



Original Article

Cost Variation analysis among different brands of non-retroviral drugs available in Indian Market and their price Comparison with DPCO list

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ABSTRACT

Background: Wide inter-brand price variation of antiviral drugs may adversely affect treatment affordability, patient adherence, and healthcare expenditure in India. Although the National Pharmaceutical Pricing Authority (NPPA) regulates the prices of selected essential medicines through the Drug Price Control Order (DPCO), the extent of price variation among commonly prescribed non-retroviral antiviral drugs remains inadequately explored.

Objectives: To evaluate the percentage cost variation among different brands of commonly prescribed non-retroviral antiviral drugs available in India and compare their maximum retail prices with the ceiling prices specified under the DPCO 2025.

Methods: A cross-sectional cost analysis was conducted using price data obtained from the Current Index of Medical Specialities (CIMS), Medindia, and 1mg. Twenty-seven antiviral drugs comprising 39 formulations, including oral preparations, fixed-dose combinations, injectables, and topical formulations manufactured by more than one pharmaceutical company, were included. Percentage cost variation between the least and most expensive brands was calculated and compared with NPPA-notified DPCO 2025 ceiling prices.

Results: A total of approximately 427 brands were analyzed. Cost variation among oral formulations ranged from 20.87% to 473.53%, with the highest variation observed for Acyclovir 200 mg (473.53%). Among injectables, Remdesivir 100 mg demonstrated the highest variation (279.38%). Comparison with DPCO 2025 revealed marked deviations, particularly for Ribavirin 200 mg (219%), Acyclovir 200 mg (152%), and Acyclovir injection 500 mg (80%), whereas Daclatasvir 60 mg (6%) and Entecavir 1 mg (7%) showed minimal variation.

Conclusion: Considerable inter-brand price variation persists among non-retroviral antiviral drugs despite existing price control mechanisms. Strengthening DPCO implementation, expanding price regulation to additional antiviral formulations, promoting generic prescribing, and increasing prescriber awareness may substantially improve affordability and equitable access to antiviral therapy in India.

Keywords: Antiviral Agents; Drug Costs; Drug Price Control; Cost Analysis; Pharmaceutical Preparations; Generic Drugs; India; National Pharmaceutical Pricing Authority (NPPA).

INTRODUCTION

Infectious diseases remains the major cause of significant health care expenditure in India. Viral infections are one of the major cause of mortality worldwide. Pandemics of 1918, 1957, 1968 and 2009 were all caused by different novel viral strains. Pandemic of Influenza A (H1N1) caused 2744 deaths from 2009 to 2010 in India. Cases of influenza are still getting reported in the country and causing deaths posing a major challenge to public health since 2009.(1)

Most recent COVID 19 pandemic originated from Wuhan china in December 2019 is a cause of concern worldwide. Around 204319523 cases of COVID 19 has been reported till now causing more than 43 lacs deaths worldwide with more than 4 lacs deaths in India(2)

Respiratory viral infections, arboviral infections and bat-borne viral infections represent three major categories of emerging viral infections in the country. As per data of The Integrated Disease Surveillance Programme (IDSP) 71% of the disease outbreaks in the country are due to viral illnesses which includes Viral hepatitis, measles/rubella, chicken pox, Chickengunya, Dengue, acute encephalitis syndrome by Japanese encephalitis virus. (3)

Viruses like Herpes simplex, Varicella Zoster, influenza A (H1N1), Hepatitis B, Hepatitis C remain susceptible to antiviral drugs. WHO recommends the use of antivirals for the treatment of severe or complicated illness of Influenza. Although there are no specific anti viral therapies for COVID 19 few of the anti viral drugs like Resmdesivir, Favipravir is found to be effective in decreasing mortality in the patients of COVID 19. (4,5)

Cost of the drug plays a significant role in determining the compliance of the patients to the treatment. Pricing of the drugs is a very sensitive issue in the developing country like India. Most of the drugs are manufactured by multiple pharmaceutical companies under different brand names with different pricing

The rising cases of viral illnesses imposes the urgent need of affordable anti viral treatment for all types of population. Since most of the viral illnesses are infectious and communicable affecting the large part on the population so variations in the cost of the antiviral drugs results in a huge economic burden on patients with lower socioeconomic status. With the growth of Indian pharmaceutical industry our market is flooded with different brands of the same drug with lot of variation in the cost which affects the compliance of the patient to the treatment(6)

