

**Determining the Availability and Price difference of
Anticancer Drugs Enlisted in WHO Essential Medi-
cines List between the Retail Pharmacy Stores and
Janaushadhi Stores**

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the

degree of Master of Business Administration

(MBA)

in

Pharmaceutical Management

by

Anup Nivrutti Shelke

Under the Supervision and Guidance of

Dr. Sudhinder Singh Chowhan,
Associate Professor, School Of Pharmaceutical Management,
IIHMR University, Jaipur

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Determining the Availability and Price difference of Anticancer Drugs Enlisted in WHO Essential Medicines List between the Retail Pharmacy Stores and Janaushadhi 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 Information derived from the published or unpublished work of others has been duly acknowledged in the text.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)

Anup Nivrutti Shelke

Date

CERTIFICATE

This is to certify that Anup Nivrutti Shelke in partial fulfillment of the requirements for the award of the degree of MBA (Pharmaceutical Management from the IIHMR University, Jaipur has successfully completed his internship at Orbees Business Solutions Pvt. Ltd. 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 and Price difference of Anticancer Drugs Enlisted in WHO Essential Medicines List between the Retail Pharmacy Stores and Janaushadhi Stores** is a record of the research work undertaken by Anup Nivrutti Shelke 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

Executive Summary

Introduction

Cancer is one of the most common and widely affecting non-communicable diseases in today's world. It is one of the most feared diseases in the world. Cancer is a lifestyle-related disease that requires a specialized infrastructure & competent human resources for the treatment as it has a lingering underlying period. India is a country where 65.53% population is living in rural areas. Thus, Non-communicable diseases involving cancer are appearing as major public health problems in India. Cancer is the second most common cause of death in India.

India is having a good pharmaceutical market with almost all kinds of treatments & drugs. But the main concern was always about the affordability of those medicines. Though India is having one of the biggest generic markets in the world the availability of certain generic medicine is still a question. To provide the medicine at an affordable price Government of India stated the Janaushadhi Pariyojana in 2008-2009 which later became the PMBJP. Under this scheme, Janaushadhi stores were opened at various locations across India to provide quality generic medicines at affordable prices to needy people. Though this scheme is considered a successful scheme, the question of the availability of certain medicines was always the point of discussion.

Objective

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

Data analysis and Findings

This study also shows that the essential drugs such as drugs belonging to Immuno-modulators for non-communicable diseases & cytotoxic drug categories are not included and very few drugs are included in the PMBJP Product list, respectively. Also, the drugs which are either

available or enlisted in the PMBJP Products list are a lot cheaper than the branded drugs this difference is near 40% - 80% based on the class of Drugs. Thus, the availability of these medicines could play a major role in the treatment & control of non-communicable diseases like Cancer as more people can afford these drugs.

Conclusion

The study of this project reveals that there is a great deficiency in the affordable healthcare system for the treatment of cancer. It is estimated that there are around 7500 Janaushadhi 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 25 drugs out of 54 mentioned by WHO in its List of Essential Medicines are included in the PMBJP products- therapeutic groups, and only 7 of them are available in the generic market currently, the rest 18 drugs are either unavailable or stopped selling due to COVID-19. This is affecting the people who are unable to afford the high-priced treatment of cancer economically which may be one of the reasons why India is currently having the 2nd most deaths caused due to cancer.

Acknowledgments

I am using this opportunity to express my gratitude to everyone who supported me in the completion of this project. I am thankful for their aspiring guidance, invaluable constructive criticism, and friendly advice during the project work. I am sincerely grateful to them for sharing their truthful and illuminating views on several issues related to the project.

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Chapter 1 – Introduction

The WHO Model List of Essential Medicines (Essential Medicines List or EML, published by the World Health Organization (WHO), contains the medications considered to be most effective and safe to meet the most important needs in a health system.

This list is frequently used by countries to help develop their local lists of essential medicine. As of 2016, more than 155 countries have created national lists of essential medicines based on the World Health Organization's model list. This includes countries in both the developed and developing world.

Cancer is one of the most common and widely affecting non-communicable diseases in today's world. It is one of the most feared diseases in the world. Cancer is a lifestyle-related disease that requires a specialized infrastructure & competent human resources for the treatment as it has a lingering underlying period. It is not a single disease, but an assortment of hundreds of diseases caused due to the abnormal growth of cells in the body. Even tumors, masses of tissues formed by this growth that arise from the same cell type can be different.

India is a country where 65.53% population is living in rural areas. Thus, Non-communicable diseases involving cancer are appearing as major public health problems in India. Cancer is the second most common cause of death in India. The risk factors for the major non-communicable diseases (Diabetes Mellitus, Cardiovascular Diseases, Diabetes, and many types of Cancer) are tobacco, dietary habits, inadequate physical activity, and alcohol consumption. This offers the prospect of integrated primary prevention strategies.

The issue of access to medicines is one of the leading causes of health care abuse in India. According to the National Sample Survey, only 30% of all health services were provided by public institutions in 2017-18. This means that most people have had to get healthcare, including medicines, from private providers. In addition, even those who have access to public health care eventually buy the drug on the market, as prescription drugs are often not available in public hospital pharmacies. According to one estimate, access to essential medicines in India is less than 35%

Out of all non-communicable diseases in India cancer is the fastest growing disease. It can be seen in Urban as well as rural parts of India. Lack of infrastructure, awareness & diagnosis measures lead to the rising number of cases & so that the deaths. Due to poverty and illiteracy, there is a lack of awareness which leads to the presentation at an advanced or metastatic stage. The treatment in most of the cases is palliative. Though now the awareness about cancer has increased and the urban population is very conscious of the disease. The expanse of the treatment is too much for many people in India.

According to a report published in the year 2022 which revealed some figures about the cancer status in India. The estimated prevalence of Cancer among males was 679,421 (94.1 per 100,000) and among females 712,758 (103.6 per 100,000). One in 68 males is having lung cancer, 1 in 29 females fighting the breast cancer, and 1 in 9 Indians will develop cancer during their lifetime i.e., 0-74 years of age. This report also stated that 5 most common cancers in 2021 for males include lung, mouth, prostate, tongue, and stomach and collectively constitute 36% of all cancers and for females are breast, cervix uteri, ovary, corpus uteri, and lung are a most common type, establishing 53% of all cancers.

According to a report by the Indian Council for Medical Research on the 'Burden of cancers in India', Indians suffering from cancer was 26.7 million in 2021 projected to increase to 29.8 million in 2025. North (2,408 patients per 100,000) and the Northeast (2,177 per 100,000) parts of India reported the highest incidence last year. The seven cancers that accounted for more than 40% of the total disease burden are lung (10.6%), breast (10.5%), esophagus (5.8%), mouth (5.7%), stomach (5.2%), liver (4.6%) and cervix uteri (4.3%).

