THE PHARMACEUTICAL INDUSTRY IN INDIA : A MARKET BEYOND PERFECT COMPETITION

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ABSTRACT :

In recent years, a dangerously flourishing monopolistic pharmaceutical market is putting a big question mark on social benevolence all over the planet – particularly in the third world. In this paper, an attempt has been made to look into the reality, which is much beyond perfectly competitive market. Analyses of various types of markets have been made through models. It has been attempted to show how rising price of medicines causes 'social morbidity' and flourishing of unwanted medicinal products and procedures – both causing immense harm to the health status of the society. Possible remedial strategies, viz., price control, monopolistic competition and Government intervention, are suggested for overcoming ominous effect of monopoly.

A. HISTORY OF INDIAN PHARMACEUTICAL POLICIES AND INDUSTRIES

The history of modern Indian pharmaceutical industry dates back to 1901 when the Bengal Chemicals and Pharmaceuticals Works was established. But, the pharmaceutical industry in pre-independent India did not progress much, causing dependence on imported drugs.

After independence, the first comprehensive drug policy came up in the year *1975* under the name of Foreign Equity Regulations Act. The policy had some important feature, viz, encouraging R & D, abolishing brand name drugs, *licensing only 117 drugs* which were considered sufficient for most of the diseases in India, maintaining quality of drugs, spreading unbiased information about drugs and monitoring drug reactions.

Next policy came up in *1978*, followed closely by *Drug Prices Control Order in 1979*, which put 347 drugs under price control, classifying the drugs according to their importance, such as :

Life saving drugs	**:**	**40% profit**
Essential drugs	**:**	**55% profit**
Non-essential drugs	**:**	**75% profit**
Other drugs	**:**	**No control**

But, this policy did not have any provision to force firms to produce the life saving and essential drugs. The firms, therefore, misused the liberty to choose to manufacture those drugs, which were more profitable.

Next came the Drug (Prices Control) Order of 1987, wherein the number of drugs under price control, were reduced from 347 to 142 and profit margins were raised.

The drug policy of *2002*, relaxed price control even more, and kept less than 40 drugs under price control. This has led to a boom in pharmaceutical industry in India, leading to uncontrolled manufacture of drugs – mostly non-essential and

unethical drugs, accumulating a staggering number of drugs in Indian market – about 3 lacs preparations.

B. THE PATENT LAWS

The first patent act in India dates back to *1856* and the next one was the *Patents and Design Act of 1911*. The latter one allowed patents to drugs, enabling, expectedly, the MNCs to take complete control of the market and charge extravagant prices. Prices of drugs in India, at that time, were ranked as the highest in the world.

In the post-independent era, the Indian Patents Act of 1970 excluded drugs altogether. One of its very important features was the Automatic Right to License, which safeguarded life saving drugs especially. The resultant boom in Indian pharmaceutical industry produced large volumes of high quality generic drugs, using reverse engineering, at much lower price, recording a turnover of over *$1.5 billion* in 2001.

It was but obvious that the global pharmaceutical giants, based mainly in *USA, Japan and Germany*, opposed this boom vehemently. They pressurised, through the Governments of industrialised countries, to impose patent restriction through World Trade Organisation. Finally, in the year 1994, they became successful to include India under the umbrella of patent act. India signed *Trade Related Intellectual Property Rights (TRIPS)* Agreement, which imposed a few vital (and potentially dangerous for developing and underdeveloped countries, and even, for the relatively poor section of industrialised countries) provisions :

1. **Provision for granting of patents for pharmaceutical products and processes,**

2. **The patent holders, who will reserve exclusive manufacturing and marketing right, will hold the patents for 20 years,**

3. **Patent will be granted irrespective of whether the applicant itself produced the drug or procured the drug from other source, say imported it from another country or bought it from some other research laboratory, and**

4. **In case the holder of the patent lodges a legal complaint against some firm for producing similar or generic drugs, then the onus of proving itself 'not-guilty' lies with the defendant.**

Under relentless pressure from the community of some industrialised countries for adoption of the provisions of TRIPS, Government of India, finally, introduced the Patents (Amendments) Act in *2005*, where the drugs were again included and, moreover, processes for all drug productions were also included. This allowed a potential monopoly of a handful of MNC pharmaceutical giants in India, causing rising price of drugs, and thereby, of treatment cost.

