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Original Article

Measuring Medicine Prices and Availability of Commonly used Essential Medicines using WHO/HAI Methodology in Hyderabad, India

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ABSTRACT

Objectives: Access to health care is a basic right of population. Essential medicines are those which satisfy the priority of health care needs and intended to be available at all times. Hence prices and availability need to assess periodically. The objective of the study was to measure the variation in prices of selected medicines, to measure the availability of some selected medicines used for treating common diseases/ailments and to compare the prices and availability of medicines among the sectors. The present survey is conducted for 20 essential medicines in Hyderabad, Telangana. **Methods:** Medicines were selected based on the criteria of WHO/HAI methodology. Data was collected during October 2019 to March 2020 for originator brands and lowest priced generics in 60 medicine outlets. Prices were compared to international reference prices and expressed as median price ratio. Percent availability computed only on the day of data collection. **Results:** Median MPRs for originator brands and lowest priced generics were 2.20 and 1.53 in independent outlets, 2.20 and 1.61 in chain pharmacies respectively. Median MPR for generics in Jan Aushadhi Kendra was 0.38 i.e., all available medicines were priced less than international reference prices. Availability was 95.8%, 95.4% and 67.5% for generics

and 12% and 13.3% for originator brands respectively. **Conclusion:** The survey revealed reasonable prices and high availability in private sectors but in JanAushadhi Kendra, prices are flattened with good availability. The maximum applicable Goods and Services Tax rate is 12% for medicines under price control and life-saving drugs resulted in 2.3% increase in tax rate ultimately causing burden to patients. Government should ensure certain policies about importance of generic drugs and their availability in Jan Aushadhi Kendra.

Keywords: Medicine prices, Availability, Jan Aushadhi Kendra, Median price ratio, International reference price.

INTRODUCTION

Access to health care is a basic right of population recognized by the government throughout the world.[1,2] However about one third of the world's population lacks reliable access to medicines.[1-3] Essential medicines are those which satisfy the priority of health care needs and selected with due regards to public health relevance.[4] These are intended to be available within the context of functioning health care systems at all times in adequate amount in appropriate dosage form with assured quality and adequate information.[5]

Accessibility to essential medicines is influenced by many factors.[2-6] Price is one of the remarkable determinants of cost and purchasing power of medicines and also important in developing a medicine pricing policy.[7] WHO estimates that in low-income areas, 90% of citizens pay for their needed medicines out of pocket because of insufficient medical and health services in public sector furthermore most of the population does not have social insurance.[2] Availability is another important issue for health facilities all over the world. Several factors such as increased prices, poor prescribing practices, inadequate supply systems and others causing low availaibility.[8]

Over 80% of India's health financing is borne by patients.[9] India is one of the countries with highest out of pocket expenses that is, over 67% is spent on healthcare. Based on High Level Expert Group report on Universal Health Coverage recommendations, an increase in public procurement from 0.1% to 0.5% of Gross Domestic Product would ensure universal

access to essential drugs that greatly reduces the burden and increases financial protection. According to WHO study estimates, about 65% of India's population is insufficient access to essential medicines. But contradictorily, India is one of the largest manufacturers and suppliers of generic drugs to the world.[10] As mentioned in National Pharmaceuticals Pricing Policy-2012, government has resorted to a regulatory frame work for pricing of drugs so as to ensure availability of essential medicines at reasonable prices by providing sufficient opportunities for innovation and competition to support the growth to meet the employment goals and economic wellbeing for all.[11]

Several similar studies that are supported by the WHO/HAI established that taxes are often the third largest component after the manufacturer price and distribution mark-ups in the chain that results in the final price paid by patients. Goods and Services Tax law in India is an indirect tax levied on the supply of goods and services. The council decided rates for medicines in the meeting held on 03 June 2017 and levied in 5 different rates based on the Harmonized System of Nomenclature code. Previously the tax rates depended on Value Added Tax and Excise duty in which 5% of Value Added Tax and Excise duty but now we have a 5% unchangeable Goods and Services Tax incidence. The maximum applicable tax rate is 12% for the medicines under price control and for life saving medicines included in National List of Essential Medicines resulted in 2.3% (earlier it was 9.5%) increase in tax rate ultimately causing burden to patients.[12-14]

