

Cost analysis and price variation of commonly used drugs in obstetrics and gynecology in Jhalawar district of Rajasthan, IndiaAnshul Jhanwar¹, Neelam Sharma^{2*}¹Department of Pharmacology,²Department of Obstetrics & Gynecology, Jhalawar Medical College, Jhalawar, Rajasthan, India**Received:** 04 July 2018**Accepted:** 10 July 2018***Correspondence to:**

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Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.**ABSTRACT****Background:** Drugs used in obstetrics and gynecology are strong selling drugs in pharmaceutical market but they are the least studied drugs in terms of cost analysis and price variation.**Methods:** Cost of most commonly used Obstetrics and Gynecology drugs in Jhalwar district manufactured by different pharmaceutical companies, in the same strength and dosage forms was obtained from Drug Today (January-March 2018). The difference in the maximum and minimum price of the same drug manufactured by different pharmaceutical companies and percentage variation in cost per 10 tablets/10 capsule/1 injection/1 protein packet/1 sachet were analysed.**Results:** In Obstetrics drugs, the highest cost ratio (1:9.5) and percentage price variation (848) was found for Ferrous Salt + Folic acid combination followed by Cefixime (1:4.3, 330), Nifedipine (1:3.7, 270), Folic acid (1:3.67, 266), Paracetamol. Amoxicillin was having least cost ratio (1:1.4) and percentage price variation (37). Maximum number of brand available for Ferrous Salt + Folic acid combination (41) followed by Paracetamol, Calcium Salt + Vitamin D3 combination. In Gynecological drugs, the highest cost ratio (1:35) and percentage price variation (3433) was found for Ethinylestradiol + Levonorgestrel combination followed by Doxycycline (1:8.9, 793), Fluconazole. Metronidazole was having least cost ratio (1:1.3) and percentage price variation (27). Maximum number of brand available for Omeperazole (27) followed by Ethamsylate (22).**Conclusions:** This study shows that the average percentage price variation of different brands of the same drugs were very wide. Improved adherence to the drug treatment can be ensured by decreasing the cost of therapy, which can be done by changes in the government policies and regulations, integrating pharmacoeconomics as part of medical education curriculum, and creating awareness among treating physicians for switching to cost effective therapy.**Keywords:** Adherence, Cost analysis, Compliance, Price variation, Pharmacoeconomics**INTRODUCTION**

Maternal health is very important as both fetus and mother are at risk. Studies in developing countries that quantify burden of Obstetrics and Gynecological disease in order to influence health policy with respect to Obstetrics and Gynecology are limited. Some of these studies have shown a high prevalence of previously unrecognized morbidity, placing a heavy burden on women.

As per data by All India Origin Chemists and Distributors-Advanced Working, Action and Correction System (AIOCD-AWACS) market research firm, Obstetrics and Gynecological drugs are one of the strong selling drugs in pharmaceutical market; they rank as the 8th in all the super groups with 16.4% growth in the month of February 2012.¹ However they are the least studied drugs in terms of cost analysis and price variation.

McKinsey and Co. have predicted that, India's pharmaceutical market would reach a size of 20 billion USD by year 2015, which would have tremendous growth to become one of the top 10 pharmaceutical drug markets in the world.² Indian drug market has large numbers of branded formulations for every drug molecule.³ Every year, direct and indirect medical costs have been dragging millions of Indian population into poverty.⁴ In India more than 80% health financing is borne by patients.⁵ There has been a lack of appreciation among clinicians about the difference between inexpensive and expensive drugs. Due to their ignorance about the drug cost, they also have tendency to overestimate the cost of inexpensive drugs while underestimating the cost of expensive ones. This lack of concern ultimately results in increased overall healthcare expenditures.⁶ In India, two third of the health expenditure is out of pocket.⁷ In India, 28% of the rural population and 20% of the urban population do not seek for the treatment of medical ailments due to financial constraints.⁸

To ensure that vital drugs are available at the affordable prices, the government of India exercises control over the prices of certain drugs defined as 'essential' through an order called Drugs Prices Control Order commonly referred to as the DPCO. The current DPCO became effective in May 2013.⁹ The National Pharmaceutical Pricing Authority (NPPA) implements this DPCO.¹⁰ The National List of Essential Medicines (NLEM) is a list of medicines prepared by the Ministry of Health and Family Welfare, which satisfy the health care needs of the majority of the population.¹¹

Under the provisions of DPCO 2013, prices of the 348 drugs in NLEM 2011 are monitored and controlled by the NPPA. Only 74 drugs were subjected to price control in the previous DPCO 1995.¹² As per the compendium of ceiling prices published in 2015, effective from 1st April, the NPPA had fixed ceiling prices of 509 formulations out of a total of 628 net formulations to be covered under the DPCO. This has increased with subsequent notifications.¹³