Rising discontent in, specially, Least Developed Countries, led to the Doha meet in 2001, which culminated in releasing *Doha 'Declaration* on the TRIPS Agreement and Public Health'. This Declaration allowed countries to use the exceptions of TRIPS for public health : *Compulsory Licensing* and *Parallel Imports.*

Under Compulsory Licensing, a government can allow manufacture of generic drugs, paying a reasonable royalty to the patent holding company. Provision of Parallel Import allows a government to shop in international market for the cheapest generic version of the patented drug marketed in its country. These provisions brought fresh air in the pharmaceutical market in India.

C. DRUG PRICE IN ESSENTIALLY A CARTELED MONOPOLY MARKET

Taking shelter, expectedly, behind the TRIPS Agreement, the few pharmaceutical giants – mainly from three industrialised countries – USA,

Japan and Germany, gained control over overwhelmingly major share of global pharmaceutical market as follows :

YEAR	*SHARE IN GLOBAL PHARMACEUTICAL MARKET*	
	LEADING 10 FIRMS	**LEADING 20 FIRMS**
1998	**35.9%**	**57.2%**
2000	**About half**	**About two thirds**

One important chain of events occurred since the advent of TRIPS Agreement – the mega mergers of pharmaceutical giants. Some examples : Glaxo Wellcome with SmithKline Beecham, Pfizer and Warnes Lambert, Hoechst-Merion with Merrell and Rhone-Poulenc - forming Aventis, etc.

Apart from mega merger, an unholy cartel amongst the pharmaceutical giants, have resulted in an essentially cartel monopoly market.

D. MODEL 1

We can illustrate such a cartel monopoly market with the help of a mathematical model.

The price of a drug is determined after the completion of four major stages of production. They are :

1. **Research & development and clinical trials**
2. **Patenting**
3. **Manufacturing**
4. **Registration**

Assumption :

a) **Cost incurred for patenting and registration is negligible.**
b) **Total fixed cost (TFC) is the same for producers of both the markets.**

Let the cost incurred for R&D be $P_{RD}Q_M$

Let the cost incurred for manufacturing be $P_{MA}Q_M$

Therefore, total variable cost is :

$$TVC = P_{RD}Q_M + P_{MA}Q_M + ßQ_M^2$$

where, ß = rate of change of marginal cost, ß > 0.

Total cost is :

$$TC = P_{RD}Q_M + P_{MA}Q_M + ßQ_M^2 + TFC, \quad TFC > 0$$

Total revenue is :

$$TR = P_MQ_M$$

Let us assume that the demand function is a linear one.

Therefore, demand function is :

$$P_M = a - bQ_M, \quad a, b > 0$$

Substituting the value of P_M in TR, we get :

$$TR = (a - bQ_M) Q_M$$

The first-order condition of profit maximisation of a monopolist is :

$$MR = MC$$

Thus, maximising profit we get,

$$a - 2bQ_M = P_{RD} + P_{MA} + 2ßQ_M$$

$$\Rightarrow Q_M^* = \frac{a - P_{RD} - P_{MA}}{2ß + 2b}$$

This is the equilibrium quantity.

Substituting the value of Q_M^* into the demand function we get :