The branded generics are sold at significantly higher prices than unbranded generics although both are identical in therapeutic value. Because of widespread poverty across the country, reasonably priced quality generic medicines availability in the market would benefit everyone. With this objective, the Pharma Advisory Forum decided to launch the Jan Aushadhi Campaign and started the sale of generics through separate medicine outlets called Pradhan Mantri Bhartiya Jan Aushadhi Kendra in various districts of the country. In India it was launched by the current Prime Minister, Shri Narendra Modi, in the year 2014 for the noble cause: 'Quality Medicines at Affordable Prices for All'.[15-16]

The present study has been conducted to evaluate the prices and availability of some commonly used essential medicines across 6 zones of Hyderabad with the objectives to measure the variation in prices of selected medicines, to measure the availability of some selected medicines used for treating common diseases/ailments and to compare the prices and availability of medicines among the sectors.

MATERIALS AND METHODS

The survey was unique in a way that it is the first survey performed in Telangana state and was conducted based on the methodology developed by WHO/HAI, which was designed to collect the data about medicine prices and availability, analyse and interpret the results in a standardized way. This data gives the information about what the price the patient pays to buy medicines, variations of prices and availability of medicines among sectors. The systematic survey was conducted from October 2019 to March 2020 at Hyderabad city of Telangana state.

Hyderabad is divided into 6 zones, namely Kukatpally, Seri-Lingampally, LB Nagar, Secunderabad, Charminar and Khairtabad by the Greater Hyderabad Municipal Corporation. The medicine outlets included in survey were private independent medicine outlets, chain pharmacies and Pradhan Mantri Bhartiya Jan Aushadhi Kendra. In each zone, 7 independent outlets (6x7=42) and 2 chain pharmacies (6x2=12) were randomly selected and 6 Jan Aushadhi Kendra, a total of about 60 medicine outlets were selected across the city.

In the present survey, 20 essential medicines were surveyed based on the following criteria: (*i*) Medicines listed under WHO global core list of medicines which are also listed in the National List of Essential Medicines of India. (*ii*) Medicines listed in WHO Essential Medicine list. (*iii*) Medicines to treat local/regional burden of diseases. (*iv*) Medicines which are usually considered as first line treatment of commonly occurring diseases and present in State Essential Medicines list. Table 1 illustrates the names and doses selected for the survey.

From the 14 global core list medicines, 6 were dropped since they were not present in National List of Essential Medicines (completely not in use) or rarely used in India. So, a total of 8 global core medicines were directly selected from WHO/HAI prepared global core list. Totally 12 supplementary medicines were selected for the survey that is 4 were therapeutic alternative medicines to global core medicines and 8 were selected based on the local or regional burden, considered as the first line treatment and present in State Essential Medicine List.

A data collection form was prepared manually based on WHO/HAI manual which includes product name, manufacturer name, pack size, pack price, unit price used to enter the prices and availability of medicines at the time of data collection in each medicine outlet. During the survey, for each medicine, the data was collected for two types of products namely, Originator Brand and Lowest Priced Generic equivalent. But in Jan Aushadhi Kendra, only generics are available. The manually recorded data had to be verified thoroughly and the details of medicine outlets and pharmacists were taken at the end of the data collection. International

Table 1: List of surveyed medicines.

Medicine name	Dose
Tab. Acyclovir	400 mg
Tab. Amitriptyline	25 mg
Tab. Amlodipine	5 mg
Cap/Tab. Amoxicillin+Clavulanic acid	625 mg
Tab. Atorvastatin	20 mg
Tab. Carbamazepine	200 mg
Inj. Ceftriaxone	1 gm
Cap/Tab. Ciprofloxacin	500 mg
Tab. Diclofenac	50 mg
Tab. Enalapril	5 mg
Tab. Glimepiride	1 mg
Tab. Metformin	500 mg
Tab. Metoprolol XL	50 mg
Tab. Omeprazole	20 mg
Tab. Pantoprazole	40 mg
Tab. Paracetamol	500 mg
Susp. Paracetamol	24 mg/ml
Tab. Prednisolone	5 mg
Salbutamol inhaler	100 mcg/dose
Tab. Telmisartan	40 mg

