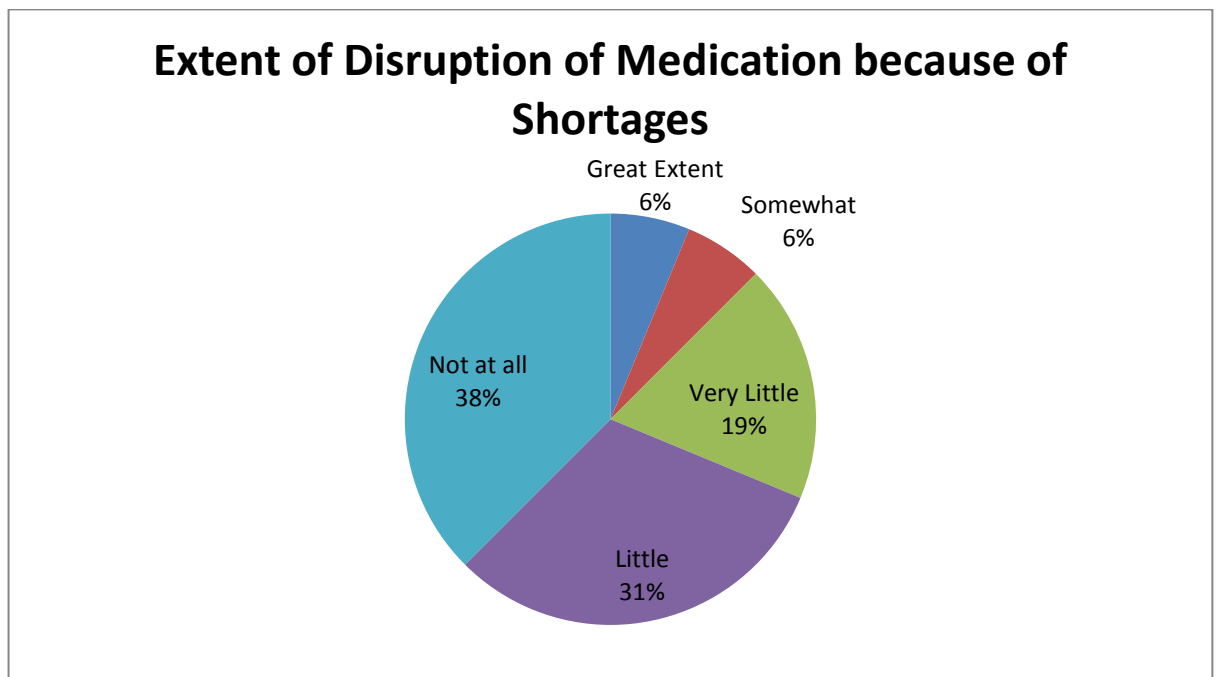
It was found that 88% of pharmacists believe patients' health outcomes have adversely been affected because of drug shortages.