$$P_M^* = a - bQ_M^*$$

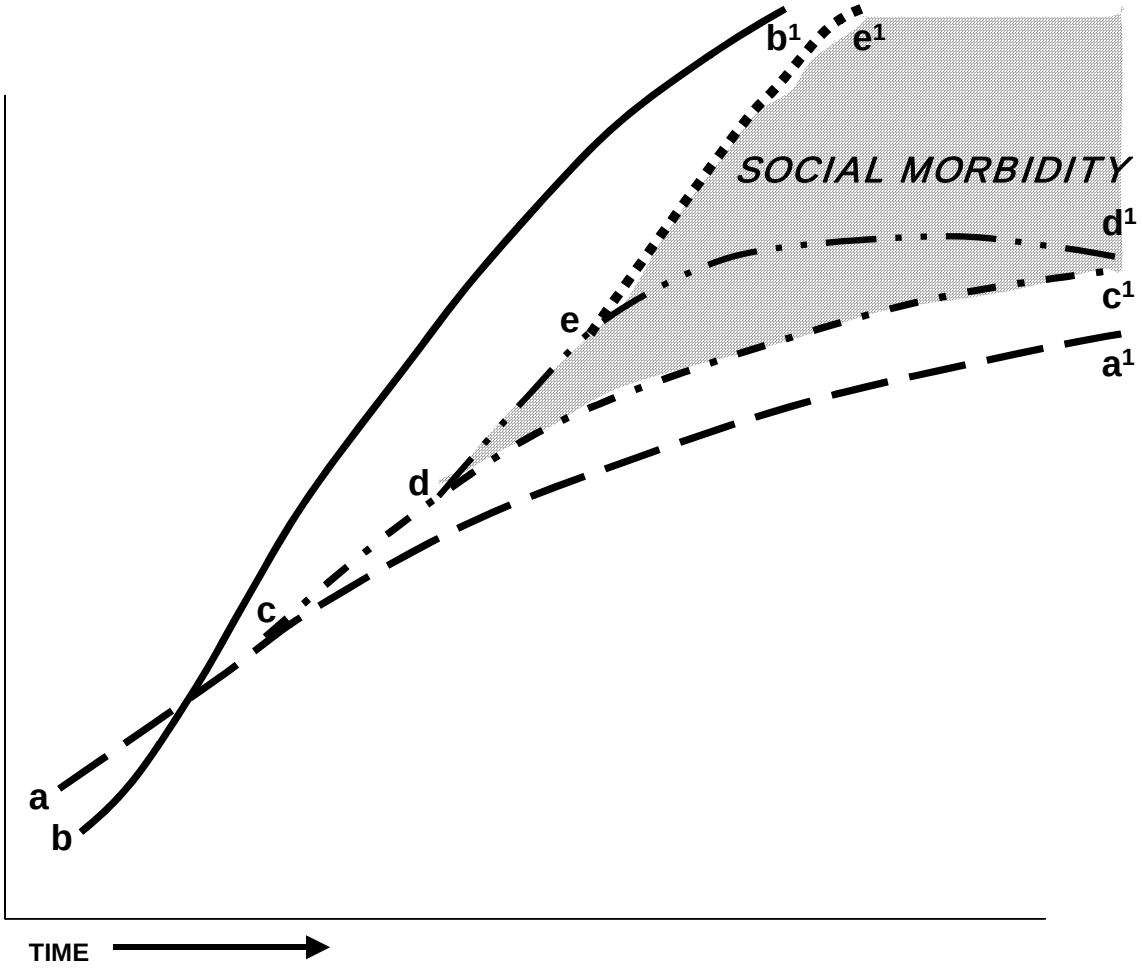
$$= a - b \left\{ \frac{a - P_{RD} - P_{MA}}{2ß + 2b} \right\}$$

$$= \frac{2a\beta + 2ab - ab + bP_{RD} + bP_{MA}}{2\beta + 2b}$$

$$\Rightarrow P_M^* = \frac{2a\beta + ab + bP_{RD} + bP_{MA}}{2\beta + 2b}$$

This is the equilibrium price.

E. MODEL 2



Under cartel monopoly, when the firms are maximising joint profits, the price of medicines will be very high. And, it will go on rising as cost incurred for R&D and final manufacturing go on rising pretty dramatically over time, as shown by curve bb^1.

Consumers' capacity to spend for health is also likely to rise over time as most people accumulate wealth over their lifetimes. But, in general, most people will

not witness a drastic rise in their purchasing power. Instead, the rise in purchasing power will be more gradual as shown by curve aa^1.