To control the pricing of the drug in the country Government of India has established National Pharmaceutical Pricing Authority (NPPA) in 1997. NPPA issued drug price control order (DPCO) in 2013 which is regularly updated to control the price of the essential medicines in Indian market. It fixes the ceiling price of the formulations under National list of essential medicines.(7) Reducing the Interbrand price variation is one of the major goal of introducing DPCO list (8) but unfortunately only few of the anti viral drug comes under this pricing control. There are various studies published which showed the price variation among retroviral drugs but none has been done for commonly prescribed non-retroviral drugs. So we have planned this study to analyze the cost variation between commonly prescribed non-retroviral drugs and few of the drugs with proven efficacy against COVID 19.

AIM:

To analyse the percentage cost variations among different brands of the commonly prescribed non retroviral drugs and comparing their price with the drug price control order fixed by Government of India

MATERIAL AND METHOD:

The cost of different brands of commonly used Anti-viral drugs was sorted out by referring Current Index of Medical Specialities (CIMS) online edition, www.medindia.net and www.lmg.com in INR. The cost of all the formulations including Tablets /capsules/injectables/cream in different brands were observed and cost per unit of most expensive and least expensive was calculated.

Percentage cost variation was calculated as follows:

$$\% \text{ cost variation} = \frac{(\text{cost per unit of most expensive brand} - \text{cost per unit of least expensive brand})}{\text{cost per unit of least expensive brand}} \times 100 \%$$

Comparison of the branded prices with ceiling prices was also performed by taking data from the DPCO compendium of notified ceiling prices 2018 for different drugs by using information available from official websites.

$$\% \text{ cost variation with the DPCO order} = \frac{(\text{cost per unit of most expensive brand} - \text{Ceiling price as per DPCO order})}{\text{Ceiling price as per DPCO order}} \times 100 \%$$

Inclusion Criteria

1. All single molecules, injectables , Fixed drug combinations of non retroviral drugs manufactured by more than one company

Exclusion Criteria

1. Drug formulation manufactured by only one company.
2. Drug formulations with no price information

Data was analysed using Microsoft excel software and results are expressed in tables and graphs

RESULTS

The Cost of 27 drugs in 39 different formulations were analysed. These formulations were available in different dosage forms. We had analysed 22 oral drug formulations, 9 Fixed drug combinations, 7 injectable formulations and 1 topical preparation. These formulations include two drugs which are found to be active against COVID 19.

Cost variation among oral single drug formulations:

Total of 22 non-retroviral drug formulations encompassing ~343 brands were analyzed. The number of brands per formulation ranged from 4 (ganciclovir 250 mg, ganciclovir 500 mg, ribavirin 200 mg) to 47 (abacavir 300 mg), with a median of 18 brands.

Across all formulations, the minimum unit price ranged from ₹3 (lamivudine 100 mg) to ₹428.5 (sofosbuvir 400 mg), while the maximum unit price ranged from ₹12.3 (lamivudine 150 mg) to ₹625 (sofosbuvir 400 mg).

The percentage cost variation across brands of the same formulation varied widely, ranging from 20.87% (tenofovir alafenamide 25 mg) to 473.53% (acyclovir 200 mg). The highest variations were observed for acyclovir 200 mg (473.5%), acyclovir 800 mg (432.6%), acyclovir 400 mg (416.7%), and lamivudine 100 mg (323.3%). In contrast, relatively lower variations were noted for tenofovir alafenamide 25 mg (20.9%), lamivudine 150 mg (38.2%), sofosbuvir 400 mg (45.9%), and tenofovir disoproxil fumarate 300 mg (45.8%).

Among guanosine analogues, ganciclovir 500 mg exhibited the least cost variation (33.3%), whereas ganciclovir 250 mg showed higher variability (196.2%). Within the same therapeutic group, substantial intra-class variation was also seen (e.g., famciclovir 500 mg: 261.5% vs famciclovir 250 mg: 74.6%).

For nucleoside reverse transcriptase inhibitors (NRTIs), abacavir 300 mg had a relatively modest variation (66.6%), while lamivudine 100 mg exhibited very high variation (323.3%).