5. To what extent patients are frustrated, angry & stressed -



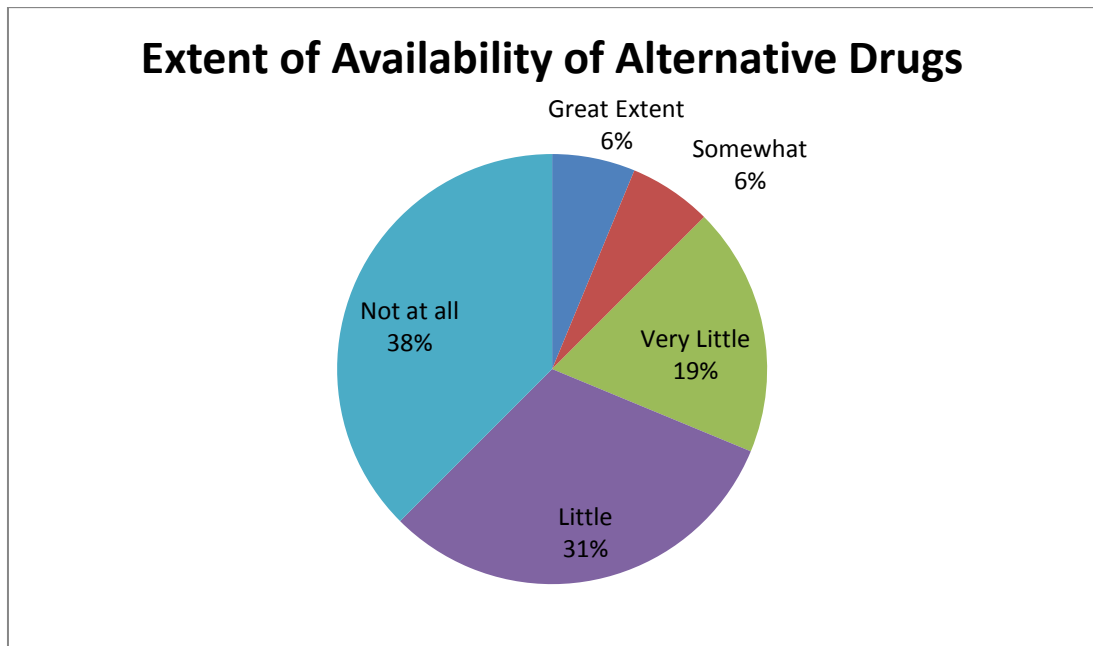
It was found that patients are frustrated, angry and stressed to an extent because of drug shortages in these pharmacy stores.

6. To what extent the shortage had disrupted their continuity of medication -



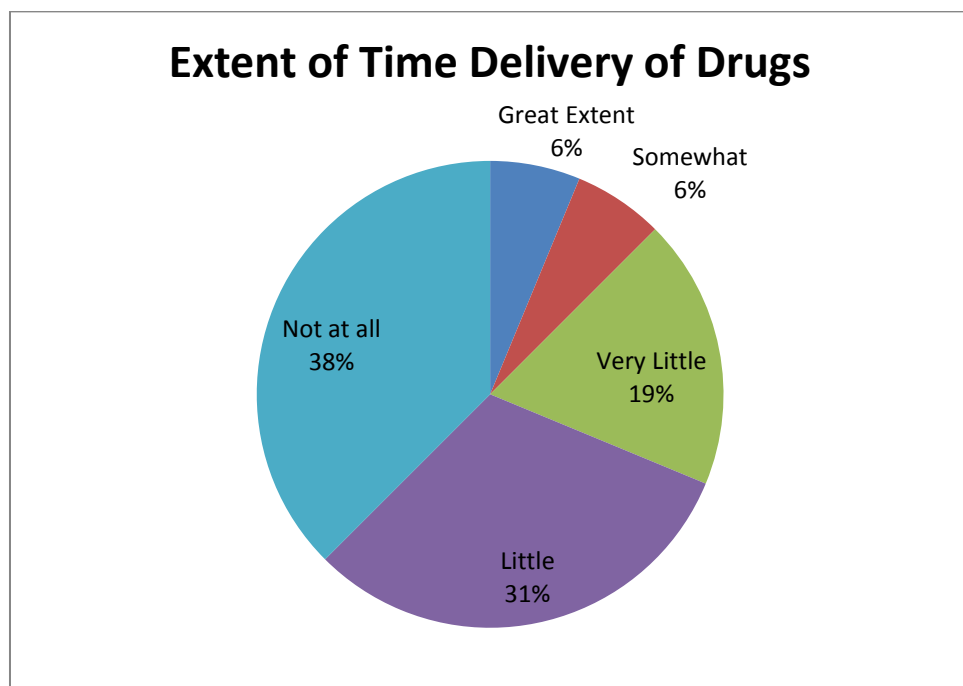
It was found that 62% pharmacists believe the shortages of medicines had disrupted patients' continuity of medication to an extent.

7. To what extent the alternative drugs are available –



It was found that the availability of alternative drugs or substitutes is not there in the pharmacy stores to 38%.