Therefore, as seen in the figure, curve bb^1 will remain below curve aa^1 only up to a certain point of time. After that, a gap will develop between the two curves, which will widen over time. This signifies that the price will soon go beyond people's capacity to spend. And, with time the magnitude of the difference will rise making the situation more and more grave.

The intersection of the curves aa^1 and bb^1 may be called the 1^{st} crisis point as it signals the start of a crisis, because from here on, the price of medicines start going more and more beyond the means of the consumers.

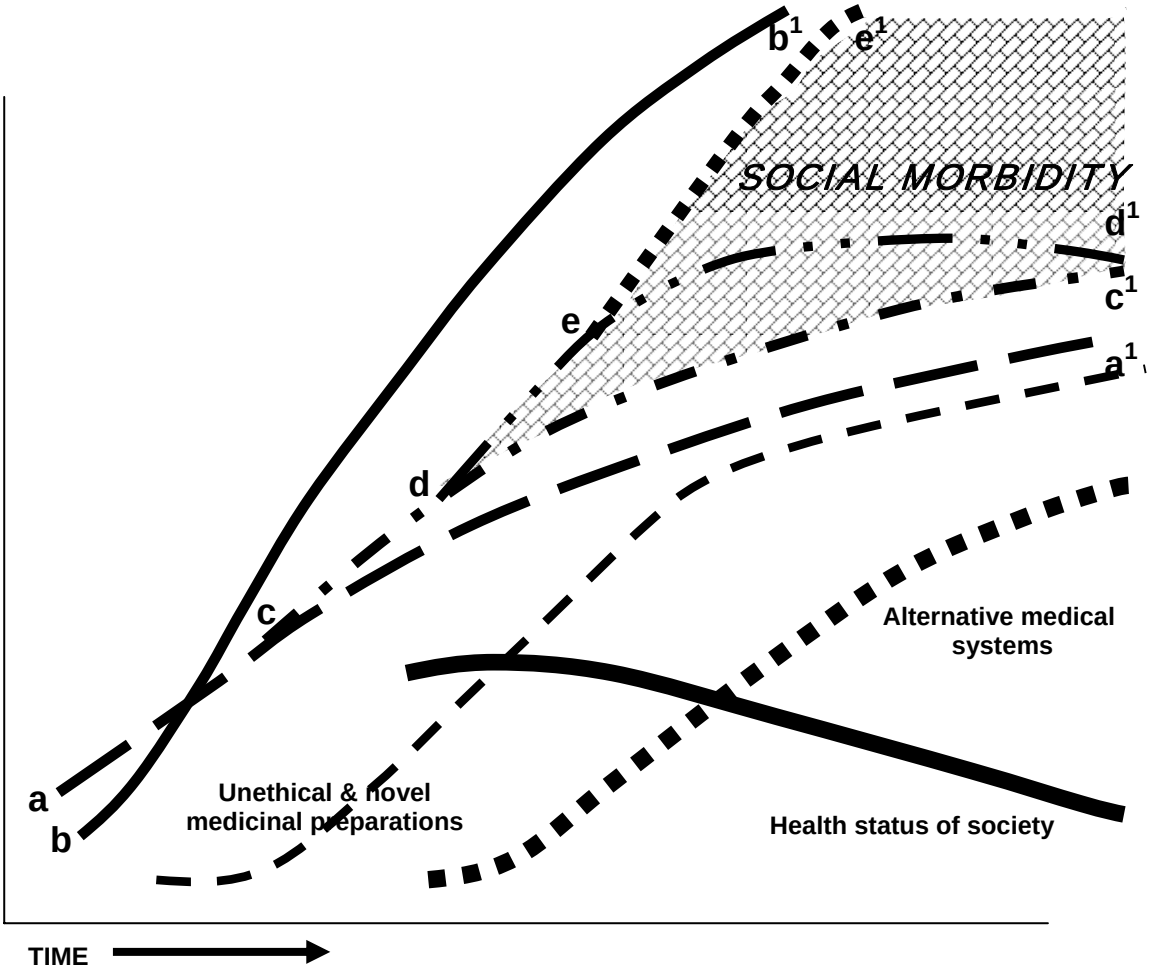
As medicines are very essential, people will start cutting down on some of their other expenditures to try to generate some more money. Let cc^1 be the curve that represents the extra amount generated by cutting down of some other expenses. But, the price still goes beyond the means of most of the people after a point of time.