Anticancer or antineoplastic drugs are of prime concern in the country like India due to their high prices & availability also. As the huge population in India is having low or limited income & still residing in rural areas the high-priced treatment of cancer is not affordable to many. It is estimated that the average cost of cancer care is Rs. 72,092 in public hospitals whereas in private hospitals this cost is around Rs. 1,41,774 and again this may vary from state to state.

For primary care and to provide the ease of treatment WHO has enlisted a total of 65 drugs divided into different classes for treatment & well-being of cancer patients in the List of Essential Medicine. It is mandated that these essential medicines should be available to the patient at an affordable price. India has a good pharmaceutical market with almost all kinds

of treatments & drugs. But the main concern was always about the affordability of those medicines. Though India is having one of the biggest generic markets in the world the availability of certain generic medicine is still a question.

To provide the medicine at an affordable price Government of India stated the Janaushadhi Pariyojana in 2008-2009 which later became the PMBJP. Under this scheme, Janaushadhi stores were opened at various locations across India to provide quality generic medicines at an affordable price to needy people. Though this scheme is considered a successful scheme, the question of the availability of certain medicines was 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 cancer by comparing the Janaushadhi stores with retail pharma stores/markets. The availability and price variation of these essential medicines is certainly the big question in the Indian Market. With the opening of Janaushadhi stores across India the availability of generic drugs along with branded drugs has certainly increased but the diversification in the price is also there.

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

Objectives

- To analyze the availability and price difference of Anti-cancer WHO Essential Medicines between the Retail Pharmacy Store & Janaushadhi Store

Primary objective

- Assess the availability of Anti-cancer WHO Essential Medicines between the Retail Pharmacy Store & Janaushadhi Store.
- Compare the price variation of Anti-cancer WHO Essential Medicines between the Retail Pharmacy Store & Janaushadhi Store.

Chapter 2 – Review of Literature

- WHO, 2008, 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 a 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 a lack of social insurance and inadequate publicly subsidized services. Not only are medicines unaffordable for large sectors of the global population, but they are also a major burden on government budgets.
- Thomas George¹ and Manjeshwar S Baliga, 2021, Various reports from India have plainly shown that out-of-pocket expenditure for cancer therapy is the most elevated for any sickness. The sum in confidential hospitals can be basically as high as multiple times spent out in the open/government hospital offices. The therapy costs are over the top, and over 60% of individuals treated in the confidential area consume almost 20% of their annual per capita household expenditure on cancer care of the impacted relative.²¹
- Sonam Lavtepatil & Soumitra Ghosh, 2022, Along with the limited coverage of essential medicines and the significant presence of Fixed dose combinations (FDCs) in the PMBJP medicine list, the availability of surveyed essential drugs was also found to be low (47%) in PMBJP outlets. around 50% and 42% of medicines were found to be out of stock for the period of 3–6 months respectively across Mumbai and Palghar districts. The cost of generic medicines of PMBJP outlets for treating various conditions range from 0.01 days' wages to 0.47 days' wages for the lowest paid unskilled worker in Maharashtra.²²
- 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 the 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, the highest-priced products cost 8.3% more, on average, than their lowest-price equivalents.¹²

- Anita Kotwani, 2013, Low-income patients are forced to buy medicines from the private sector or forego treatment since affordability is a major issue for a large proportion of the Indian population. The various policy options suggested including the continuous monitoring and evaluation of the system will help make the government policy of providing ‘free-medicines-to-all’ a reality. Policymakers have a good opportunity to improve the situation by better spending on medicines and more spending on health.⁸
- Maiti, R. & et.al, 2015, World Health Organization (WHO) defines essential drugs or medicines as “those drugs that satisfy the healthcare needs of the majority of the population; they should therefore be available at all times in adequate amounts and 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.⁴
- Mukherjee K, 2017, Medicines constitute a substantial proportion of out-of-pocket (OOP) expenses in Indian households. To address this issue, the Government of India launched the Jan Aashaadha (Medicine for the Masses) Scheme (JAS) to provide cheap generic medicines to patients. These medicines are provided through the Janaushadhi stores established across the country. The extent of OOP expenditure is so high that some affected patients and households must take loans to buy medicines. This meant that the expenditure on medicines was responsible for pushing the rural and urban poor into debt. A study over four weeks showed that 41%-56% of households surveyed in low- and middle-income countries had solely spent their health expenses on medicines.¹⁰
- Mukherjee K, 2017, since medicines constitute most OOP expenses in India, making cheap generic medicines available for patient households would be an important strategy to achieve the objective. In Europe, generic medicines reduced the region's medicine bill by 61% in 2014.¹³ Even in developing countries, substantial savings could

be achieved by switching private sector purchases from branded medicines to lowest-priced generic equivalents.¹⁰

- Sonak Pastakia | Benson Njuguna | Dan N. Tran, 2018, The WHO Essential Medicines List (EML) was developed in 1977 to guide the development of national and institutional EMLs to improve access to medicines, availability, safety, and cost-effectiveness.²
- 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-countries (LMIC), essential medicines are largely unaffordable for patients who must 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 an affordable level (WHO, 2013). This is done through so-called pharmaceutical pricing policies.³
- Manoj Pareek | Dr. M. Prakash, 2019, Private pharmacy outlets earn from 30 % to as high as 200 % which is much higher than a Janaushadhi 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.¹³
- Kashyap A, Balaji M, Chhabra M, Rashid M, Muragundi P., 2020, Cost variation of cyclophosphamide and 5-Fluorouracil was observed, a range of 25% to 606.11% respectively among the branded agents considered. When compared to generic drugs gemcitabine proposed the highest cost variation (373.68%-990.78%) and cyclophosphamide (71.42%-114.28%) with the lowest variation. The highest level of cost-saving (₹60,807.3 to ₹1,31,864.1) with TAC regimen and the lowest range (₹12,15.84 to ₹15,667.2) with AC regimen was observed among adjuvant therapy regimens.⁶

Chapter 3 – Methodology

This study is a descriptive exploratory study, which involves the study of various research articles, books, and publications to know about the working of janaushadhi stores, how and which medicines are being available there and essential list of medicine by WHO and pricing along with the availability of selected anticancer drugs.

On gathering the information of list of essential anticancer medicine enlisted by WHO, list of medicine available in India is created. The price analysis and availability search is performed to know the difference and availability of these medicines.

The market study of infertility combinations is done to know the growth opportunities in this area of medicine.

The duration of the study is 3 months and the tools used to perform the study are WHO data PMBJP data, Research papers, publications, books, Retail price of anticancer drugs. And studying the data using the MS Excel and R-studio.

