

**DETERMINING THE AVAILABILITY & PRICE DIFFERENCE OF
ANTIBIOTICS DRUGS ENLISTED IN WHO ESSENTIAL MEDICINES
LIST BETWEEN THE RETAIL PHARMACY STORES & JAN-AUSHADHI
STORES**

Dissertation Submitted to



IIHMR University, Jaipur

for the partial fulfilment of the award of the degree of
Master of Business Administration (MBA) in

Pharmaceutical Management

By

Abdul Anis Khan (0226)

Under the Supervision and Guidance of

Dr. Surya Prakash

Associate Professor, School of Pharmaceutical Management

2022

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DECLARATION

I hereby declare that this dissertation titled **Determining the Availability & Price Difference of Antibiotics Drugs Enlisted in Who Essential Medicines List Between the Retail Pharmacy Stores & Jan-Aushadhi Stores** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

(Signature)

Name of Student

Date

CERTIFICATE

This is to certify that **Abdul Anis Khan (0226)** in partial fulfilment of the requirements for the award of the degree of MBA (Pharmaceutical Management) from the IIHMR University, Jaipur has completed her/his internship at IIHMR UNIVERSITY during March 22, 2022, to June 19, 2022.

Place:

Preceptor/Head of the Organization

Date:

Name of the organization

CERTIFICATE

This is to certify that dissertation titled **Determining The Availability & Price Difference Of Antibiotics Drugs Enlisted In Who Essential Medicines List Between The Retail Pharmacy Stores & Jan-Aushadhi Stores** is a record of the research work undertaken by **Abdul Anis Khan (0226)** in partial fulfillment of the requirements for the award of the degree of MBA (Pharmaceutical Management) from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

Faculty Guide

IIHMR University, Jaipur

Date

School Dean

IIHMR University, Jaipur

Date

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CHAPTER 1: ABSTRACT

Affordability of Medicines is one of the major concerns in India. Due to high MRP of the medicines people suffer a lot and it affects the treatment of the patients. To avoid this, the Government of India has started a scheme known as Pradhan Mantri Jan-Aushadhi (PMBJP) in 2008. This schemes provide affordable generic medicine to the individuals. The whole aim of the scheme was to provide affordable medicines to the people of India.

This study covers about the price comparison about the Antibiotics listed in the WHO list of essential medicines. Bacterial infection is one of the major cause of illness and antibiotics are used to treat this bacterial infection. There are total 50 medicines listed in the WHO list of essential medicines out of which it was found that 24 out of 50 medicines were not available at Jan-Aushadhi stores. Also, it was seen that most of the medicines available at Jan-Aushadhi stores were very affordable when compared to the Retail MRP. Products belonging to Carbapenem group were having the highest MRP and have the maximum price difference.

Also, this study consists of the awareness of the generic medicines and Jan-Aushadhi stores among some population. Total 50 responses were collected and it was seen that most of the people know about generic medicines but majority are not aware about the Jan-Aushadhi stores. There is a need for the awareness of Jan-Aushadhi to the people so they can take advantage of the same.

CHAPTER 2: INTRODUCTION

The WHO Model List of Essential Medicines (Essential Medicines List or EML, posted with the aid of using the World Health Organization (WHO), carries the medicinal drugs taken into consideration to be only and secure to satisfy the maximum crucial desires in a fitness system.

This listing is often utilized by international locations to assist broaden their very own neighborhood lists of critical medicine. As of 2016, extra than one hundred fifty five international locations have created country wide lists of critical drug treatments primarily based totally at the World Health Organization's version listing. This consists of international locations in each the evolved and growing world.

Bacterial infections have a massive effect on public health. Disease can arise at any frame web page and may be as a result of the organism itself or via way of means of the frame's reaction to its presence. Bacteria are transmitted to human beings thru air, water, food, or dwelling vectors.

Bacterial infections variety from extraordinarily minor consisting of pores and skin or gastrointestinal infections, to severe and life-threatening, consisting of bloodstream infections or pneumonia. Most micro organism are labeled as Gram-effective or Gram-negative.

