

RESEARCH ARTICLE

Cost analysis of various brands of ovulation induction agents available in India

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ABSTRACT


Background: Infertility is the most common problem in recent times. Primary infertility is the main concern in infertile couples. Different groups of pharmacological agents are available in the market to induce ovulation. **Aims and Objectives:** The purpose of this retrospective analysis of cost variation in ovulation inducing agents is to compare the cost-analysis of various ovulation induction agents which are used in infertility patients. **Materials and Methods:** To review the price list of ovulation induction agents, the current index of medical stores April 2018 and online sources were used as an information guide. **Results:** The cost of 11 drugs were analyzed, which were manufactured by different pharmaceutical companies in different doses and formulations in Indian market. Table 1 shows the variation in price of parenteral ovulation induction agents. The cost variation is higher in human menopausal gonadotropin 150 IU (206.76), cetrorelix 0.25 mg (190.43) followed by chorionic gonadotropin 2000 IU (181.25). Table 2 shows the variation in price of oral ovulation induction agents. The cost variation is more in Letrozole 2.5 mg (6566.66) followed by clomifene 50 mg (217.65). **Conclusion:** There are ample differences in the cost of different brands of ovulation inducing agents available in India. All agents have significant role in the management of infertility. The clinicians prescribing these drugs should have awareness of these cost variations, so as to reduce the cost of drug therapy and increase patient adherence to the therapy.

KEY WORDS: Infertility; Ovulation Inducer; Cost Analysis

INTRODUCTION

Infertility is defined as “failure to achieve a clinical pregnancy after 12 months or more of regular, unprotected sexual intercourse.”^[1] One in seven couples face infertility problems, and ovulation disorders are one of the causes for it.^[2] There are two types of infertility; one is primary infertility where the couples have never conceived, and the secondary infertility is when, the couple has experienced pregnancy before and

failed to conceive later. Most infertile couples suffer from primary infertility. Despite increase in global population, still infertility accounts approximately 10–15%. The cause for infertility is male factors (20–25%) and female factors such as anovulation (15–20%), tubal defects (15–40%), endometriosis (5–10%), and unknown etiology (20–30%).^[3] Among female factors, infertility due to ovulatory disorders is about 30–40%.^[4] Normogonadotrophic anovulation also classified as Group II anovulation by the World Health Organization which is the one of the important categories of anovulatory infertility. It could be due to polycystic ovary syndrome (PCOS).^[5] Anovulatory infertility is meant by when there is no or infrequent rupture of follicles of the ovaries. Although many factors are responsible for ovulatory dysfunction, female hormonal imbalance is one of the important factors to be rectified. To treat the WHO Group II anovulation, ovulation induction agent is a safe and effective

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method. It will avoid invasive, expensive and complicated procedures of *in vitro* fertilization (IVF).^[6] Pharmacological agents which are commonly used to treat infertility and induce ovulation are antiestrogens, gonadotropins, gonadotropin-releasing hormone (GnRH) agonists, GnRH antagonists, and dopamine agonists. Clomiphene citrate is an antiestrogen which has both estrogen agonistic and antagonistic properties which lead to increased GnRH secretion by reducing the hypothalamic estrogen receptors, thus rising pituitary gonadotropin release and ovarian activity.^[7] Even though, it has high ovulation rate (60–90%), the pregnancy rate is only 10–20%.^[8] The second-line ovulation-inducing agents such as follicle-stimulating hormone (FSH) and luteinizing hormone (LH), which are available as recombinant gonadotropins (recombinant FSH [rFSH], and recombinant LH [rLH]) and used along with GnRH agonists/antagonist. Even though, the efficacy of rFSH is equivalent to human menopausal gonadotropin (hMG), rFSH has increasingly been used in ovulation induction for IVF treatments.^[9] However, letrozole a highly specific nonsteroidal aromatase inhibitor has become the popular drug in the infertility treatment because, it has superior ovulation induction potential, high pregnancy rate of 80% and less antiestrogenic effect on endometrium.^[10] In case of failure in clomiphene therapy, gonadotropin is the drug of choice, but it leads to ovarian hyperstimulation syndrome and is costly. Aromatase inhibitor like letrozole has the pregnancy rate comparable with gonadotropin with less side effects.^[11] Pharmacoeconomics is a scientific discipline which compares the value of one pharmaceutical drug or drug therapy to another.^[12] The pharmacoeconomics centers can use cost-minimization analysis, cost-benefit analysis, cost-effectiveness analysis or cost-utility analysis when they do the economic evaluation of pharmaceuticals. The country such as Canada, Finland, New Zealand, Norway, Sweden, and the UK are following the Pharmaceutical Benefits

Advisory Committee, who advises Federal Government Ministers on whether new drugs should be placed on a list of drugs that consumers can then purchase from pharmacies at a subsidized price. However, in India, it is still in developing process. The purpose of this retrospective analysis of cost variation in ovulation induction agents is to compare the cost analysis of various ovulation induction agents which are used in infertility patients. The present study was started after getting approval from Institutional Ethics Committee from SRM Medical College and Research Centre.