Research question

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

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-** 3 Months
- **Tool for Analysis-** MS Excel, R studio

Chapter 4 – Data Analysis and Findings

Table 4.1: Detailed Comparison of Availability & Price of the Drugs enlisted by WHO in essential List of Medicines

DRUG PRICE DETAILS						
Sr. No.	Drug Name	Use of Drug	Availability	Ja-naushadhi Store Price in Rs	Retail Pharma Store Highest Price	Retail Pharma Store Low Price
Immunomodulators for non-malignant disease						
1	Ada-limumab	Injection: 40 mg/0.8 mL; 40 mg/0.4 mL	NA	₹ -	₹ 23,500.00	₹ 8,700.00
2	Azathio-prine	Powder for injection: 100 mg (as sodium salt) in vial. Tablet (scored): 50 mg.	NA	₹ -	₹ 259.50	₹ 79.80
3	Ciclosporin	Capsule: 25 mg. Concentrate for injection: 50 mg/ mL in 1-mL ampoule for organ transplantation.	NA	₹ -	₹ 488.29	₹ 413.00
Neoplastic and Supportive Medicines						
The medicines listed below should be used according to protocols for the treatment of the diseases.						
1. Cytotoxic medicines						
4	Arsenic tri-oxide	Concentrate for solution for infusion: 1 mg/mL	NA	₹ -	₹ 825.00	₹ 429.00
5	Asparagi-nase	Powder for injection: 10 000 IU in a vial.	NA	₹ -	₹ 2,210.00	₹ 1,385.00

Table 4.2: Detailed Comparison of Availability & Price of the Drugs enlisted by WHO in essential List of Medicines

6	Benda- mustine	Injection: 45 mg/0.5 mL; 180 mg/2 mL.	NA	₹ -	₹ 8,383.00	₹ 7,200.00
7	Bleomycin	Powder for injection: 15 mg (as sulfate) in vial.	Avail- able	₹ 600.67	₹ 1,260.00	₹ 248.55
8	Calcium Folate	Injection: 3 mg/ mL in 10- mL ampoule. Tablet: 5 mg, 15 mg, 25 mg.	NA	₹ -	₹ 990.00	₹ 74.31
9	Capecita- bine	Tablet: 150 mg; 500 mg.	Avail- able	₹ 420.00	₹ 1,820.00	₹ 1,292.00
10	Carboplatin	Injection: 50 mg/5 mL; 150 mg/15 mL; 450 mg/45 mL; 600 mg/60 mL.	NA	₹ -	₹ 2,030.00	₹ 759.50
11	Chloram- bucil	Tablet: 2 mg.	NA	₹ -	₹ 129.53	₹ 1,620.00
12	Cisplatin	Injection: 50 mg/50 mL;	Avail- able	₹ 380.30	₹ 635.00	₹ 260.00
13	Cyclophos- phamide	Powder for injection: 500 mg in the vial.	Avail- able	₹ 35.00	₹ 89.80	₹ 58.00
14	Cytarabine	Powder for injection: 100 mg in the vial.	NA	₹ -	₹ 960.00	₹ 175.00
15	Dacarba- zine	Powder for injection: 100 mg in a vial.	Avail- able	₹ 188.00	₹ 310.00	₹ 250.00
16	Dactinomy- cin	Powder for injection: 500 micrograms in the vial.	NA	₹ -	₹ 699.00	₹ 427.44
17	Daunorubi- cin	Powder for injection: 20 mg (hydrochloride) in vial.	Avail- able	₹ 204.00	₹ 431.00	₹ 240.00
19	Docetaxel	Injection: 20 mg/ mL ; 40 mg/ mL.	NA	₹ -	₹ 4,678.52	₹ 2,965.00
20	Doxorubi- cin	Powder for injection: 10 mg; 50 mg (	Avail- able	₹ 74.11	₹ 350.00	₹ 171.00

Table 4.3: Detailed Comparison of Availability & Price of the Drugs enlisted by WHO in essential List of Medicines

21	Etoposide	Capsule: 50 mg, 100 mg. Injection: 20 mg/mL in 5- mL ampoule.	Available	₹ 76.06	₹ 274.86	₹ 190.00
22	Fludarabine	Powder for injection: 50 mg (phosphate) in vial. Tablet: 10 mg	NA	₹ -	₹ 9,124.00	₹ 5,780.00
23	Fluorouracil	Injection: 50 mg/mL in 5- mL ampoule.	NA	₹ -	₹ 172.50	₹ 10.50
24	Gemcitabine	Powder for injection: 200 mg in vial, 1 g in vial.	Available	₹ 204.78	₹ 1,929.00	₹ 990.00
25	Hydroxycarbamide	Solid oral dosage form: 200 mg; 250 mg; 300 mg; 400 mg; 500 mg; 1 g.	NA	₹ -	₹ 148.50	₹ 70.55
26	Ifosfamide	Powder for injection: 500 mg vial; 1-g vial; 2-g vial.	NA	₹ -	₹ 927.00	₹ 670.00
27	Irinotecan	Injection: 40 mg/2 mL in 2- mL vial; 100 mg/5 mL in 5- mL vial; 500 mg/25 mL in 25- mL vial.	NA	₹ -	₹ 18,720.00	₹ 3,200.00
28	Melphalan	Tablet: 2 mg Powder for injection: 50 mg in a vial	NA	₹ -	₹ 2,000.00	₹ 1,519.00
29	Mercaptopurine	Tablet: 50 mg.	NA	₹ -	₹ 114.00	₹ 69.70
30	Methotrexate	Powder for injection: 50 mg (as sodium salt) in vial. Tablet: 2.5 mg (as sodium salt).	NA	₹ -	₹ 101.00	₹ 49.90
31	Oxaliplatin	Powder for injection: 50 mg, 100 mg in a vial.	Available	₹ 430.00	₹ 4,938.00	₹ 1,740.00

Table 4.4: Detailed Comparison of Availability & Price of the Drugs enlisted by WHO in essential List of Medicines