With the help of Anti-infectives we can,

- Treat Infectious diseases like pneumonia or tuberculosis and also minor infections
- Also helps to perform routine procedures and complex surgery, such as joint replacements or cesaren sections, which carry a risk of serious infection
- In chemotherapy it gives vital immune-suppressive treatments to treat people with cancer

One of the biggest threat today to global health, food security is **Antibiotic resistance**. It majorly occurs due to overuse of Antibiotics and this cause the longer stay in hospitals, higher medical costs and increased mortality.

In 2019, WHO (World health organization) has developed the AWaRe classification of antibiotics. The reason for developing the AWaRe was to improve the use of antibiotics through antibiotic, and to curb the further spread of antimicrobial resistance (AMR). It is also important for ensuring appropriate treatment.

AWaRe Classification:

AWaRe= Access group Antibiotics, this group consists of antibiotics which have interest towards a huge variety of normally encountered prone pathogens whilst additionally displaying decrease resistance capability than antibiotics within the different groups.

WaRe= Watch group Antibiotics, this group consists of antibiotics which have better resistance ability and consists of maximum of the very best precedence drugs most of the Critically Important Antimicrobials for Human Medicine and/or antibiotics which can be at exceedingly excessive danger of choice of bacterial resistance.

AWa**R**e= Reserve group Antibiotics, this group consists of antibiotics and antibiotic classes that ought to be reserved for remedy of showed or suspected infections because of multi-drug-resistant organisms. Antibiotics in Reserve group ought to be dealt with as “remaining resort” options, which ought to be accessible, however their use ought to be tailor-made to distinctly unique sufferers and settings, whilst all options have failed or aren't suitable.

To provide the medicine at an affordable price Government of India started the Janaushadhi Pariyojana in 2008-2009 which later became the PMBJP. Under these scheme Janaushadhi stores were opened at various locations across the India to provide the quality generic medicines at affordable price to the needy people. Though this scheme is considered as successful scheme, the question about the availability of certain medicines were always the point of discussion.

In this research we are focusing on the availability & price of the WHO enlisted essential medicines for the treatment of the cancer by comparing the Janaushadhi stores with retail pharma stores/market. The availability and price variation of these essential medicines is certainly the big question among the Indian Market. With the opening of Janaushadhi stores across the India the

availability of generic drugs along with the branded drugs has certainly increased but the diversification in the price might also be there

Thus, this project aims to determine the availability & price differences of certain medicines which are high priced in Indian market by comparing their availability in the Retail Pharma Stores & Janaushadhi Stores. For the study various literature & government data is accessed. The availability and price of Drugs available is taken from the data available on the site of Bureau of Pharma PSUs of India's official site, whereas the price of branded drug is taken from the online sources.

CHAPTER 3: LITERATURE REVIEW

- 1) Kanchan Mukherjee, 2017, Cost analysis of Jan Aushadhi scheme in India, Out-of-pocket expenses for medicines constitute a considerable proportion in India. To address this issue Government of India launched the Jan Aushadhi scheme (JAS) to provide cheap generic medicine to the patients. ¹
- 2) Sonak Pastakia | Benson Njuguna | Dan N. Tran, 2018, The WHO Essential Medicines List (EML) was developed in 1977 with the goal of guiding the development of national and institutional EMLs to improve access to medicines, availability, safety, and cost effectiveness.²
- 3) Anita Kotwani, 2016, Generic medicine improve the access of essential medicine in India, Affordability of Medicine is a major concern in India, In India mostly Branded Generics are available and the MRP for the same are way too high, To improve the access of medicine Government of India has launched various schemes which provides affordable medicines one of them is Jan Aushadhi scheme (JAS). ³
- 4) Sabine Vogler, 2019, Ensuring affordable access to essential medicines (i.e., those medicines that satisfy the priority health needs of the population (WHO, 2017a) is a major policy objective globally (United Nations, 2017). One-third of the world's population; however, is estimated to have limited or no access to essential medicines (WHO, 2011). One of the key barriers is the high price of medicines. In many countries, particularly in low- and middle income countries (LMIC), essential medicines are largely unaffordable for patients who have to pay out-of-pocket (Cameron et al., 2011; Lu et al., 2011; WHO, 2004). Governments have been urged to regulate medicine prices to keep them at a level that is affordable (WHO, 2013). This is done through so-called pharmaceutical pricing policies. ⁴
- 5) Maiti, R. & et.al, 2015, World Health Organization (WHO) defines essential drugs or medicines as “those drugs that satisfy the healthcare needs of majority of the population; they should therefore be available at all times in adequate amounts and in appropriate dosage forms, at a price the community can afford”. This is the basis of the Essential Medicine Concept that was launched in 1977 and became one of the eight pillars of WHO's “Primary Health Care” strategy. This concept is intended to be flexible and adaptable to many different situations and it is a national responsibility to determine the essential medicines. ⁵