Next, consumers will start drawing from their savings. Let dd^1 be the curve that represents the amount drawn from savings. The point where dd^1 touches cc^1 can be called the 2^{nd} crisis point, as from this point forth the already existing crisis becomes more serious.

Finally, when the price goes beyond the extra amount generated by savings, people will start to borrow. Let ee^1 be the curve that represents the amount of borrowings. The point where ee^1 touches dd^1 can be called the 3^{rd} crisis point as here the situation becomes critical.

Exhausted savings and a debt burden gives rise to social morbidity, which may be defined as, psychosomatic morbidity of people of a society. It is represented by the shaded area in the figure. And, this is induced by an imperfect pharmaceutical market.

F. MODEL 3



In a situation, as described in the previous model, when the price of medicines go beyond every effort consumers make to meet the price, they will start turning towards alternative healthcare systems. This is because both novel & unethical preparations and alternative medical systems are much cheaper than the drugs produced by the MNCs.

But, most novel and unethical drugs have very harmful side effects. Also, many of the alternative systems are not scientific. Thus, they compromise the health of the consumers. Therefore, the health status of the society is found to decline when consumers try to escape social morbidity, which, in turn, is a direct effect of dramatically rising prices of ethical drugs.

G. REMEDIES

There are three possible ways in which this situation may be remedied. They are:

1. **Price control**
2. **Monopolistic competition**
3. **Government intervention**

1. PRICE CONTROL

There are primarily two ways in which price of drugs may be controlled.

Method 1 :

The medicinal drugs may be grouped into four different categories according to their importance.

Group A : **Life Saving Drugs**
Group B : **WHO Listed Essential Drugs**
Group C : **Indian List of Additional Essential Drugs**
Group D : **Non-Essential Products**

And, then for medicinal products of Groups A, B, and C, the Government of India may use its power by utilising the provisions made by the Doha Declaration and allow the production of "generic" drugs. This will give rise to a perfectly competitive market.

MODEL 4

The situation under a perfectly competitive market can be illustrated with the help of a mathematical model.

Let the cost incurred for R&D be $P_{RD}Q_C$
Let the cost incurred for manufacturing be $P_{MA}Q_C$

Therefore, total variable cost is :

$$TVC = P_{RD}Q_C + P_{MA}Q_C + ßQ_C^2$$

where, ß = rate of change of marginal cost, ß >0.

Total cost is :

$$TC = P_{RD}Q_c + P_{MA}Q_c + ßQ_c^2 + TFC, \quad TFC > 0$$

Total revenue is :

$$TR = P_cQ_c$$

Therefore, profit is :

$$\Pi = TR - TC$$

$$= P_cQ_c - P_{RD}Q_c - P_{MA}Q_c - ßQ_c^2 - TFC$$

The first-order condition of profit maximisation is :

$$\frac{\delta\Pi}{\delta Q_C} = 0$$

$$\Rightarrow P_C - P_{RD} - P_{MA} - 2ßQ_C = 0$$

$$\Rightarrow Q_C = \frac{P_C - P_{RD} - P_{MA}}{2ß}$$

There is 'n' number of firms in the industry.

Therefore,

$$Q_C^1 = nQ_C$$

$$= n\left\{\frac{P_C - P_{RD} - P_{MA}}{2ß}\right\}$$

Let us assume that the demand function facing the industry is a linear one.

Therefore, the demand function is :

$$P_C = a - bQ_C^1, \quad a, b > 0$$

$$\Rightarrow Q_C^1 = \frac{a - P_C}{b}$$

The supply curve facing the consumers is :

$$Q_C^1 = n\left\{ \frac{P_C - P_{RD} - P_{MA}}{2ß} \right\}$$

At equilibrium,

Demand = Supply

$$\Rightarrow \frac{a - P_C}{b} = \frac{nP_C - nP_{RD} - nP_{MA}}{2ß}$$

$$\Rightarrow P_C^* = \frac{2aß + bnP_{RD} + bnP_{MA}}{2ß + bn}$$

This is the equilibrium price.