MATERIALS AND METHODS

To review the price list of ovulation induction agents, the current index of medical stores April 2018 and online sources were used as information guide.

1. The maximum and minimum retail price of a particular drug, manufactured by various pharmaceutical companies in the same dose were compared, and the variation between the two were calculated
2. Percentage cost variation was calculated as follows:

$$\% \text{ Cost variation} = \frac{(\text{Maximum cost} - \text{Minimum cost}) \times 100}{\text{Minimum cost}}$$

RESULTS

The cost of 11 drugs were analyzed, which were manufactured by different pharmaceutical companies in different doses and formulations in Indian market. Table 1 shows the variation in price of parenteral ovulation induction agents. The cost variation is higher in hMG 150 IU (206.76), cetrorelix 0.25 mg (190.43) followed by chorionic gonadotropin 2000 IU

Table 1: Parenteral ovulation induction agents

Combination	Dose	Formulation	Number of manufacturing pharma companies	Minimum cost (INR)	Maximum cost (INR)	% price variation
Chorionic gonadotropin	1000 IU	1	6	80	560	600
	1500 IU	1	1	192	192	0
	2000 IU	1	12	176	495	181.25
	5000 IU	1	17	320	630	96.87
	10000 IU	1	7	537	963	79.33
Human menopausal gonadotropin (hMG)	75 IU	1	5	465	850	82.80
	150 IU	1	3	740	1600	206.76
Urofollitropin	75 IU	1	7	580	1190	105.17
	150 IU	1	4	980	1500	53.06
Cetrorelix	0.25 mg	1	3	979	2272	190.43
Menotropin	75 IU	1	5	445	650	46.07
Lutropin	75IU	1	1	2137	2137	0
Follitropin	50 IU	1	1	1475	1475	0
	75 IU			735	735	0
	150 IU			2975	2975	0
	300 IU			8846	8846	0
	600 IU			17693	17693	0

Table 2: Oral ovulation induction agents

Combination	Dose (mg)	Formulation	Number of manufacturing pharma companies	Minimum cost (INR)	Maximum cost (INR)	% price variation
Clomifene	25	1	20	2.960	9.6	224
	50	1	30	2.89	9.18	217.65
	100	1	11	5.3	12.79	141.32
	300	1	1	19	19	0
Bromocriptine	1.25	1	1	8.70	8.70	0
	2.5	1	2	15.62	29.00	85.66
Cabergoline	0.25	1	4	24	28	16.67
	0.50	1	5	63	54.5	16.67
	1	1	1	116	116	0
Letrozole	2.5	1	17	2.4	160	6566.66

(181.25). Table 2 shows the variation in price of oral ovulation induction agents. The cost variation is more in letrozole 2.5 mg (6566.66) followed by clomifene 50 mg (217.65).

DISCUSSION

Among the parenteral ovulation inducers, seven drugs were considered in the present study. Of which, the cost variation was higher in hMG 150 IU (206.76) and cetrorelix 0.25 mg (190.43) followed by chorionic gonadotropin 2000 IU (181.25). In oral preparations, four drugs were taken for analysis; the cost variation is more in letrozole 2.5 mg (6566.66) followed by clomifene 50 mg (217.65). Drugs taken in the present study are available in different doses. Hence, it is very difficult to choose the drug based on the price. The physician would decide to select the drug based on the patient's condition. Although the global population has been increasing drastically, infertility is one of the major concerns among couples, which affects about 15%. The World Health Organization reported that one in every four couples is affected by infertility in developing nations.^[13] Because of the changes in environment, food habits and lifestyle, the prevalence of infertility in India has been raised to 22–23 million.^[14] Infertility is treated with intrauterine insemination and IVF methods. In the current economic zone, the estimated number of IVF cycles is around 100,000, and it is expected to touch 250,000 and above by the year 2020. The average cost per IVF cycle between at INR 150,000 and 200,000, but infertility couples often need multiple treatment cycles, which is basically unaffordable to nearly 80% of the population.^[15] Clomiphene citrate is the commonly prescribed drug which is cheap, orally effective with lesser side effects and comparatively safe for fetus. It can be given in avulatory infertility with PCOS.^[7,16] In clomiphene resistant PCOS cases, laparoscopic ovarian drilling is recommended treatment option.^[17] Hence, the aim of the present study is to highlight the cost of varying group of ovulation-inducing agents available in India. Since India is in the list of developing country, most of the infertile couples are unable to meet the high cost of the treatment. Hence, India needs to pay a special concern in giving the infertility medicine at economical price.

CONCLUSION

There are ample differences in the cost of different brands of ovulation induction agents available in India. All agents have significant role in management of infertility. The clinicians prescribing these drugs should have awareness of these cost variations, so as to reduce the cost of drug therapy and increase patient adherence to the therapy.

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