- 6) WHO, 22nd list, 2021, In developing countries today medicines account for 25–70% of overall healthcare expenditure, compared to less than 10% in most high-income countries. The cost of newer products with proven advantage over older medicines, such as antiretroviral, medicines for tuberculosis and new antimalarial, limits access to medicines in resource-poor settings. Moreover, up to 90% of the population in low and middle-income countries must pay for medicines out of pocket due to lack of social insurance and inadequate publicly subsidized services (1,4). Not only are medicines unaffordable for large sectors of the global population, but they are also a major burden on government budgets. ⁶
- 7) Dr Antony KR & et.al, 2009, Patients in private pharmacies are paying 1.82 and 1.32 times the international reference price, on average, to purchase highest-priced and lowest-priced products, respectively. Substantial variation is observed across individual medicines, with one quarter of highest priced and lowest-priced products costing over 4.12 and 2.25 times their international reference price, respectively. In the private sector, highest-priced products cost 8.3% more, on average, than their lowest-price equivalents.⁷
- 8) Manoj Pareek | Dr. M. Prakash, 2019, Private pharmacy outlets earn from 30 % to as high as 200 % which is much higher than a Jan Aushadi or generic store owner who earns only 20%. On the sale of surgical items margins are in the range of 70% to 100%. They are the most unlikely participants to stock and sell generic medicines. Therefore, there is a need to encourage generic stores in India. ⁸

CHAPTER 4: OBJECTIVES

- To analyze the availability and price difference of Antibiotics WHO Essential Medicines between the Retail Pharmacy Store & Janaushadhi Store
- To determine the awareness of Janaushadi store and Generic medicines in general public

CHAPTER 5: RESEARCH QUESTION

- Is the Antibiotics WHO Essential Medicines available in the Retail Pharmacy Store & Janaushadhi Store?
- What is the price difference between Retail Pharmacy Store & Janaushadhi Store?

CHAPTER 6: METHODOLOGY

- Type of Study- Exploratory Study
- Type of Data- Secondary
- Research Instruments- Articles, Research Papers, Data Published by Governments Agencies, Online Sources.
- Duration of Study- 45 – 60 days
- Tool for Analysis- MS Excel, R studio

CHAPTER 7: RESULT & DISCUSSION

Drug name	Generic name	Availability	Price	Retail price	Difference
Amikacin	Amikacin Injection IP 100mg/2ml, 2ml vial 2ml Vial	Available	₹ 9.50	₹ 30.29	₹ 20.79
	Amikacin Injections IP 250mg 2ml Vial	Available	₹ 16.40	₹ 48.97	₹ 32.57
Amoxycillin	Amoxycillin 1000mg+ Clavulanic acid 200 mg Inj. Vial with wfi	Available	₹ 55.00	₹ 124.77	₹ 69.77
	Amoxycillin 250mg + Clavulanic acid 50 mg Inj. Vial with WFI	Available	₹ 20.00	₹ 32.50	₹ 12.50
	Amoxycillin Capsules IP 500mg 10's	Available	₹ 26.26	₹ 108.70	₹ 82.44
Ampicillin	Ampicillin 500mg inj. Vial	Available	₹ 7.20	₹ 32.30	₹ 25.10
Azithromycin	Azithromycin (100mg/ 5ml) Suspension 15 ml	Available	₹ 13.00	₹ 26.90	₹ 13.90
	Azithromycin 100 mg DT Tablet 10's	Available	₹ 25.50	₹ 27.80	₹ 2.30