"Ceiling price" means a price fixed by the government in accordance with the provisions of the DPCO. This price control has come under scrutiny recently, with the Supreme Court of India calling the pricing policy as "unreasonable and irrational", and asking the government to re-examine it.¹⁴ The DPCO had also come heavily under the scanner for bringing an additional 108 non-scheduled formulations under price control in the public interest, then withdrawing its decision.^{15,16} Multiple brands are available for a single drug in India and variations are known to be prevalent in the prices of these brands because an open competitive market system entertaining both domestic and foreign manufacturers is followed.¹⁷ With the implementation of price control, such price variations are expected to have come down. The DPCO states that reducing such inter-brand price variations in major therapeutic groups is one of its major aims.¹⁸

'Cost analysis' is a type of partial pharmacoeconomic evaluation which compares the costs of two or more alternatives without regard to outcome.^{19,20}

Aim of this study was to evaluate cost differences for the various brands of the same generic commonly used Obstetric and Gynecological drugs. The purpose of the study was to determine if there are any variations in the costs of various brands. The awareness of the same information can be applied to ensure successful treatment by employing treatment regimen of lower cost thus improving the patient compliance.

METHODS

It was an observational study. A list of most commonly used Obstetrics and Gynecological drugs available in the major pharmacies of Jhalawar district were prepared and datas obtained and analysed from Drug Today (January-March 2018). Drug Today is considered a trusted and authentic source of commercial drug information and was chosen as the single source of information to ensure uniformity of price data, and avoid repetition and ambiguity which may arise from using multiple sources. Datas were analysed by descriptive statistics and results were expressed as percentage and absolute numbers.

Following parameters were noted/calculated:

- Price in Indian rupees (INR) of drugs manufactured by different pharmaceutical companies in India, in the same strength were obtained from Drug Today (January-March 2018).
- The cost of 10 tablets/10 capsules/1injection/1 protein packet/1 sachet was calculated.
- The cost ratio (ratio of cost of costliest to cheapest brand) of the same generic drug was estimated.
- Percentage cost variation was calculated as follows:

$$\% \text{ cost variation} = \left(\frac{\text{maximum cost} - \text{minimum cost}}{\text{minimum cost}} \right) \times 100$$

Inclusion criteria

- Drugs with Cost ratio >1.
- Drugs with more than one brand.

Exclusion criteria

- Drugs with Cost ratio = 1.
- Drugs with only one brand.
- Topical drugs.
- Drugs whose price were not mentioned in Drug Today.

RESULTS

This study shows that there is wide variation in the prices of different brands of same drugs. Table 1 shows cost analysis and price variation of commonly used Obstetrics drugs in which the highest cost ratio (1:9.5) and percentage

price variation (848) was found for Ferrous Salt + Folic acid combination followed by Cefixime (1:4.3, 330), Nifedipine (1:3.7, 270), Folic acid (1:3.67, 266), Paracetamol, Doxylamine succinate + Pyridoxine combination. Amoxicillin was having least cost ratio

(1:1.4) and percentage price variation (37). Maximum number of brand available for Ferrous Salt + Folic acid combination (41) followed by Paracetamol, Calcium Salt + Vitamin D₃ combination.

Table 1: Cost analysis and price variation of commonly used obstetrics drugs.

Drugs	Total brands (n)	Formulation and dose (mg)	Maximum price (INR)	Minimum price (INR)	Cost ratio	Price variation (%)
Folic acid	17	Tab 5mg	22	06	3.67	266
Ferrous salt + Folic acid	41	Tab 100mg+1.5mg	92	9.7	9.5	848
Doxylamine succinate + Pyridoxine	08	Tab 10mg+10mg	34	19.8	1.7	71
Calcium salt + Vitamin D ₃	24	Tab 1250mg+250i.u.	82	24	3.4	241
Nifedipine	09	Tab 10mg	35.9	9.7	3.7	270
LMWH*	03	Inj 0.4ml	520	374	1.4	39
Amoxicillin	22	Tab 500mg	70	51	1.4	37
Iron Sucrose	10	Inj 2.5ml	140	80	1.75	75
L-arginine	12	Sachet	45	25	1.8	80
Paracetamol	29	Tab 500mg	15.3	4.5	3.4	240
Micronised Progesterone	18	Cap 200mg	310	180	1.7	72
Cefixime	16	Tab 200mg	280	65	4.3	330
Amoxicillin + clavulanic acid	21	Tab 500mg +125mg	389	120	3.2	224
hCG**	11	Inj 5000i.u	574	240	2.4	139
Ranitidine	18	Tab 150mg	19	4.75	4	300
Protein Powder	16	Powder 200gm	300	140	2.1	114

*Low Molecular weight heparin, **Human Chorionic Gonadotropin

Table 2: Cost analysis and price variation of commonly used gynecological drugs.