32	Paclitaxel	Powder for injection: 6 mg/ mL.	Available	₹ 540.00	₹ 16,640.00	₹ 1,400.00
33	Tioguanine	Solid oral dosage form: 40 mg.	NA	₹ -	₹ 2,700.00	₹ 1,945.00
34	Vinblastine	Powder for injection: 10 mg (sulfate) in a vial.	NA	₹ -	₹ 258.00	₹ 225.00
35	Vincristine	Powder for injection: 1 mg; 5 mg (sulfate) in vial.	Available	₹ 25.00	₹ 65.00	₹ 46.79
36	Vinorelbine	Injection: 10 mg/mL in 1- mL vial; 50 mg/5 mL in 5- mL vial.	NA	₹ -	₹ 13,990.00	₹ 2,575.00
2 Targeted therapies						
37	Bortezomib	Powder for injection: 3.5 mg in the vial.	Available	₹ 3188.00	₹ 60,360.00	₹ 15,000.00
38	Dasatinib	Tablet: 20 mg; 50 mg; 70 mg; 80 mg; 100 mg; 140 mg.	NA	₹ -	₹ 1,045.00	₹ 1,160.00
39	Erlotinib	Tablet: 100 mg, 150 mg	NA	₹ -	₹ 19,500.00	₹ 6,660.00
40	Imatinib	Tablet: 100 mg; 400 mg.	Available	₹ 345.83	₹ 850.00	₹ 4,155.20
41	Rituximab	Injection (intravenous): 100 mg/10 mL in 10- mL vial; 500 mg/50 mL in 50- mL vial.	NA	₹ -	₹ 80,000.00	₹ 7,500.00
3 Immunomodulators						
42	Filgrastim	Injection: 120 micrograms/0.2 mL; 300 micrograms/0.5 mL; 480 micrograms/0.8 mL in pre-filled syringe 300 micrograms/mL in.	Available	₹ 259.20	₹ 19,680.00	₹ 8,930.00

Table 4.5: Detailed Comparison of Availability & Price of the Drugs enlisted by WHO in essential List of Medicines

43	Lenalidomide	Capsule: 25 mg	Available	₹ 422.00		
44	Thalidomide	Capsule: 50 mg - Multiple myeloma	NA	₹ -	₹ 2,430.00	₹ 98.80
4 Hormones and antihormones						
45	Abiraterone	Tablet: 250 mg; 500 mg	NA	₹ -	₹ 95,000.00	₹ 13,000.00
46	Anastrozole	Tablet: 1 mg.	Available	₹ 77.40	₹ 734.00	₹ 49.50
47	Bicalutamide	Tablet: 50 mg.	Available	₹ 131.00	₹ 3,900.00	₹ 364.00
48	Dexamethasone	Injection: 4 mg/ mL in 1- mL ampoule (as disodium phosphate salt).	Available	₹ 12.42	₹ 85.00	₹ 2.15
49	Hydrocortisone	Powder for injection: 100 mg (as sodium succinate) in the vial.	Available	₹ 18.40	₹ 520.00	₹ 10.32
50	leuprorelin	Injection: 7.5 mg; 22.5 mg in pre-filled syringe	NA	₹ -	₹ 33,600.00	₹ 182.00
51	Methylprednisolone	Injection: 40 mg/ mL (as sodium succinate) in 1- mL single-dose vial and 5- mL multi-dose vials;	Available	₹ 494.81	₹ 1,999.00	₹ 4.00
52	Prednisolone	Oral liquid: 5 mg/ mL [c]. Tablet: 5 mg; 25 mg.	Available	₹ 22.65	₹ 1,650.00	₹ 3.68
53	Tamoxifen	Tablet: 10 mg; 20 mg (as citrate)	Available	₹ 10.96	₹ 429.00	₹ 11.50
5. Supportive medicines						
54	Allopurinol	Tablet: 100 mg; 300 mg.	Available	₹ 7.72	₹ 900.00	₹ 12.30

Table 4.6: Detailed Comparison of Availability & Price of the Drugs enlisted by WHO in essential List of Medicines

55	Mesna	Injection: 100 mg/ mL in 4- mL and 10- mL ampoules. Tablet: 400 mg; 600 mg.	NA	₹ -	₹ 927.00	₹ 30.00
56	Zoledronic acid	Concentrate solu- tion for infusion: 4 mg/5 mL in 5- mL vial. Solution for infusion: 4 mg/100 mL in 100- mL bottle.	Availa- ble	₹ 164.25	₹ 19,516.0 0	₹ 1,350.00

The **GREEN COLOUR** in Janaushadhi Store Price column shows that the drug is currently available in the market.
Whereas the **RED COLOUR** shows that the drug enlisted in the list of PMBJP drug list is currently unavailable in the stores.

- The above table shows that the total 56 drugs given by WHO in its list of essential medicines are categorized into 6 classes i.e., Immunomodulators for nonmalignant diseases, Cytotoxic Drugs, Targeted Drug Therapies, and Immunomodulators, hormones & Anti Hormone Drugs & Supportive Medicines.
- Out of all 56 drugs only 25 drugs are mentioned in the list of *PMBJP* whereas only 7 Drugs (*Cisplatin*, *Doxorubicin*, *Gemcitabine*, *Methylprednisolone*, *Tamoxifen*, and *Zoledronic acid*) are available in the Janaushadhi Stores as per the latest rate of medicines available in the Janaushadhi Stores & 18 Drugs are unavailable in the market.
- There are no drug immunomodulators for non-malignant diseases class mentioned in the PMBJP list. Whereas in the Cytotoxic drug Category out of 33 drugs only 12 drugs (*Bleomycin*, *Capecitabine*, *Cisplatin*, *Cyclophosphamide*, *Dacarbazine*, *Daunorubicin*, *Doxorubicin*, *Etoposide*, *Gemcitabine*, *Oxaliplatin*, *Paclitaxel*, *Vincristine*) are mentioned in the PMBJP list and only 4 (*Bleomycin*, *Cisplatin*, *Doxorubicin*, *Gemcitabine*) of them are available in the generic market.
- In the case of Targeted Drug Therapies out of 5 drugs only 2 Drugs (*Bortezomib*, and *Imatinib*) are mentioned in the PMBJP list but unavailable in the market.

- Out of 3 immunomodulators enlisted by WHO, 2 drugs (Filgrastim, and Lenalidomide) are mentioned in PMBJP but both are unavailable. Lenalidomide is a drug that is not available in Janaushadhi stores and retail pharma stores as well.
- There are 9 drugs in the Hormone & Anti Hormone Drugs category given by WHO out of which 7 drugs (Anastrozole, Bicalutamide, Dexamethasone, Hydrocortisone, Methylprednisolone, Prednisolone, and Tamoxifen) are mentioned in the list of PMBJP but Methylprednisolone and Tamoxifen are only available in the generic market.
- In the case of Supportive Medicines, Zoledronic acid is available in the generic market out of 2 drugs (Allopurinol and Zoledronic acid) enlisted in PMBJP from 3 drugs given by WHO.