	Azithromycin 250 mg film coated Tablet 10's	Available	₹ 40.00	₹ 118.45	₹ 78.45
	Azithromycin 500 mg film coated Tablet 10's	Available	₹ 80.60	₹ 119.20	₹ 38.60
Benzathine Benzylpenicillin	-	-	-	-	-
Cefazolin	Cefazolin Sodium Injection IP 500mg Vial&WFI	Available	₹ 7.40	₹ 20.91	₹ 13.51
Cefixime	Cefixime film coated Tablets IP 100mg 10's	Available	₹ 24.35	₹ 95.00	₹ 70.65
	Cefixime 200 mg film coated Tablet 10's	Available	₹ 41.50	₹ 107.74	₹ 66.24
	Cefixime oral suspension 50mg/5ml 30 ml	Available	₹ 16.00	₹ 53.75	₹ 37.75
Cefotaxime	Cefotaxime Sodium 1 gm+ Sulbactam Sodium 500 mg Inj.	Available	₹ 21.40	₹ 232.00	₹ 210.60
	Cefotaxime Sodium 1000mg Inj. Vial & wfi	Available	₹ 15.93	₹ 59.85	₹ 43.92
Ceftazadime	Ceftazadime 1000 mg Inj. Vial & wfi	Available	₹ 66.83	₹ 240.00	₹ 173.17
	Ceftazadime 250 mg Inj. Vial & wfi	Available	₹ 28.46	₹ 95.00	₹ 66.54

	Ceftazadime 500 mg Inj. Vial & wfi	Available	₹ 44.33	₹ 62.50	₹ 18.17
Ceftriaxone	Ceftriaxone 1000mg + Tazobactum 125 mg Inj. Vial & wfi	Available	₹ 44.46	₹ 159.00	₹ 114.54
	Ceftriaxone 1000mg+ Sulbactam 500 mg Inj. Vial & wfi	Available	₹ 31.90	₹ 114.00	₹ 82.10
	Ceftriaxone 250 mg + Sulbactum 125 mg Injection with WFI	Available	₹ 13.00	₹ 48.00	₹ 35.00
	Ceftriaxone 250 mg Inj. Vial & wfi	Available	₹ 11.40	₹ 24.51	₹ 13.11
	Ceftriaxone 500 mg Inj. Vial & wfi	Available	₹ 20.90	₹ 65.37	₹ 44.47
	Ceftriaxone Injection IP 1g Vial & wfi	Available	₹ 22.50	₹ 60.18	₹ 37.68
Cefuroxime	Cefuroxime 500 Mg+ Clavulanic Acid 125 mg (AS Pot.Clavulanate) Tablets 6's	Available	₹ 122.10	₹ 264.50	₹ 142.40
	Cefuroxime Axetil 250 mg film coated Tablet 10's	Available	₹ 56.00	₹ 299.00	₹ 243.00

	Cefuroxime Axetil 500mg film coated Tablet 10's	Available	₹ 128.00	₹ 490.00	₹ 362.00
	Cefuroxime Tablets IP 125mg 6's	Available	₹ 34.77	₹ 106.48	₹ 71.71
Ciprofloxacin	Ciprofloxacin 250 mg film coated Tablet 10's	Available	₹ 8.10	₹ 23.16	₹ 15.06
	Ciprofloxacin 250mg + Tinidazole 300 mg film coated Tablet	Available	₹ 22.12	₹ 60.50	₹ 38.38
	Ciprofloxacin 500 mg film coated Tablet 10's	Available	₹ 17.00	₹ 40.68	₹ 23.68
	Ciprofloxacin 500mg + Tinidazole 600 mg) film coated tablets 10's	Available	₹ 30.00	₹ 117.19	₹ 87.19
Clarithromycin	Clarithromycin Tablets 250 mg 10's	Available	₹ 89.15	₹ 314.02	₹ 224.87
	Clarithromycin Tablets IP 500 mg 4's	Available	₹ 60.00	₹ 221.42	₹ 161.42
Clindamycin	Clindamycin Capsules IP 300 MG	Available	₹ 54.77	₹ 242.64	₹ 187.87