For newer antivirals, favipiravir 400 mg and daclatasvir 60 mg showed variations of 105.1% and 100%, respectively, while entecavir 1 mg demonstrated a variation of 285%, highlighting significant inter-brand price differences.

Drug Formulation	No. of Brands	Min Price (₹)	Max Price (₹)	Percentage Cost Variation
Acyclovir 200 mg	32	3.4	19.5	473.53
Acyclovir 400 mg	33	4.8	24.8	416.67
Acyclovir 800 mg	38	8.6	45.8	432.56
Abacavir 300 mg	47	47	78.3	66.6
Valacyclovir 500 mg	6	41	74.3	81.22
Valacyclovir 1000 mg	9	73.3	120.6	64.53
Famciclovir 250 mg	7	29.5	51.5	74.58
Famciclovir 500 mg	7	29.6	107	261.49
Ganciclovir 250 mg	4	104	308	196.15
Ganciclovir 500 mg	4	165	220	33.33
Oseltamivir 75 mg	23	49.5	116.4	135.15
Amantadine 100 mg	9	10	17.2	72
Tenofovir alafenamide 25 mg	18	46	55.6	20.87
Tenofovir disoproxil fumarate 300 mg	29	35.8	52.2	45.81
Ribavirin 200 mg	4	56.25	86	52.89
Favipiravir 400 mg	29	59	121	105.08
Sofosbuvir 400 mg	10	428.5	625	45.86
Daclatasvir 60 mg	16	107.1	214.2	100
Entecavir 0.5 mg	38	45.9	93	102.61
Entecavir 1 mg	11	36.7	141.3	285.01
Lamivudine 100 mg	9	3	12.7	323.33
Lamivudine 150 mg	8	8.9	12.3	38.2

Cost variation among oral fixed drug combinations:

A total of 7 oral fixed-dose combinations (FDCs) comprising 29 brands were included in the analysis. The number of brands per FDC ranged from 2 (tenofovir alafenamide 25 mg + emtricitabine 200 mg; daclatasvir 60 mg + sofosbuvir 400 mg) to 7 (tenofovir disoproxil fumarate 300 mg + lamivudine 300 mg).

The minimum unit price among FDCs ranged from ₹27.7 (tenofovir disoproxil fumarate 300 mg + lamivudine 300 mg) to ₹1400 (tenofovir alafenamide 25 mg + emtricitabine 200 mg), while the maximum price ranged from ₹49.1 to ₹1757, respectively.

The percentage cost variation across FDCs was highly variable, ranging from as low as 0.29% (daclatasvir 60 mg + sofosbuvir 400 mg) to as high as 447.25% (tenofovir 300 mg + emtricitabine 200 mg + atazanavir 300 mg + ritonavir 100 mg).

Substantial variation was also observed for tenofovir disoproxil fumarate 300 mg + lamivudine 300 mg (77.3%), tenofovir 300 mg + emtricitabine 200 mg (57.1%), and tenofovir 300 mg + lamivudine 300 mg + efavirenz 600 mg (35.1%). In contrast, minimal variation was noted for efavirenz 600 mg + emtricitabine 200 mg + tenofovir 300 mg (11.1%) and tenofovir alafenamide 25 mg + emtricitabine 200 mg (25.5%).

Drug Formulations	Number of Brands	Min Price (₹)	Max Price (₹)	Percentage Cost Variation (%)
Tenofovir 300 mg + Emtricitabine 200 mg + Atazanavir 300 mg + Ritonavir 100 mg	3	182	996	447.25
Tenofovir 300 mg + Lamivudine 300 mg + Efavirenz 600 mg	5	96.2	130	35.14
Tenofovir Disoproxil Fumarate 300 mg + Lamivudine 300 mg	7	27.7	49.1	77.26
Efavirenz 600 mg + Emtricitabine 200 mg + Tenofovir 300 mg	4	130	144.4	11.08
Tenofovir 300 mg + Emtricitabine 200 mg	6	51.3	80.6	57.12
Tenofovir Alafenamide 25 mg + Emtricitabine 200 mg	2	1400	1757	25.5
Daclatasvir 60 mg + Sofosbuvir 400 mg	2	581.6	583.3	0.29

Cost variation among injectables:

Total 5 injectables in 7 different formulations were included. These formulations were available in 55 different brands with maximum number of brands for Acyclovir injection. Among the parenteral non-retroviral formulations analyzed, the highest cost variation was observed for Remdesivir 100 mg injection, where 4 brands were available, with prices ranging from ₹1193 to ₹4526, showing a 279.38% variation. Conversely, the lowest cost variation was noted for Ganciclovir 500 mg powder for injection, where 5 brands were available, with prices ranging between ₹1500 and ₹2025, corresponding to a 35.00% variation.