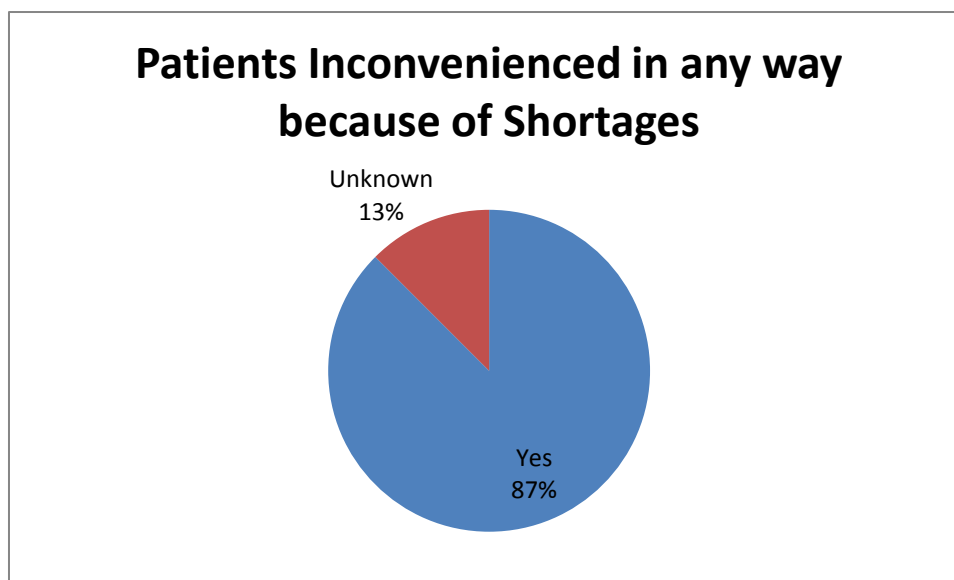
8. To what extent the drugs are delivered on time -



It was found that about 62% pharmacists believe drugs have been delivered at the pharmacy stores on time to a limited extent.

9. Have your patients been inconvenienced in any way as a result of drug shortages?

Reasons for inconvenience include: More waiting & travelling to the pharmacy required, Frequent changes to medication causing confusion, Added stress & loss of trust, Increased cost to the patient, Patients who have switched pharmacies.

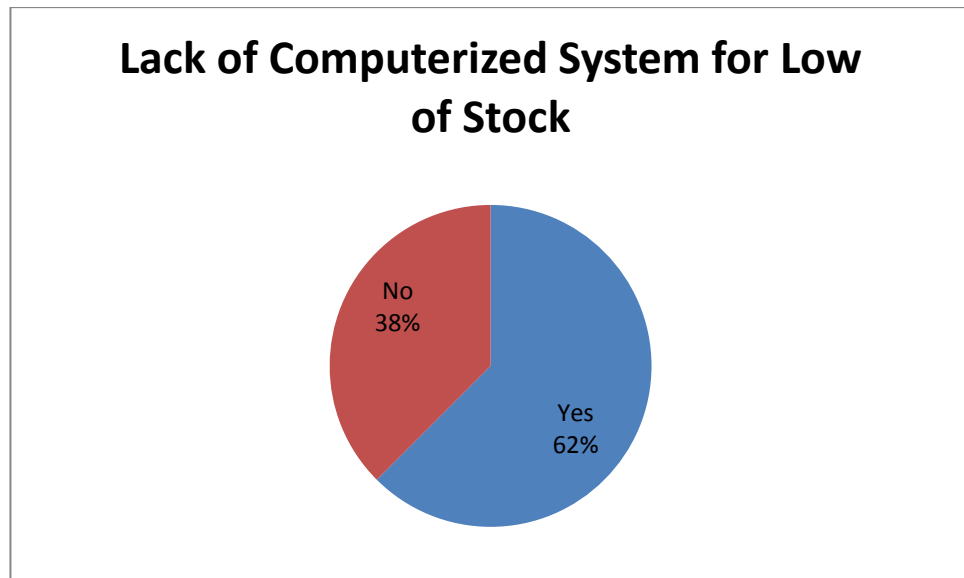


It was found that 87% patients have faced inconvenienced in any mentioned way only because of drug shortages in all the pharmacy stores.