	Clindamycin inj ip 300 MG/2 ML	Available	₹ 23.40	₹ 190.32	₹ 166.92
Doxycycline	Doxycycline Capsules IP 100mg 10's	Available	₹ 11.60	₹ 28.00	₹ 16.40
Erythromycin	Erythromycin Estolate Suspension 125 Mg/5ml 60ml	Available	₹ 15.60	₹ 51.70	₹ 36.10
Ethionamide	-	-	-	-	-
Ethambutol	Ethambutol Tablets IP 800 MG	Available	₹ 31.05	₹ 37.50	₹ 6.45
Fosfomycin	-	-	-	-	-
Gentamycin	Gentamycin Sulphate 80 mg/ 2ml Inj. 2 ml	Available	₹ 2.25	₹ 9.43	₹ 7.18
Imipenem And Cilastatin	Imipenem And Cilastatin Inj IP (500mg+500mg)	Available	₹ 385.00	₹ 898.00	₹ 513.00
Isoniazid + Rifampentine	-	-	-	-	-
Isoniazid + Rifampicin	-	-	-	-	-
Isoniazid + Pyrizinaide+Rifampicin	-	-	-	-	-
Isoniazid	-	-	-	-	-
Levofloxacin	Levofloxacin film coated Tablets IP 500mg 10's	Available	₹ 26.80	₹ 90.48	₹ 63.68
	Levofloxacin film coated Tablets IP 250mg 10's	Available	₹ 16.00	₹ 49.44	₹ 33.44

Linezolid	Linezolid Infusion 600 MG/300 ML	Available	₹ 95.15	₹ 399.00	₹ 303.85
	Linezolid Tablets IP 600 MG	Available	₹ 176.10	₹ 334.78	₹ 158.68
Meropenem	Meropenem Injection IP 1gm Vial & wfi	Available	₹ 214.60	₹ 1,600.00	₹ 1,385.40
Meropenem+ Vabrobactum	-	-	-	-	-
Metronidazole	Metronidazole film coated Tablets IP 200mg 10's	Available	₹ 2.00	₹ 11.59	₹ 9.59
	Metronidazole film coated Tablets IP 400mg 10's	Available	₹ 3.85	₹ 23.74	₹ 19.89
Moxifloxacin	Moxifloxacin Tablets 400 MG	Available	₹ 63.00	₹ 284.48	₹ 221.48
Chloramphenicol	-	-	-	-	-
Cloxacillin	-	-	-	-	-
Cycloserine	-	-	-	-	-
Colistin	-	-	-	-	-
Clofazimine	-	-	-	-	-
Ceftazidime + avibactam	-	-	-	-	-
Cefiderocol	-	-	-	-	-
Cefazolin	-	-	-	-	-
Cefalexin	-	-	-	-	-
Nitrofurantoin	-	-	-	-	-
Piperacillin 4gm + Tazobactum	Piperacillin 4gm + Tazobactum 0.5 gm Inj. Vial & wfi	Available	₹ 164.20	₹ 369.81	₹ 205.61

P-aminosalicylic acid	-	-	-	-	-
Phenoxymethylpenicillin	-	-	-	-	-
Polymyxin B	-	-	-	-	-
Protionamide	-	-	-	-	-
Procaine Benzylpenicillin	-	-	-	-	-
Plazomicin	-	-	-	-	-
Pyrazinamide	Pyrazinamide Tablets I.P 1000mg	Available	₹ 50.00	75.00	₹ 25.00
Terimethoprim and Sulphamethoxazole	Terimethoprim and Sulphamethoxazole Tab IP (80 mg + 400 mg) 10's	Available	₹ 12.23	₹ 25.14	₹ 12.91

The **GREEN COLOUR** shows that there is a price difference of more than 100 Rupees and they are available at the Jan Aushadhi store.

Whereas the **RED COLOUR** shows that the drug is enlisted in the list of PMBJP drug list but currently unavailable in the stores.

Table: 1 Detailed Comparison of Availability & Price of the Drugs enlisted by WHO in essential List of Medicines

- The above table shows that the total 50 drugs given by WHO in its list of essential medicines with various dosage forms available of the same as mentioned above.
- Out of all 50 drugs in the essential medicine list only 26 drugs are available at the Janaushadhi store.
- Out of the available 26 drugs, 16 drugs have a price difference of more than 100 rupees.
- Two drugs belonging to Carbapenem class Viz. Imipenem - Cilastatin, Meropenem have a price difference of more than 500 rupees.