Table shows the 20 medicines selected for the survey based on the WHO/HAI criteria which includes global core list and supplementary list of medicines

reference price is the practice of regulating the price of a medication in one country by comparing with the price in a basket of other reference countries.[18] Median Price Ratio is the ratio of median unit price of medicines across the facilities in a sector to the international reference prices (calculated by using local currency).[2-3,18] The ideal value in public sector is ≤ 1.5 and in private sector ≤ 2.[2] Availability was calculated in terms of percentage only on the day of data collection. Mean percent availability and comparison of availability was done among sectors.

The data was entered in the International Medicine Prices Excel Workbook - Part I (Pre-programmed Excel Worksheet) provided by the WHO/HAI website. Then excel workbook automatically generates median price ratios, product summary, sector summary, availability data.

RESULTS

Medicine Prices

In private independent medicine outlets, the median price ratios of available 3 originator brands ranged from 1.98-2.50 with median MPR of 2.20 and interquartile ranges for 25th and 75th percentiles were 2.09 and 2.35 respectively which was 1.1 times the ideal value. The originator brands of Glimepiride (2.50) had the highest value and Amoxicillin+Clavulanic acid (1.98) had the lowest. For lowest priced generics ranged from 0.17-18.93 with median MPR of 1.53 and interquartile ranges for 25th and 75th percentiles were 1.11 and 2.40 respectively which was 0.77 times the ideal value. The lowest priced generic of Diclofenac (18.93) had the highest and Metoprolol XL (0.17) had the lowest. Figure 1 Median MPRs of medicines having OBs and LPGs in chain pharmacies and private independent outlets. In chain pharmacies, median price ratios of originator brands followed similar pattern as that in independent outlets ranged from 1.98-2.50 with median MPR of 2.20. For lowest
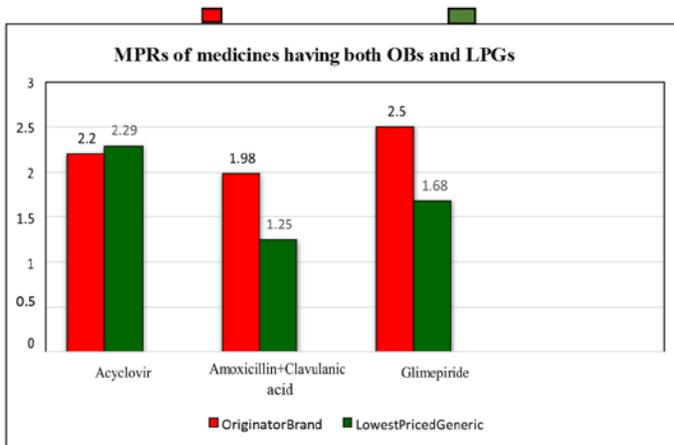
Figure 1: Median MPRs of medicines having OBs and LPGs in chain pharmacies and private independent outlets.
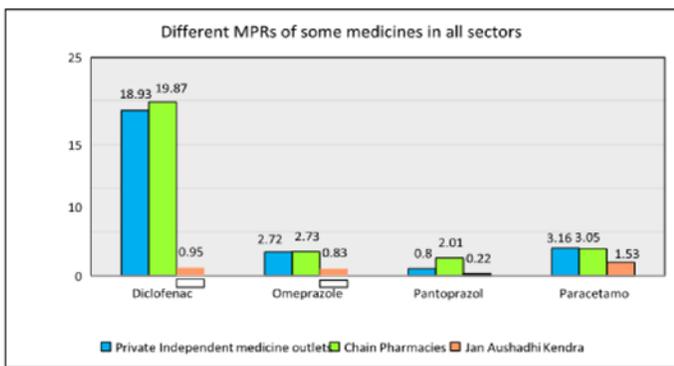*Note: MPR: Median Price Ratio; OBs: Originator brands; LPGs: Lowest priced generics*

Figure 2: Different MPRs of some medicines in 3 sectors.
Note: *Private independent medicine outlets; Chain pharmacies; Jan Aushadhi Kendra; MPR: Median Price Ratio*

Table 2: Median MPRs and percent availability of medicines in three sectors.