Chapter 5 – Results and Discussion

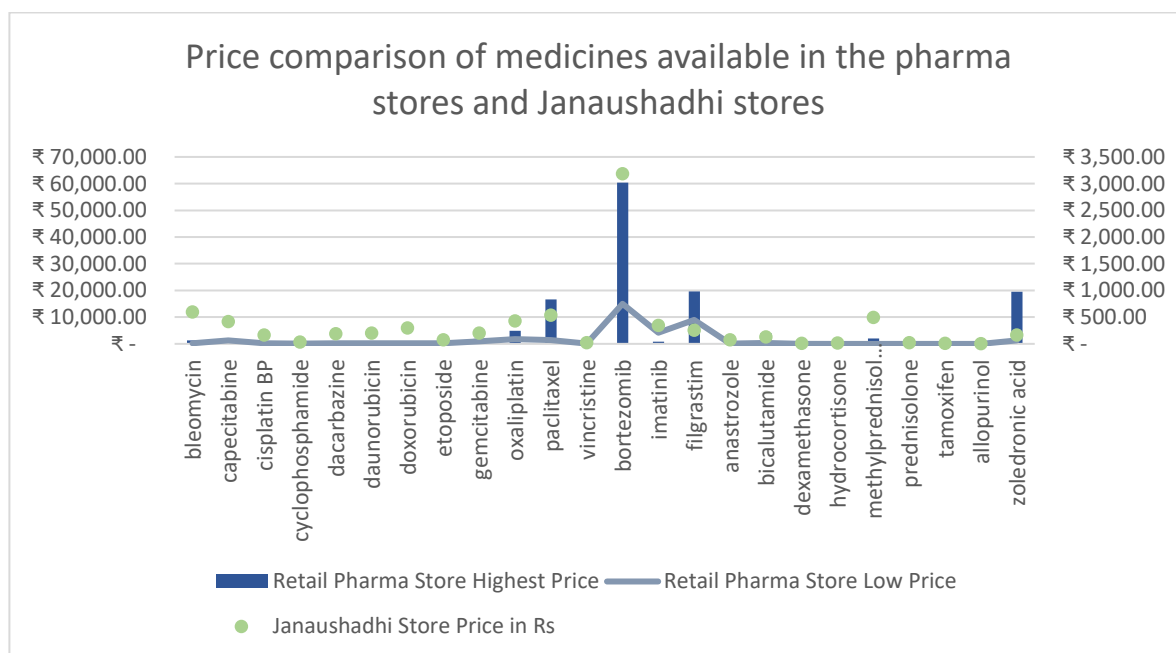
- The details class wise availability & price comparison of these drugs are as follows:

Table 5.7: Detailed Comparison Price of the Drugs available in Janaushadhi Store & Retail Pharma Stores

Price Comparison of Drugs Available at the Janaushadhi Store & Retail Pharma Store				
Sr. No.	Drug Name	Janaushadhi Store Price in Rs	Retail Pharma Store Highest Price	Retail Pharma Store Low Price
1	Bleomycin	₹ 600.67	₹ 1,260.00	₹ 248.55
2	Capecitabine	₹ 420.00	₹ 1,820.00	₹ 1,292.00
3	Cisplatin	₹ 380.30	₹ 635.00	₹ 260.00
4	Cyclophosphamide	₹ 35.00	₹ 89.80	₹ 58.00
5	Dacarbazine	₹ 188.00	₹ 310.00	₹ 250.00
6	Daunorubicin	₹ 204.00	₹ 431.00	₹ 240.00
7	Doxorubicin	₹ 74.11	₹ 350.00	₹ 171.00
8	Etoposide	₹ 76.06	₹ 274.86	₹ 190.00
9	Gemcitabine	₹ 204.78	₹ 1,929.00	₹ 990.00
10	Oxaliplatin	₹ 430.00	₹ 4,938.00	₹ 1,740.00
11	Paclitaxel	₹ 540.00	₹ 16,640.00	₹ 1,400.00
12	Vincristine	₹ 25.00	₹ 65.00	₹ 46.79
13	Bortezomib	₹ 3,188.00	₹ 60,360.00	₹ 15,000.00
14	Imatinib	₹ 345.83	₹ 850.00	₹ 4,155.20
15	Filgrastim	₹ 259.20	₹ 19,680.00	₹ 8,930.00

Table 5.8: Detailed Comparison Price of the Drugs available in Janaushadhi Store & Retail Pharma Stores

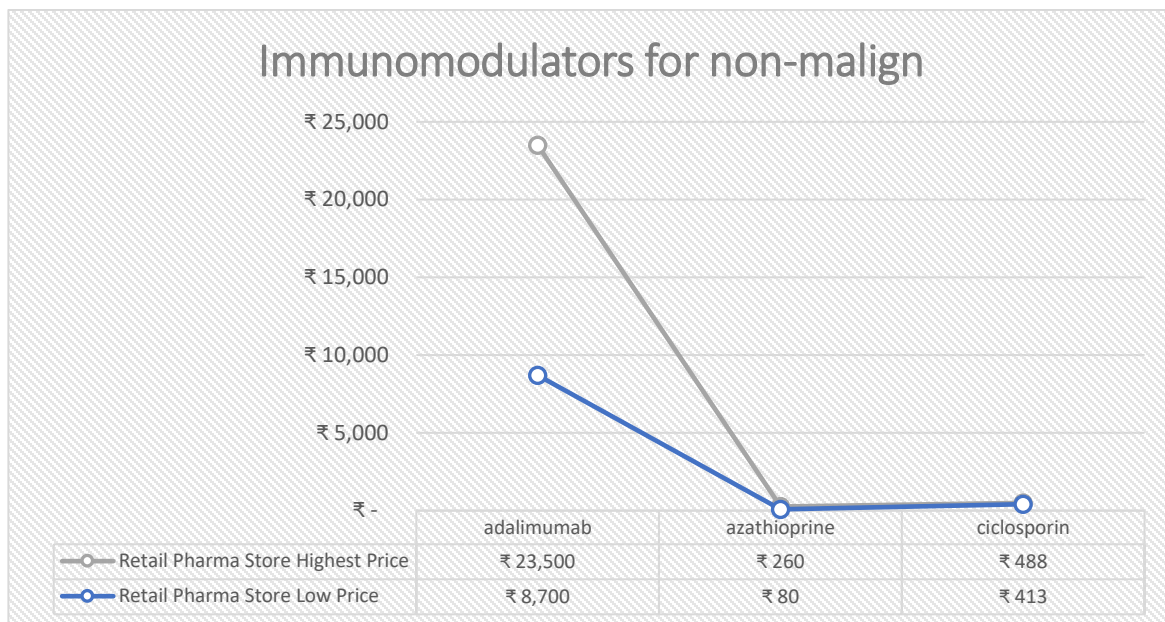
16	Lenalidomide	₹ 422.00		
17	Anastrozole	₹ 77.40	₹ 734.00	₹ 49.50
18	Bicalutamide	₹ 131.00	₹ 3,900.00	₹ 364.00
19	Dexamethasone	₹ 12.42	₹ 85.00	₹ 2.15
20	Hydrocortisone	₹ 18.40	₹ 520.00	₹ 10.32
21	Methylprednisolone	₹ 494.81	₹ 1,999.00	₹ 4.00
22	Prednisolone	₹ 22.65	₹ 1,650.00	₹ 3.68
23	Tamoxifen	₹ 10.96	₹ 429.00	₹ 11.50
24	Allopurinol	₹ 7.72	₹ 900.00	₹ 12.30
25	zoledronic acid	₹ 164.25	₹ 19,516.00	₹ 1,350.00