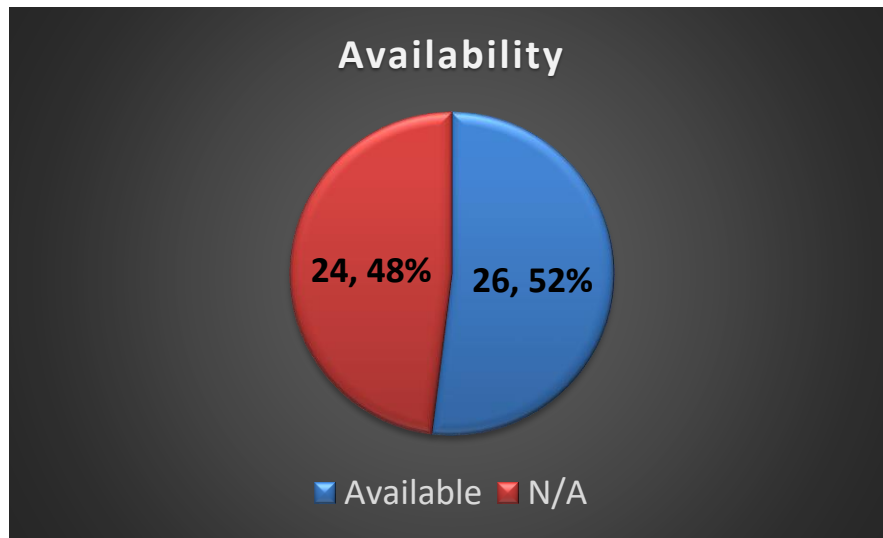


Figure 1: Pie chart indicating availability of medicines in Jan-Aushadhi stores.

The above Pie chart depicts that out of 50 essential medicine listed in the essential medicine list, there's a 50:50 to be more specific 48% & 52% non-available and available respectively.

Out of 50 drugs 26 are available at Jan Aushadhi store and 24 are not available which makes a ratio of (52: 48).

Price comparison of Carbapenem class drugs					
Drug name	Generic name	Availability	Price	Retail price	Difference
Imipenem And Cilastatin	Imipenem And Cilastatin Inj Ip (500mg+500mg)	Available	₹ 385.00	₹ 898.00	₹ 513.00
Meropenem	Meropenem Injection IP 1gm Vial & wfi	Available	₹ 214.60	₹ 1,600.00	₹ 1,385.40