Sector	Median MPR		Percent availability	
	OBs (n=3)	LPGs (n=20)	OBs (n=3)	LPGs (n=20)
Private independent medicines outlets (*n*=42)	2.20	1.53	12%	95.8%
Chain pharmacies (*n*=12)	2.20	1.61	13.3%	95.4%
Jan Aushadhi Kendra (*n*=6)	----	0.38	----	67.5%

Note: *MPR: Median Price Ratio; OBs: Originator Brands; LPGs: Lowest Priced Generics; N: Number of medicine outlets in 6 zones of Hyderabad ; n: number of medicines having specific type (either originator brand or lowest priced generic)*
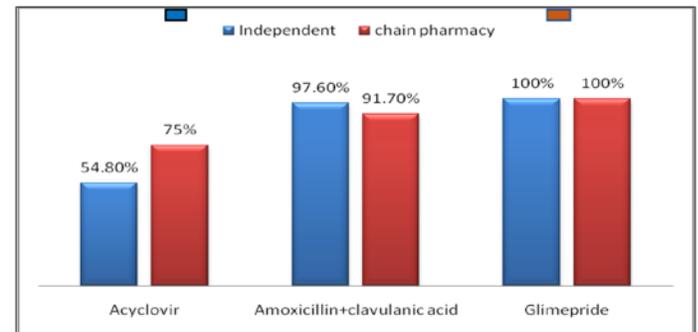

Figure 3: OBs in independent outlets vs. chain pharmacies.
Note: OBs: Originator brands; Private independent medicine outlets; Chain pharmacies

priced generics ranged from 0.17 - 19.87 with median MPR of 1.61 and interquartile ranges for 25th and 75th percentiles were 1.15 and 2.40 respectively which was 0.81 times the ideal value. The lowest priced generics of Diclofenac (19.87) had the highest value and Metoprolol XL (0.17) had the lowest. Figure 1 Median MPRs of medicines having OBs and LPGs in chain pharmacies and private independent outlets. In Jan Aushadhi Kendra, interestingly, median price ratios found were quite low. The median MPR was 0.38 which was 0.25 times the ideal value and interquartile ranges for 25th and 75th percentiles were 0.25 and 0.70 respectively. Paracetamol (1.53) had the highest value and Metoprolol XL (0.01) had the lowest. Most of the medicines' prices were far less from their IRPs. Figure 2 Different MPRs of some medicines in 3 sectors. Also, medicine prices were consistent as there was no much variation in prices across the stores. Table 2 illustrates the median MPRs of both medicine types in all the sectors.

Availability

In both independent outlets and chain pharmacies originator brands were available only for 3 medicines and 20 lowest priced generics were found. In independent outlets, mean percent availability of originator brands was 12% with a standard deviation of 30.3% and ranged from 54.8-97.6%. Amoxicillin+Clavulanic acid (97.6%) showed the highest

availability and Acyclovir (54.8%) showed the lowest. The mean percent availability of lowest priced generics was 95.8% with a standard deviation of 7.4% and ranged from 73.8-100%. Out of 20, more than half of the medicines (12 medicines) showed 100% availability and Amitriptyline (73.8%) with lowest. In chain pharmacies, mean percent availability of originator brands was 13.3% with a standard deviation of 32.8% and ranged from 75-100%. Glimepiride (100%) had the highest availability and Acyclovir (75%) had the lowest. The mean percent availability of lowest priced generics was 95.4% with a standard deviation of 6.3% and ranged from 83.3 - 100%. Out of 20, more than half of the medicines (12 medicines) showed 100% availability and three medicines Amoxicillin + Clavulanic acid, Metformin and Prednisolone showed the lowest (83.3%). Figure 3 OBs in independent outlets vs. chain pharmacies. The mean percent availability of lowest priced generics was higher compared to originator brands in both sectors. Table 2 illustrates the mean percent availability of 20 medicines of both types in all sectors. In Jan Aushadhi Kendra, mean percent availability for generics was 67.5% with a standard deviation of 39.5%. From a total of 20 medicines, half of the medicines showed 100% availability. Medicines like Acyclovir, Carbamazepine and Ceftriaxone showed 0% availability. Figure 4 Percent availability of LPG medicines in Jan Aushadhi Kendra. Figure 2 Different MPRs of some medicines in 3 sectors.