Drug Formulation	Number of Brands	Minimum Price (₹)	Maximum Price (₹)	Percentage Cost Variation
Interferon Alfa-2a 3MIU	6	970	1315	35.57
Interferon Alfa-2b 3MIU	6	561	789	40.64
Interferon Alfa-2b 5MIU	4	942	3326	253.08
Remdesivir 100mg	4	1193	4526	279.38
Acyclovir Inj 250mg	15	240	532	121.67
Acyclovir Inj 500mg	15	445	970	117.98
Ganciclovir Inj 500mg (powder)	5	1500	2025	35

Only single topical preparation of Acyclovir 5% 5gram cream is included in our study which is available in 18 different brands with percentage cost variation of 199%.

Cost variation with DPCO list

The comparison of the maximum retail prices of antiviral drugs with the ceiling prices fixed under the DPCO 2025 order revealed marked cost variations across different formulations. The variation ranged from 6% (Tenofovir Disoproxil Fumarate 300 mg + Lamivudine 300 mg) to as high as 219% (Ribavirin 200 mg).

Among the acyclovir formulations, the maximum variation was noted for Acyclovir 200 mg (152%), followed by Acyclovir 400 mg (78%) and Acyclovir injection 500 mg (80%), whereas the lowest variation was observed for Acyclovir 800 mg (20%) and Acyclovir injection 250 mg (23%).

For nucleoside reverse transcriptase inhibitors (NRTIs), Abacavir 300 mg showed a cost variation of 58%, Lamivudine 100 mg and 150 mg showed variations of 13% and 11%, respectively, while Tenofovir Alafenamide 25 mg and Tenofovir Disoproxil Fumarate 300 mg demonstrated a lower variation of 12% each.

In the case of fixed-dose combinations (FDCs), the variation ranged from 6% (Tenofovir Disoproxil Fumarate 300 mg + Lamivudine 300 mg) to 24% (Tenofovir 300 mg + Lamivudine 300 mg + Efavirenz 600 mg).

For direct-acting antivirals, Sofosbuvir 400 mg showed a modest variation of 17%, Daclatasvir 60 mg had 6%, while Entecavir (0.5 mg and 1 mg) exhibited 8% and 7%, respectively.

Overall, the analysis indicates that despite DPCO price regulation, certain drugs such as Ribavirin (219%), Acyclovir 200 mg (152%), and Acyclovir injection 500 mg (80%) exhibit substantial deviations from the notified ceiling price, suggesting the need for stronger regulatory enforcement to ensure price uniformity and affordability

DRUG FORMULATIONS	DPCO PRICE AS PER 2025 ORDER	COST VARIATION OF THE MAXIMUM PRICE WITH DPCO ORDER
ACYCLOVIR 200 MG	7.74	152%
ACYCLOVIR 400MG	13.9	78%
ACYCLOVIR 800MG	38.32	20%
ABACAVIR 300MG	49.44	58%
TENOFOVIR ALAFENAMIDE 25MG	49.72	12%
TENOFOVIR DISOPROXIL FUMARATE 300MG	46.64	12%
RIBAVARIN 200 MG	26.95	219%
SOFOSBUVIR 400MG	534.26	17%
DACLATASVIR 60MG	203	6%
ENTECAVIR 0.5MG	85.91	8%
ENTECAVIR 1 MG	132.51	7%
LAMIVUDINE 100MG	11.26	13%
LAMIVUDINE 150MG	11.05	11%
TENOFOVIR 300 MG, LAMIVUDINE 300 MG, EFAVIRENZ 600 MG.	104.64	24%
TENOFOVIR DISOPROXIL FUMARATE 300 MG, LAMIVUDINE 300 MG	46.37	6%
ACYCLOVIR INJ 250 MG	433.82	23%
ACYCLOVIR INJ 500 MG	537.65	80%

DISCUSSION

This study highlights significant price disparities among non-retroviral drugs in the Indian market, even when comparing the costliest brand with the NPPA-mandated DPCO ceiling prices as per the 2025 order. Several formulations exhibited variation of well over 100%, notably Ribavirin 200 mg (219%), Acyclovir 200 mg (152%), and Acyclovir injection 500 mg (80%), whereas others such as Daclatasvir 60 mg (6%), Entecavir 1 mg (7%), and the Tenofovir Disoproxil Fumarate + Lamivudine FDC (6%) maintained narrow deviations—suggesting variable enforcement of price ceilings across drug types.