Table 2: Comparison of Carbapenem class drugs

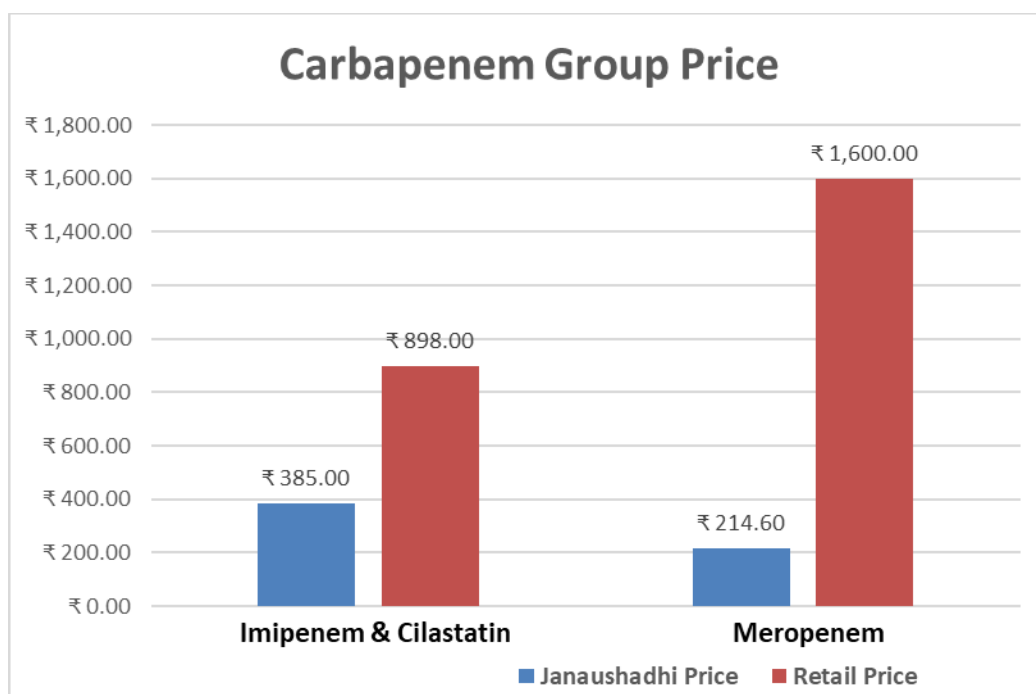


Figure 2: Bar chart indicating price of Carbapenem group.

- The above graph gives an idea about the difference in price between the Carbapenem group of drugs.
- It was seen that these two drugs Viz. Imipenem – Cilastatin & Meropenem were having the highest price difference.
- Imipenem – Cilastatin cost around Rs.385 and same when taken from Retail store the price was doubled to Rs.898.

- Same goes for Meropenem, the price in Retail is around 3 folds high when compared to Janaushadhi (Rs.214.60 in Janaushadhi & Rs.1600 in Retail store).

CHAPTER 8: AWARENESS ABOUT GENERIC MEDICINES AND JAN-AUSHADHI STORES

A questionnaire was being circulated in the form of Google forms which consists of Yes/No type of question. Total 50 responses were collected from 11 states of India. The states were, Ahmedabad, Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Telangana, Uttar Pradesh, Uttarakhand.

Below is the quick analysis of the responses,

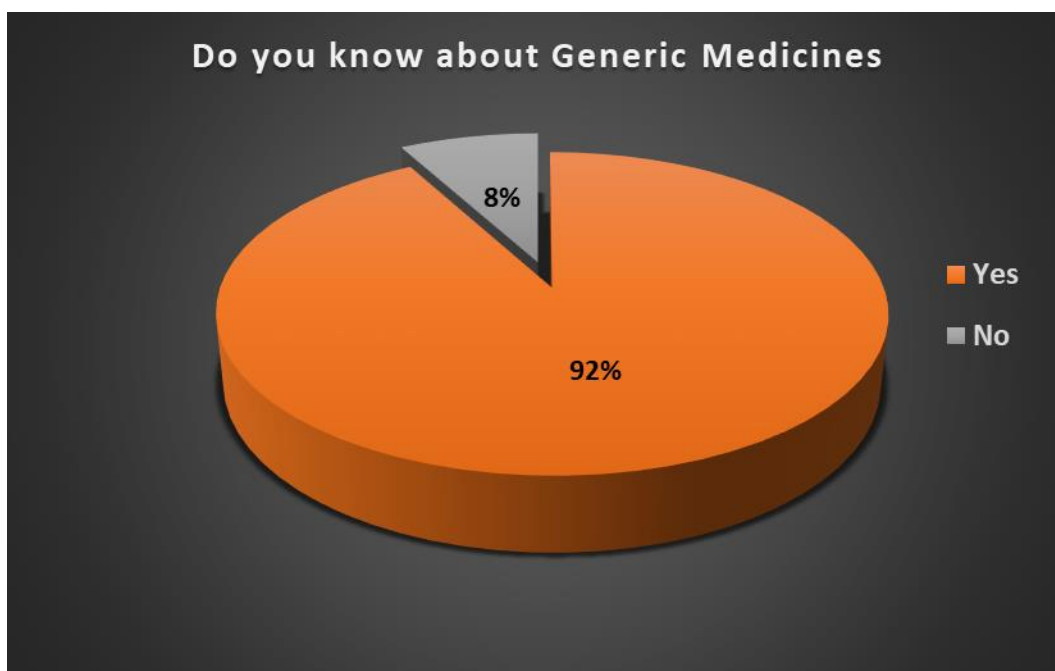


Figure 3: Pie chart indicating the awareness of Generic Medicines.

By the analysis it was seen that, Among the 50 responses 46 individuals know about generic medicines, and 4 individuals are not aware about Generic medicines. The four individuals who don't know about generic medicines belong to Maharashtra, Madhya Pradesh & Rajasthan.