DISCUSSION

The present study reveals about the prices and availability of 20 essential medicines used for treating common diseases collected from 60 medicine outlets across six zones of Hyderabad. This is the first study conducted in Telangana to assess the accessibility of essential medicines to all in
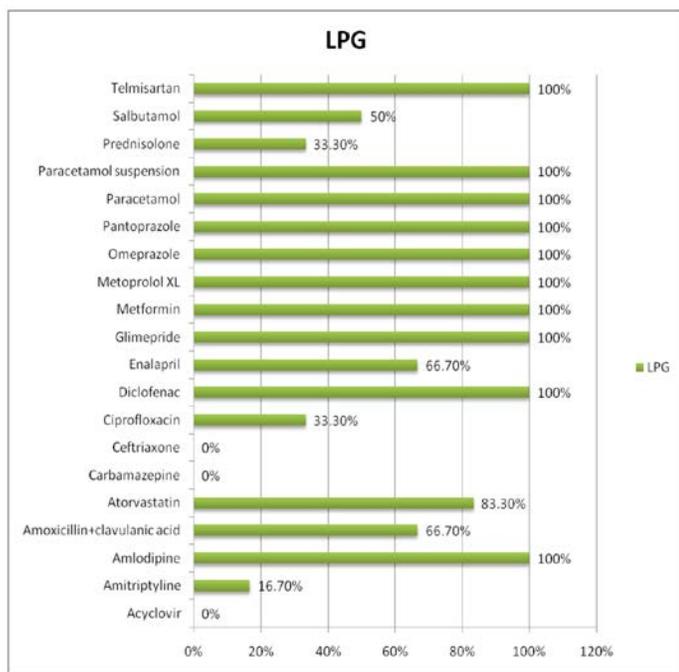
Figure 4: Percent availability of LPG medicines in Jan Aushadhi Kendra.
Note: *LPG: Lowest Priced Generics (In Jan Aushadhi Kendra only generics are available which are considered as LPGs in the survey*

Table 3: Paired analysis* of medicines in private independent medicine outlets and chain pharmacies.

Type and number of medicines(*n*=3)	Median MPR	25th Percentile	75th Percentile	Max. MPR	Min. MPR
OBs	2.20	2.09	2.35	2.50	1.98
LPGs	1.68	1.47	1.99	2.29	1.25

Note:OBs: Originator brands;LPGs: Lowest priced genericsn: number medicines having both originator brands and lowest price generics ;Max. MPR: Maximum Median Price Ratio;Min. MPR: Minimum Median Price Ratio

both private and public sectors using the standardized WHO/HAI methodology. Similar studies were already conducted in Tamil Nadu, Kerala, Karnataka and other few sites[9] but not in Telangana. Hence this study has been conducted in Hyderabad. This study also conducted with the intension to understand the difference in prices and availability at Jan Aushadi Kendra and other private outlets.

In both independent outlets and chain pharmacies, two originator brands (Acyclovir and Glimepiride) and lowest priced generics (Acyclovir, Amitriptyline, Ceftriaxone, Diclofenac, Enalapril, Omeprazole and Paracetamol) were priced two times higher than the international reference prices as their median price ratios were above ideal value (≥ 2) and listed under high-priced category. On the other hand, the median price ratios of lowest priced generics of Amlodipine and Salbutamol inhaler in both sectors including Enalapril in independent outlets and Acyclovir, Ceftriaxone injection and Ciprofloxacin in chain pharmacies were found to be very consistent as there were no fluctuations in pricing across the surveyed regions. In both sectors, there was no price variation for OBs with median MPR 2.20. But for a few LPGs price variation was found to be significant among three sectors (Pantoprazole, Paracetamol, Diclofenac etc). In both independent outlets and pharmacies, median MPRs for LPGs were 1.53 and 1.61 respectively (1.53 vs. 1.61) with 5.3% variation. (Carbamazepine price in independent outlets was 0.03 times lower than in chain pharmacies, Paracetamol price in independent outlets was 0.04 times the price in chain pharmacies). The paired analysis* (*n*=3) showed a notable price difference (2.20 vs. 1.68) that is lowest priced generics' prices were found to be 24% lower than the originator brands. Table 3 illustrates the paired analysis of 3 medicines having both types. In Jan Aushadhi Kendra almost all the medicines prices were consistent and none of the available medicines fallen under the high-priced category except Paracetamol tablet (1.53) which was slightly above the ideal range (≥ 1.5). The prices were 75.2% and 76.4% lower when compared to other sectors respectively. (Enalapril price was