Graph 5.1: : Price comparison of medicines available in the pharma stores and Janaushadhi stores

- The above table and graphical representation (Graph 1) show the price comparison of the drugs which are available in India. The Price of Anticancer Drugs available at the Janaushadhi store is much less than the price of the same drugs available at the Janaushadhi Stores.
- The treatment cost of diseases like cancer is very huge and it is not affordable to all the individuals especially the ones from the below poverty line and from the low-income class.
- WHO's Essential medicine list has enlisted the 56 drugs for the treatment of cancer. Out of those 56 drugs less than half are included in the *Pradhanmantri Bhatiya Janaushadhi Pariyojana*.
- Out of these 24 drugs, only 7 drugs are available in the generic market the rest 18 are unavailable. Looking at the price difference the availability of these drugs could play a crucial role in the treatment of Cancer.
- The price of certain drugs is as high as 60,000 which is impossible for people in India to buy but the generic form of the same drug costs around Rs. 3,000 in the Janaushadhi store but it is unavailable in those stores.
- The average price difference between Janaushadhi drug stores and retail pharma is as high as ₹ 1,31,000 and as low as ₹ 28,000.
- Considering the out-of-pocket expenditures of the Indian population, this huge price difference shows the necessity and availability of anti-cancer drugs in generic medicals.

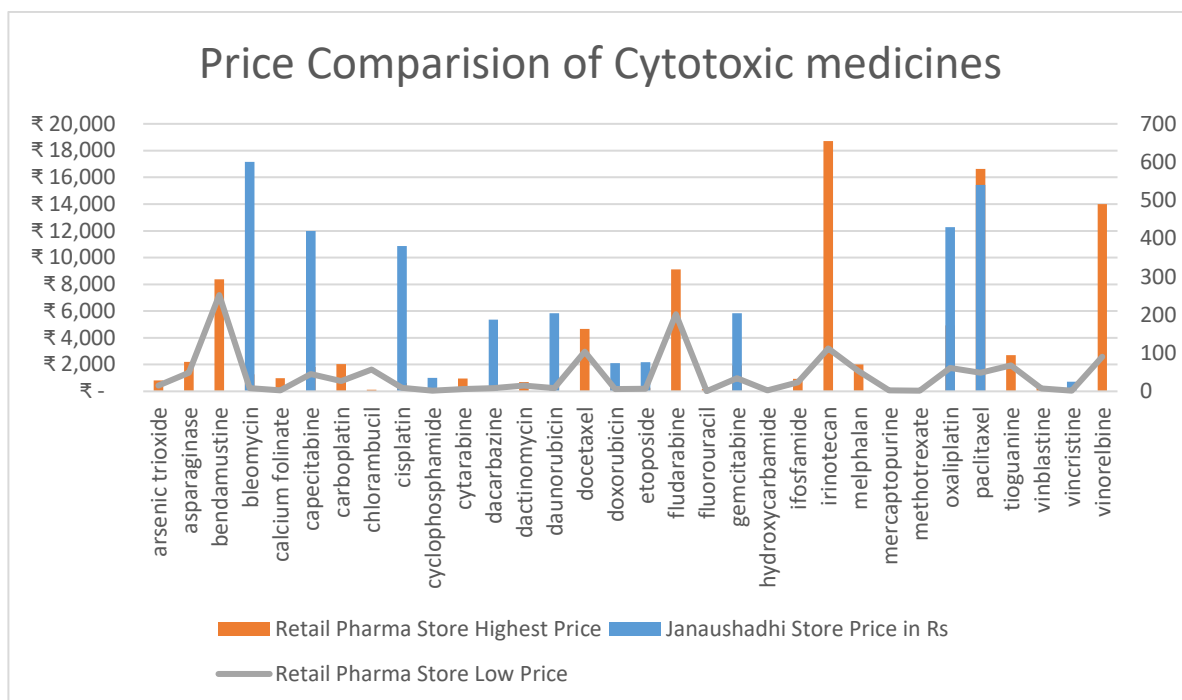
1. Immunomodulators for non-malignant disease:



Graph 5.2: Price comparison of immunomodulators for non-malign

- Graph 2 shows that there are 3 Immunomodulators i.e., Adalimumab, Azathioprine and Ciclosporine mentioned by WHO in its essential medicine list & out of that no drug is mentioned in the PMBJP list of medicines.
- The retail pharma market price of Adalimumab is Rs. 23,000 whereas lowest price is around Rs. 8700 as it is patented drug which will expire in 2034.
- In case of Azathioprine and Ciclosporin process are under Rs. 500 and patents of both drug are expired yet they are not enlisted in PMBJP list of medicine.

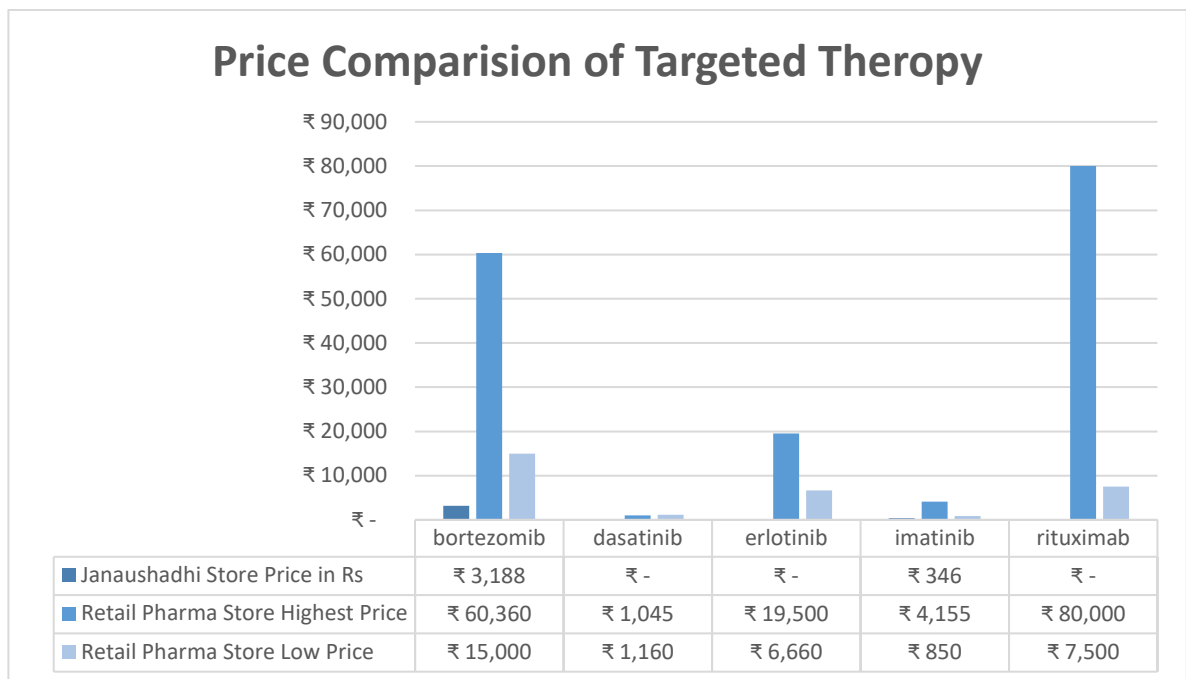
2. Cytotoxic Drugs:



Graph 5.3: Price comparison of Cytotoxic medicines

- In graph 5.3, out of 33 cytotoxic drugs given by WHO in its essential medicine list only 12 drugs are mentioned in the list of drugs given by PMBJP out of which only 4 are currently available in the market & 8 drugs are not mentioned in the revised price list of Oct 2020.
- Bleomycin, Cisplatin, Doxorubicin, and Gemcitabine are the only 4 drug which are available in the generic market. Remaining 8 drugs are unavailable.
- Price comparison of all 12 drugs shows that the Price in the Janaushadhi store is cheaper and more affordable than the price of those 12 drugs in retail pharma stores except cisplatin and Bleomycin (Graph 3).

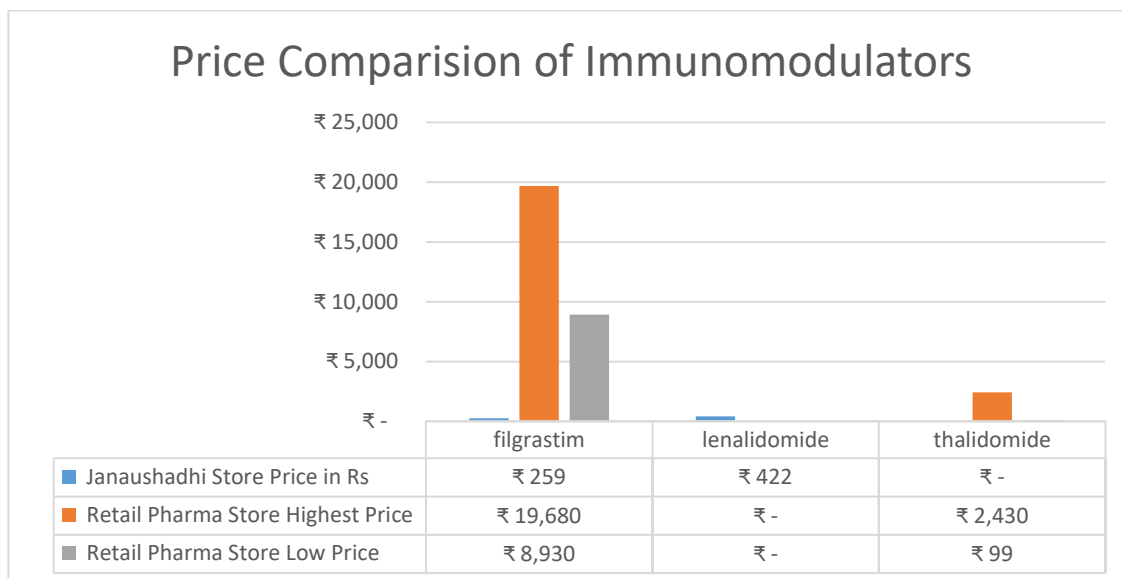
3. Targeted therapies:



Graph 5.4: Price comparison of Targeted Therapy

- In graph 5.4, out of 5 drugs for a targeted therapy only two drugs are enlisted in the list of PMBJP but are not available in generic stores as per the recent pricing list.
- The price comparison of Bortezomab and Imatinib show the difference is around 60%-80% (Graph 4).
- The three unavailable drugs Dasatinub, Erlotinib and Rituximab are having high price and patents are expired.

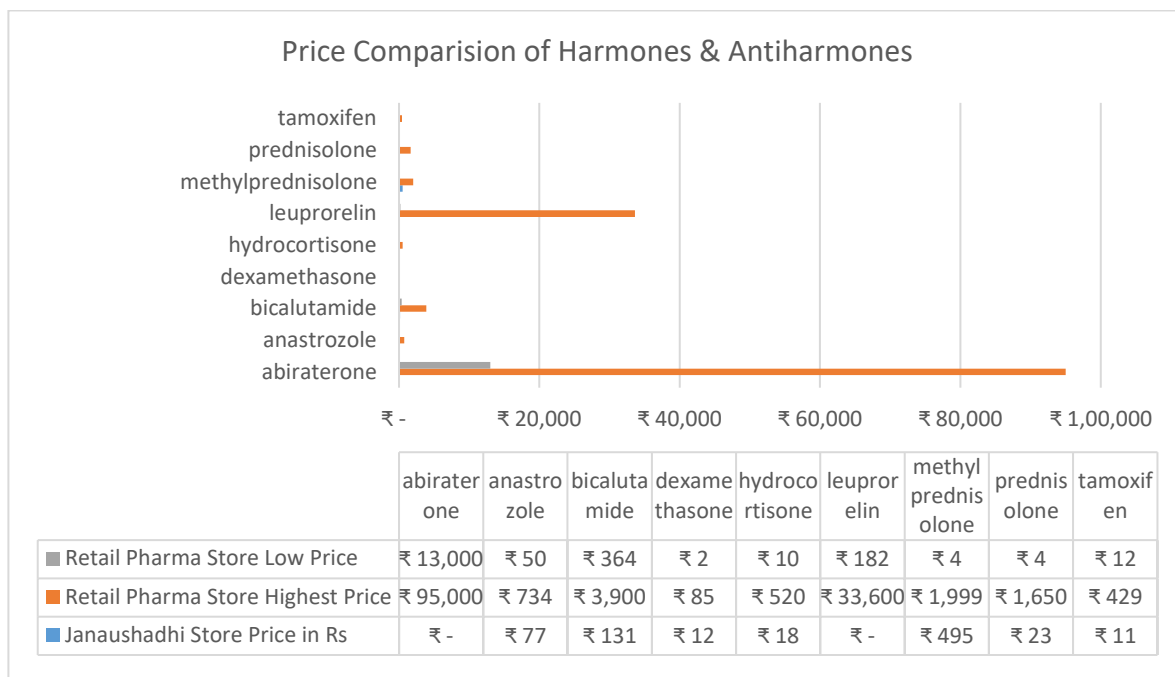
4. Immunomodulators:



Graph 5.5: Price comparison of Immunomodulators

- There are 3 drugs are mentioned under the Essential Drugs by WHO out of which two are mentioned in the PMBJP list of drugs but unavailable in the recent drug price list. Lenalidomide which is mentioned in the PMBJP and unavailable in Janaushadhi stores is also unavailable in the retail pharma market as well (Graph 5).
- Filgrastim which is unavailable in the Janaushadhi stores is cheaper by about 90% compared to the Branded Drugs (Graph 5.5).