10. Make a top 20 drug shortages list –

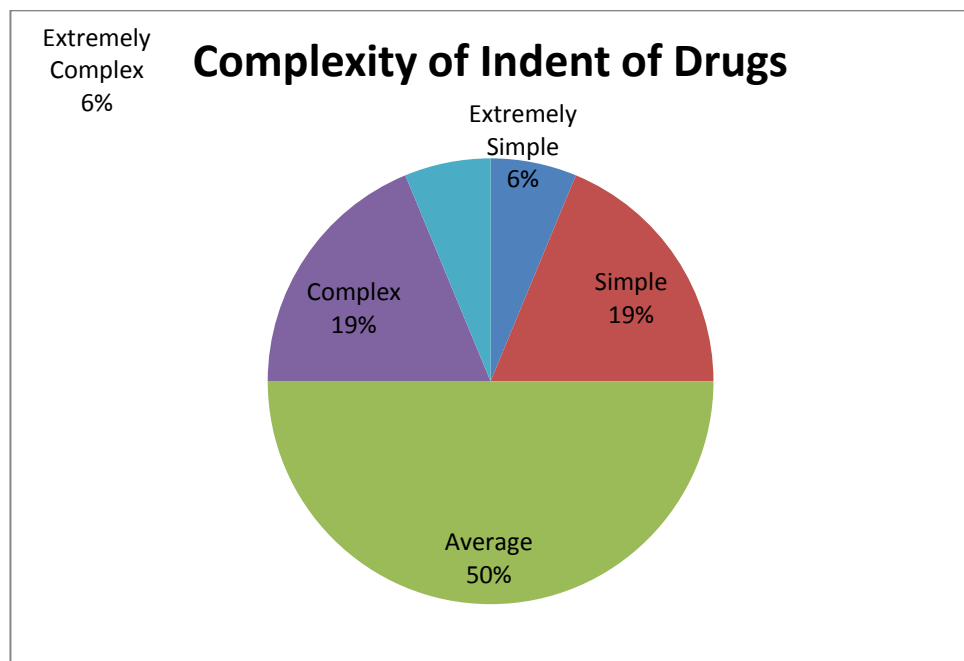
EDL	Non-EDL
Glimepiride Tab	Cadex Syrup
Telmisetron Tab	RexcofDx Syrup
Voglibodge Tab	Ecosprin Tab
Losartan Potassium Tab	Diclofenac + Paracetamol Tab
Dextromethorphan Syrup	ORS Powder
Metoprolol Tab	Bisoprolol Tab
Lactulose Solution	Prazosin Tab
Atorvastatin Tab	Prasugrel Tab
Metformin HCL Tab	Tamsulosin Cap
Fluconazole Tab	Letrozole Tab

11. Lack of computerized alert system for low of stock drugs –



It was found that there is a lack of computerized system for low of stock to a greater extent.

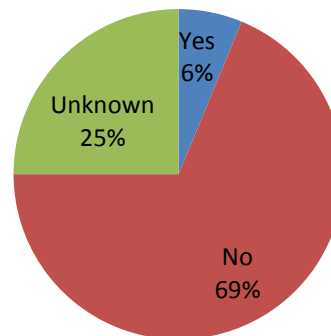
12. Complexity of indent for required drugs -



It was found that about 19% pharmacists face difficulties in order to make a request for medicines.

13. Do you know the actual reason for the delay of supply or drug shortages at the store?

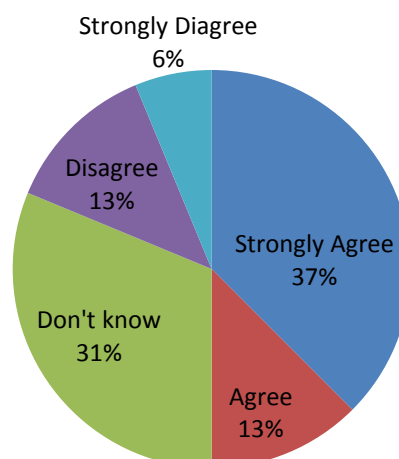
Information about the Reason of Shortages



It was found that about 69% pharmacists have no idea about the delay of supply or drug shortages at all the pharmacy stores.