8.6 times lower and Metformin price was 3.9 times lower compared to other sectors). Huge price variation was found for Diclofenac followed by Omeprazole, Pantoprazole and Paracetamol in independent outlets and chain pharmacies sectors compared to Jan Aushadhi Kendra.

Similar studies are also conducted in India in different states such as, the Rajasthan survey (2003) showed that the median price ratios for innovator brands and lowest priced generics was 2.81 and 1.83 respectively and the prices of 17 lowest priced generics was less than twice the international reference prices indicating reasonable prices and remaining were priced lower.[17] A study conducted at six sites in India (2007) showed median price ratios for procurement prices were 0.27, 0.48, 0.33, 0.41 and 0.38 indicating very low prices in public sector. In private sector, the median price ratios ranged from 1.74-4.38 for originator brands and 1.3-1.84 for lowest priced generics indicating no much variation across six sites.[9] A study in Delhi (2013) showed the median price ratios of 0.61, 0.59, 0.53, 0.82 and 0.69 in five different facilities of public sector which are less than ideal median price ratio value indicating very low procurement prices. In private sector, the median price ratios were 4.71 and 2.83 for both types in private pharmacies and also median price ratios were 4.41 and 3.12 in chain pharmacies respectively which were higher than ideal value indicating higher prices of originator brands.[18]

Out of 20 selected medicines, only three originator brands and 20 lowest priced generics were available in both in both independent outlets and chain pharmacies. Also, most of the drugs were off patent. The lowest priced generics availability was higher in independent outlets and chain pharmacies sectors comparatively to Jan Aushadhi Kendra. The medicines which are useful for treating common diseases were available in Jan Aushadhi Kendra, some of them were sparsely available and few of them showed zero availability which determines the deviation in availability pattern. The study reported poor availability of some medicines, no availability of injectables and also found that many of the medicines would be procured only on orders. Along with low availability, the outlets of Jan Aushadhi Kendra across the city were also found poor.

In our study, the products available are usually generics, 95.8% in independent outlets, 95.4% in chain pharmacies sectors and originator brands (12%) was comparatively very less. In Jan Aushadhi Kendra, median availability is 67.5% and availability pattern is good for some of the medicines (11outof20) Similar results were found in the study conducted in six survey sites of India in the year 2004 -2005, Maharashtra showed 95% availability.[9] The poor availability of medicines in Jan Aushadhi Kendra may be due to inefficient distribution system, financial constraint of government and availability was assessed only for the data on the day of collection.

CONCLUSION

Overall, the prices of lowest priced generics were reasonable in both independent outlets and chain pharmacies sectors but when compared to Jan Aushadhi Kendra the prices were comparatively higher. The generics

showed higher availability in independent outlets and chain pharmacies sectors. In Jan Aushadhi Kendra, the availability was average, but a few medicines were totally unavailable and a few other medicines showed less than 50% of availability. Though Jan Aushadhi Kendra showed very less prices compared to other sectors it didn't come into the light because of the less availability of medicines due to inappropriate distribution and even more sparsely distributed outlets. So, people are being forced to purchase medicines in independent and chain pharmacies. To make medicines available to all people at lower price, the government should focus particularly on monitoring the Jan Aushadhi Kendra for the availability of essential medicines used for treating common disease conditions and also should increase the number of outlets. General awareness campaigns (through pamphlets, advertisements, social camps in communities and others.) about Jan Aushadhi Kendra should be conducted to make the people understand the value of generic medicines.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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