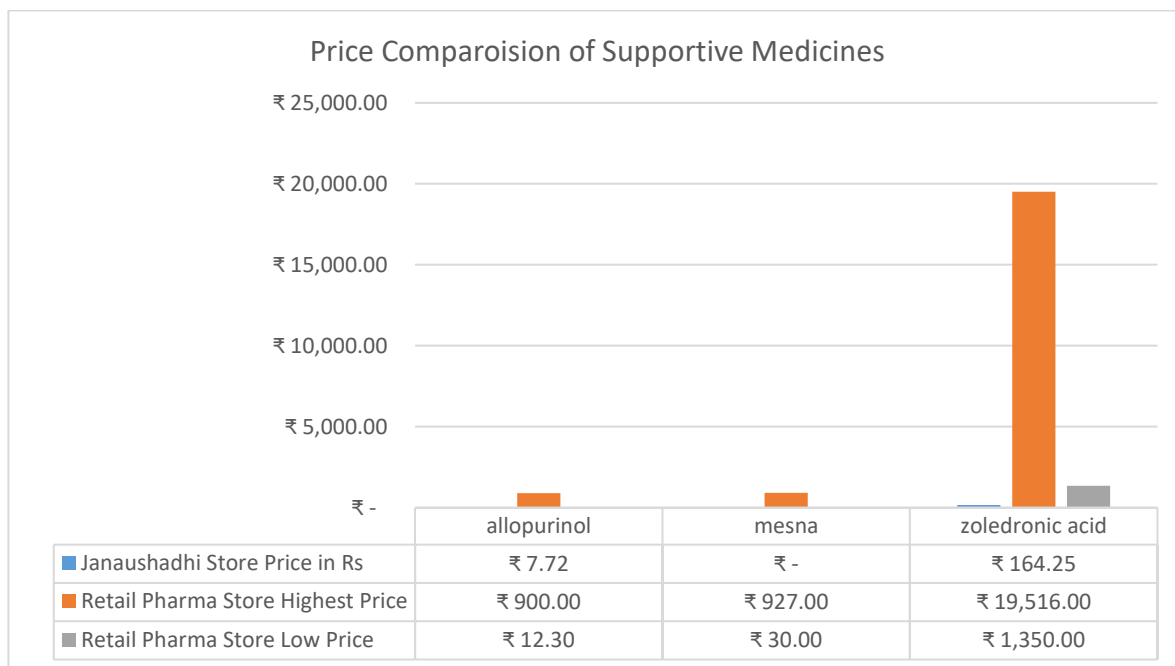
5. Hormones & Antihormones:



Graph 5.6: Price comparison of Hormones and Anti-hormones

- In graph 5.6, Out of 9 drugs mentioned by WHO in the essential medicine list, 7 of them are mentioned in the PMBJP but only 2 of them are available in the recent pricing list, the rest five drugs are unavailable.
- The Price comparison of the available and unavailable drugs shows that the price of these medications is nearly equal to the lowest price of branded medicines while some drugs have less prices than branded one compared to generic drugs available in the Janaushadhi stores (Graph 5.6).

6. Supportive Medicines:



Graph 5.7: Price comparison of Supportive medicines

- In the case of supportive medicines, two drugs are mentioned in the list of PMBJP out of 3 drugs given by the WHO, whereas only one is available in the market currently.
- The price comparison shows that the two drugs are having very less price compared to the Branded drugs (Graph 5.7).

Chapter 6 – Discussion

The results show the price comparison of the drugs which are available in India. The Price of Anticancer Drugs which are available at the Janaushadhi store is significantly lower than the price of the same drugs available at the Janaushadhi Stores.

The treatment cost of diseases like cancer is very huge and it is not affordable to all the individuals especially the ones from the below poverty line and from the low-income class. WHO's Essential medicine list has enlisted the 56 drugs for the treatment of cancer. Out of those 56 drugs less than half are included in the *Pradhanmantri Bhatiya Janaushadhi Pariyojana*. Out of these 24 drugs, only 7 drugs are available in the generic market the rest 18 are unavailable. Looking at the price difference the availability of these drugs could play a crucial role in the treatment of Cancer.

The price of certain drugs is as high as 60,000 which is impossible for people in India to buy but the generic form of the same drug costs around Rs. 3,000 in the Janaushadhi store but it is unavailable in those stores. The average price difference between Janaushadhi drug stores and retail pharma is as high as ₹ 1,31,000 and as low as ₹ 28,000.

Considering the out-of-pocket expenditures of the Indian population, this huge price difference shows the necessity and availability of anti-cancer drugs in generic medicals. Though this analysis shows the drugs available in the Indian generic market certain drug like Adalimumab which is sold under brand name Humaira is patented and the patent of this will expire in year 2034. Availability and price of such case of medicines are crucial in India. Especially considering the Cancer patient load in India which is projected to increase to 29.8 million by 2025 the availability of these medicines in an affordable price range is something important for authorities look out for in India.

Chapter 7 – Conclusion

The study of this project reveals that there is a great deficiency in the affordable healthcare system for the treatment of cancer. It is estimated that there are around 7500 Janaushadhi 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 25 drugs out of 54 mentioned by WHO in its List of Essential Medicines are included in the PMBJP products- therapeutic groups, and only 7 of them are available in the generic market currently, the rest 18 drugs are either unavailable or stopped selling due to COVID-19. This is affecting the people who are unable to afford the high-priced treatment of cancer economically which may be one of the reasons why India is currently having the 2nd most deaths caused due to the Cancer.

This study also shows that the essential drugs such as drugs belonging to Immunomodulators for Non-communicable diseases & cytotoxic drug category are not included and very few drugs are included in the PMBJP Product list, respectively. Also, the drugs which are either available or enlisted in the PMBJP Products list are a lot cheaper than the branded drugs this difference is near 40% - 80% based on the class of Drugs. Thus, the availability of these medicines could play a major role in the treatment & control of non-communicable diseases like Cancer as more people can afford these drugs.

The Janaushadhi scheme is one of the most celebrated initiatives started by the government to strengthen 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 that are causing huge problem & inconvenience for the common man and people under the poverty line. And thus, the rebuilding of this system is needed considering the current situation. The information obtained from this cost difference analysis will be helpful for the healthcare fraternity, patients, policymakers, and society at large.

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