14. Lack of effective communication among pharmacy, pharmaceutical warehouse & related staff -

Lack of Effective Communication among related departments



It was found that about 37% pharmacists feel a communication gap between pharmacy, pharmaceutical warehouse and related staff.

RECOMMENDATIONS

The cause of drug supply shortages survey has helped the organization to identify the extent of drug shortages and its reasons. It is a preliminary step in the formative planning of a well-addressed process that will address the needs and solutions in all the Deendayal Pradhan Mantri Jan Aushadhi Stores. Thus, the study suggests implementing a computerized alert system for low drug stocks so that the cost of inventory to the organization can be reduced to an extent. Also, this implementation helps in committing to the patients in regards to the availability of required drugs. There is a need to activate and coordinate the communications among pharmacy, pharmaceutical warehouse and related staff through multiple channels in order to control any problem related to drug supply shortages.

In addition, the study recommends adding alternative drugs for at least the critical drugs that can have an effect on patient health in case of shortages. I plan to extend the survey to include all 52 Deendayal Pradhan Mantri Jan Aushadhi Stores in Gujarat.

CONCLUSION

Overall, the results indicate that the majority (75%) of participants do not get notices of drug shortages in advance. Few receive the notices of drug shortages in which only one pharmacy store get informed the expected delay of supply of required medicines.

It was found that about 69% pharmacists believe that drug shortages in all the pharmacy stores have greatly increased over last 6 months. Also, it was found that 88% pharmacists believe patients' health outcomes have adversely been affected because of drug shortages. Patients are frustrated, angry and stressed to an extent because of drug shortages in these pharmacy stores. The study says that 62% pharmacists believe the shortage of medicines had disrupted patients' continuity of medication to an extent. It was found that 87% patients have faced inconvenienced in any mentioned way only because of drug shortages in all the pharmacy stores.

It was found that the availability of alternative drugs or substitutes is not there to a required extent in the pharmacy stores. One precaution to control when drugs become low on stock is to provide an alternative or substitution for drugs having the same effect. Most participants (38%) say that the alternative medicines are not available to a greater extent at the store and this unavailability of drug alternatives is a cause of drug supply shortages in all the Deendayal Pradhan Mantri Jan Aushadhi Stores.

It was found that there is a lack of computerized system for low of stock to a greater extent. More than half of the participants (62%) usually learn that a drug is in short supply when it becomes zero stock on the shelves so there is a need to implement a computerized system at the store through which the pharmacists can be aware if there is any shortage of any medicine. It was found that about 19% pharmacists face difficulties in order to make a request for medicines. It was found that about 69% pharmacists have no idea about the delay of supply or drug shortages at all the pharmacy stores.

It was found that about 37% pharmacists feel a communication gap between pharmacy, pharmaceutical warehouse and related staff. The lack of communication between pharmacy store and warehouse is a most common cause of delay in drugs supply & delivery so there should be a proper follow-up with the warehouse to deliver the drugs on the promised date in order to avoid a shortage of drug supplies.

LIMITATIONS

- The research study is limited to only Saurashtra region in Gujarat.
- Out of 52 stores all over the Gujarat, the study includes the responses from only 16 stores that come under my job responsibilities.