Drugs	No. of brands (n)	Dose (mg) and formulation	Maximum price (INR)	Minimum price (INR)	Cost ratio	Price variation (%)
Clomiphene	12	Tab 50mg	80.9	28.9	2.8	179
Clotrimazole	06	Tab 100mg	110	50	2.2	120
Metformin	12	Tab 500mg	25	6	4.2	316
Mefenemic acid + Dicyclomine	18	Tab 250mg+10mg	30	14	2.1	114
Omeperazole	27	Cap 20mg	103	27	3.8	281
Tranexemic acid	13	Tab 500mg	171	89	1.9	92
Doxycycline	14	Tab 100mg	78.3	8.76	8.9	793
Norethisterone	08	Tab 5mg	165	43	3.8	283
Ethinylestradiol +Levonorgetral	07	Tab 0.05mg+0.25mg	106	3	35.3	3433
Cetirizine	20	Tab 10mg	35	10.8	3.2	224
Ethamsylate	22	Tab 500mg	182	63	2.9	188
Azithromycin	26	Tab 500mg	276.6	85	3.3	225
Fluconazole	15	Tab 150mg	320	40	8	700
Acyclovir	09	Tab 400mg	240	110	2.2	118
Metronidazole	4	Tab 400mg	7.9	6.2	1.3	27

Table 2 elaborate cost analysis and price variation of commonly used Gynecological drugs in which the highest

cost ratio (1:35) and percentage price variation (3433) was found for Ethinylestradiol + Levonorgetral combination

followed by Doxycycline (1:8.9, 793), Fluconazole (1:8, 700), Metformin (1:4.2, 316). Metronidazole was having least cost ratio (1:1.3) and percentage price variation (27). Maximum number of brand available for Omeperazole (27) followed by Ethamsylate (22).

DISCUSSION

Maternal anaemia in the first or second trimester of pregnancy increases the risk of prematurity and low birth weight.²¹ Globally, it is estimated that nearly one-fifth of pregnant women have iron deficiency anaemia at some stage during their pregnancy.²² The World Health Organization (WHO) guidelines recommend a daily dose of 30-60mg iron and 400µg folic acid supplements throughout pregnancy. This study showed that there is wide variation in the prices of different brands of Ferrous Salt + Folic acid combination with highest price of INR 92/10 tab which is quite high for a developing country like India in which maximum population belong to rural part and are below poverty line.

Urinary tract infections (UTIs) are still one of the most common bacterial infections in pregnant women.²³ Cefixime is safest and most effective drug in UTI in pregnancy but shows wide variation in price. Paracetamol (acetaminophen) remains the first line for the treatment of pain and fever in pregnancy.²⁴ Among 29 brands of Paracetamol, the cost ratio is 3.4.

Combined oral contraceptive pills (Ethinylestradiol+Levonorgestrel) not only needed to inhibit pregnancy but also used in menorrhagia, dysmenorrhoea, acne, regularization of menstrual cycle. Our study showed that percentage price variation is quite high (3433).

Doxycycline is a good old drug in use for PID and Azithromycin is a new macrolide with promising effects for same but high cost ratio and percentage price variation make compliance failure and relapse.

For the unawareness of the treating physician regarding cost variation of various brands of the same drug, provision of manual having information regarding comparative drug costs along with prescribing advices can be done.²⁵ Medical council of India has issued a circular regarding prescription of drugs only by their generic names.²⁶ Although from this regulation, it can ensure the prevention of any specific brand of a drug but it does not specify the role of pharmacist to dispense the brand with lesser cost. The regulation should also specify the pharmacist to decrease the treatment costs.

It has been found that differing cost of a brand of the same drug are linked to marketing strategy of that particular brand. The brands with aggressive marketing promotion have higher costs as compared to the brands with no marketing promotion. In contrast to the popular myth,

there has been no relation found between the cost and the quality of that particular brand of drug.²⁷

The following steps can be taken to improve the rationality and decrease the cost variation:²⁸

- The hit and trial method of combining drugs should be replaced by a rational and logical basis for bringing out a fixed dose drug formulation.
- There is a need to strengthen the mechanism for continuing professional development of practitioners to ensure that they have the necessary knowledge and skills to prescribe rationally.
- The doctor must choose the drug on the basis of cost and rationality rather than the on the basis of claims done by various pharmaceutical companies.
- Medical education must provide training to the medical and postgraduate students as they are the future of any country.

CONCLUSION

In this study, there was very wide price variation of different brands of the same generic most commonly prescribed Obstetrics and Gynecological drug. For long term adherence to the treatment, cost of a drug plays an important role for successful drug therapy. This can be done by changes in the government policies and regulations, integrating pharmacoeconomics as part of medical education curriculum, and creating awareness among treating physicians for switching to cost effective therapy.

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