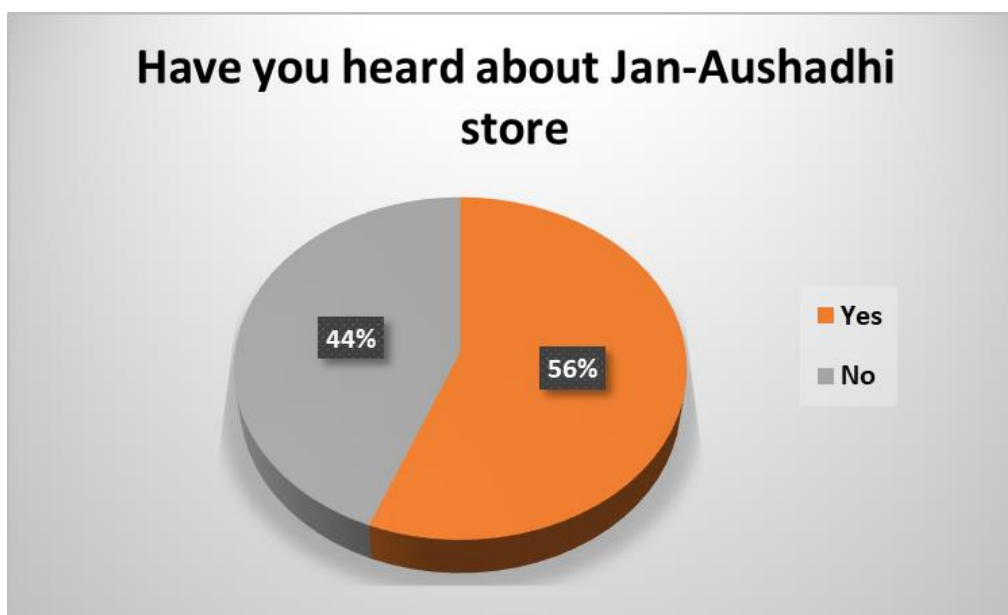


Figure 4: Pie chart indicating the awareness of Jan-Aushadhi stores.

The second question asked in the questionnaire was regarding the awareness of Jan-Aushadhi stores. Total 50 responses were taken and out of 50, 28 know or have heard about Jan-Aushadhi stores. Whereas, 22 out of 50 don't know or haven't heard about Jan-Aushadhi stores. It was seen that there is a lack of awareness of Jan-Aushadhi store as only 50% in the total response taken are aware about the Jan-Aushadhi.

CHAPTER 9: CONCLUSION

The study of the project reveals that there is a great problem of affordability in some of the antibiotics. It is estimated that, there are around 7500 Jan-Aushadhi stores in India to provide cheap but quality medicines to the masses with the help of BPPU (Bureau of Pharma Public Sector Undertakings of India). But only 26 drugs out of 50 mentioned in the WHO List of Essential Medicines are available at the Jan-Aushadhi stores and 24 drugs are not available. And it was observed that 26 products out of 50 have price difference of above 50 rupees. It was seen that out of 50 products 2 products (belonging to Carbapenem group) has a price difference of above 500 rupees.

When taken survey regarding the availability of the medicine at Jan-Aushadhi store, it was seen that the supply chain was a major problem and some political factors were also there. Apart from this, there was a quick analysis of Carbapenem group drugs as this were the drugs which have the highest price difference, the Mrp in retail store was Rs. 1600 whereas in Jan-Aushadhi store it is available for Rs. 214. It makes a huge difference of about Rs. 1400. Carbapenem's are one of the most preferred choice antibiotics in most of the patients and due to this high price patient are suffering economically.

This study also shows the awareness of generic medicines and Jan-Aushadhi stores in the individuals. Total 50 responses were taken and it was seen that people know about generic medicine but about 50% of the people are not aware/ don't know about Jan-Aushadhi stores.

The Janaushadhi scheme is one of the most celebrated initiative started by the government to strengthening the Healthcare System of India by providing the drugs at an affordable price rate but from this study we can conclude that this initiative is hindered by one or more factors which is causing huge problem & inconvenience for the common man and people under poverty line. And thus, the rebuilding of this system is needed considering the current situation.

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