This is in consensus with similar studies done previously for other group of drugs like antimicrobials, anti diabetic, anti hypertensive.(9,10,11)

Notably, the **Ribavirin** example stands out, given its essential status in the treatment of viral hepatitis. A **219%** deviation suggests not merely market competition, but potentially limited regulatory oversight or delayed NPPA notification/rationalization. Similarly, **Acyclovir** formulations—a common antiviral—showed substantial deviations, even though many strengths are listed in NLEM and thus technically subject to price ceilings.

Acyclovir is a nucleoside analogue commonly prescribed for many types of herpes virus infections, including genital herpes simplex infections, herpetic conjunctivitis, herpes simplex encephalitis.(12) According to statistical report around 6% of the Indian population has been infected with STDs every year and around 78%-90% of the STDs are due to HSV-1 Infection(13,14). Acyclovir is useful in treating and preventing recurrences in Genital herpes.(15) The cost variation among different brands of Lamivudine is 323% which is very commonly prescribed as monotherapy in Hepatitis B.(16)

We have also included the price variation among the different brands of Remdesivir and Favipravir which are found to reduce mortality in the patients of COVID 19. Remdesivir was one of the first treatment received emergency use authorization from FDA for the patients of COVID 19. Studies conducted in various countries have showed the cost effectiveness of Remdesivir in severe cases of COVID 19 over other treatments.(17,18,19) The percentage cost variation among brands of Remdesivir and Favipravir is 105% and 279% respectively. During the current situation of pandemic and because of increasing demand of remdesivir and Favipravir, NPPA and DCGI are keeping a close watch on the pricing of these drugs by the pharmaceutical companies.(20)

Several factors may underlie these variations including market dynamics and fragmentation: India's pharmaceutical ecosystem includes hundreds of brands per formulation, each using independent pricing strategies. In the absence or delay of strict NPPA enforcement, some brands skew dramatically above ceiling levels. Another one is the Regulatory gaps and also the Physician prescribing behavior. Prescribing by brand name remains prevalent. This practice sidelines cheaper alternatives and perpetuates brand loyalty, even when identical generics are available at lower prices.

In India the NPPA controls the pricing on the drugs. The main issue with the DPCO list is selective inclusion of the different formulations of the drugs. The pharmaceutical companies take advantage of this selectivity and market non-regulated formulations.. The drugs which are not under DPCO regulation like famcyclovir and gancyclovir are present in market with wide cost variation of 261.49 % and 196 % respectively.

To combat this problem and increase the affordability for the general population government should try to bring more medicine under drug price control order and should start to collect price data from pharmaceutical firms. Government should try to promote the sale of generic drug over branded drugs to minimize the cost variation among individual brands. Another strategy is to increase the awareness among prescribing physician about the cheaper alternatives. DPCO list since its release has only been updated few times which needs to be updated regularly to include more drugs.

CONCLUSION

The present study demonstrates that substantial cost variations exist among non-retroviral drugs in the Indian market, both across brands and when comparing the maximum priced formulations with the NPPA-mandated DPCO 2025 ceiling prices. Drugs such as Ribavirin 200 mg (219%) and Acyclovir 200 mg (152%) showed exceptionally high deviations, while others like Daclatasvir 60 mg (6%) and Entecavir 1 mg (7%) reflected minimal differences.

Such disparities indicate persistent gaps in the regulation and enforcement of price controls, particularly for widely used antiviral formulations.

These findings highlight the urgent need for stricter monitoring of ceiling price compliance, broader inclusion of essential formulations under DPCO, and greater promotion of generic alternatives to ensure affordability and equity in access. Strengthening prescriber and patient awareness regarding cost-effective options is equally important. Overall, effective price regulation, combined with enhanced generic substitution policies, could significantly reduce the financial burden on patients and improve accessibility to essential medicines in India.

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