REFERENCES

- Bogucki B., B.R. Jacobs and J. Hingle, 2004. Computerized reminders reduce the use of medications during shortages. *J. Am. Med. Inf. Association*, 11: 278-280.
- Fox, E.R. and L.S. Tyler, 2003. Managing drug shortages: seven years' experience at one health system. *Am. J. health Syst. Pharm.*, 60: 245-253.
- Kweder, S.L. and S. Dill, 2013. Drug shortages: The cycle of quantity and quality. *Clin. Pharmacol. Ther.*, 93: 245-251.
- Rider, A.E., D.J. Templet, M.J. Daley, C. Shuman and L.V. Smith, 2013. Clinical dilemmas and a review of strategies to manage drug shortages. *J. Pharmacy Pract.*, 26: 183-191.
- Aronovich, D, Marie T, Ethan C, Adriano S and Linda A.(2010). *Measuring SupplyChain Performance: A Guide to Key Performance Indicators for PublicHealth Managers*. Arlington, Va.: USAID
- Brynjolfsson,E. and Yang,S.(1996) *Information Technology and Productivity: AReview of the Literature*, *Advances in Computers*
- Davis P R (2008): "A relationship approach to construction supply chains", *Industrialmanagement & data systems*, vol. 108 no. 3, pp 310-327
- Lysons K. and Farrington B. (2006): *Purchasing and Supply Chain Management*,Pearson Educational Limited
- Mettler T., and Rohner P.(2008) *Supplier Relationship Management in Health CarePractice – A Case Study*, in *Proceedings of 6th COLLECTeRÍberoamérica*.Madrid, Spain.

- O'Brien, K. (2003). Value Chain Report–Aligning Your Supply Chain To Support World-Class Customer Service.
IndustryWeek.www.industryweek.com/ReadArticle.aspx?ArticleID=2279
Accessed Date: 25.04.2017
- <https://gmscl.gujarat.gov.in/>
Accessed Date: 01.05.2017
- <http://www.deendayaldrugs.com/>
Accessed Date: 03.05.2017

ANNEXURE

Supply Chain Management Questionnaire

4/19/2017

Supply Chain Management Questionnaire

Supply Chain Management Questionnaire

A survey to obtain a clearer picture of the extent of drug shortages in all the Deendayal generic medicine stores in Gujarat.

***Required**

1. Email address *



2. Do you receive advance notices of shortages? *

Mark only one oval.

- ☐ Never
- ☐ Infrequently
- ☐ Sometimes
- ☐ Frequently
- ☐ Always

3. If Yes, do you get informed the expected delay in drug supply or shortages? *

Mark only one oval.

- ☐ Never
- ☐ Infrequently
- ☐ Sometimes
- ☐ Frequently
- ☐ Always

4. Based on your experience, over the past 6 months, have drug shortages - *

Mark only one oval.

- ☐ Greatly Increased
- ☐ Somewhat Increased
- ☐ Not Changed
- ☐ Decreased
- ☐ Unknown

5. Do you think your patients' health outcomes have been adversely affected because of drug shortages? *

Mark only one oval.

- ☐ Yes
- ☐ No
- ☐ Unknown

6. To what extent patients are frustrated, angry & stressed - *

Mark only one oval.

	1	2	3	4	5	
Not at all	☐	☐	☐	☐	☐	To a large extent

7. To what extent the shortage had disrupted their continuity of medication - *

Mark only one oval.

	1	2	3	4	5	
Not at all	☐	☐	☐	☐	☐	To a large extent

8. To what extent the alternative drugs are available - *

Mark only one oval.

	1	2	3	4	5	
Not at all	☐	☐	☐	☐	☐	To a large extent

9. To what extent the drugs are delivered on time - *

Mark only one oval.

	1	2	3	4	5	
Not at all	☐	☐	☐	☐	☐	To a large extent

10. Have your patients been inconvenienced in any way as a result of drug shortages? *

Reasons for inconvenience include: More waiting & travelling to the pharmacy required, Frequent changes to medication - causing confusion, Added stress & loss of trust, Increased cost to the patient, Patients who have switched pharmacies.

Mark only one oval.

- ☐ Yes
- ☐ No
- ☐ Unknown

11. Make a top 20 drug shortages list - *

12. Lack of computerized alert system for low of stock drugs - **Mark only one oval.*☐ Yes☐ No**13. Complexity of indent for required drugs - ****Mark only one oval.*

	1	2	3	4	5	
Extremely Complex	☐	☐	☐	☐	☐	Extremely Simple

14. Do you know the actual reason for the delay of supply or drug shortages at the store? **Mark only one oval.*☐ Yes☐ No☐ Unknown**15. If Yes, please specify - ***

16. Lack of effective communication among pharmacy, pharmaceutical warehouse & related staff - **Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Strongly Agree