Substituting the value of P_C^* into the demand function we get :

$$Q_C^{1*} = \frac{a - P_C^*}{b}$$

$$= \frac{abn + 2aß - 2aß - bnP_{RD} - bnP_{MA}}{2ßb + b^2n}$$

$$\Rightarrow Q_C^{1*} = \frac{an - nP_{RD} - nP_{MA}}{2ß + bn}$$

This is the equilibrium quantity.

OBSERVATION MADE FROM THE MODEL

Price charged by the monopolist is higher than the price charged in the competitive market.

$$P_M^* - P_C^* = \frac{2aß + ab + bP_{RD} + bP_{MA}}{2ß + 2b} - \frac{2aß + bnP_{RD} + bnP_{MA}}{2ß + bn}$$

$$= \frac{2abnß + ab^2n - 2abß - b^2nP_{RD} + 2bßP_{RD} - b^2nP_{MA} + 2bßP_{MA} - 2bnßP_{RD} - 2bnßP_{MA}}{(2ß + 2b)(bn + 2ß)}$$

$$= \frac{b(P_{RD} + P_{MA})(2ß - bn - 2nß) + abn(2ß + b) - 2abß}{(2ß + 2d)(bn + 2ß)} > 0$$

This implies that, $\underline{P_M^* > P_C^*}$

Analysis : ***Therefore, a perfectly competitive market will induce a reduction in the price of medicines produced by the pharmaceutical giants and thus, the price will be controlled automatically.***

Method 2 :

The other method is the adoption of certain measures by the government. They are :

1. **Compulsory usage of pharmacological name instead of brand name – as insisted by World Health Organisation.**

   Effect : This will eliminate polypharmacy (novel drugs containing multiple medicines combined together unethically) and also the need for marketing.

2. **As suggested by WHO, prohibition of push sale to doctors and medical institutions using medical representatives and unethical incentives.**
3. **Prohibition of publicity in popular media to influence consumers directly.**

   Effect : These will prevent asymmetric information and other unethical business techniques.

4. **Allow legitimate profit for Group A, B and C medicinal products.**
5. **Compensate the companies for profit by way of subsidy to those companies.**

Effect : These will relieve the consumers of the burden of profit, especially the illegitimate profits.

These measures will result in a reduction in the cost incurred by the pharmaceutical giants, which will have a direct impact on the price of medicines. Also, a reduction in the profit margin of the more essential drugs will help control the price of drugs. Therefore, the health status of the society can also be maintained.

2. MONOPOLISTIC COMPETITION

Another method of reducing the price may be allowing a monopolistic competition offered by controlled and well-supervised growth of alternative therapies.

We have seen that the health status of the society starts declining only if the Oriental and other alternative therapies are not properly monitored. But, if these methods are indeed properly monitored, then the health of the society will not be at risk. In this case, consumption of the Western drugs will fall and the firms who had been holding monopoly power will start to lose market power.

Therefore, since both the modern medicines and the Oriental and other alternative therapies / medicines will hold some market power each, a monopolistically competitive market will be set up. This situation has been illustrated by the following mathematical model.

MODEL 5

Let the cost incurred for R&D be $P_{RD}Q_{MC}$
Let the cost incurred for manufacturing be $P_{MA}Q_{MC}$

Therefore, total cost is :

$$TC = P_{RD}Q_{MC} + P_{MA}Q_{MC} + ßQ_{MC}^2$$

where, ß = rate of change of marginal cost, ß > 0.

Here, there is no TFC as we are examining the long-run.

Therefore, average cost is :

$$AC = P_{RD} + P_{MA} + ßQ_{MC}$$

Let us assume that the demand function is a linear one.

Therefore, demand function is :

$$P_{MC} = a - bQ_{MC}, \quad a, b > 0$$

The first-order condition of profit maximisation in a monopolistically competitive market is :

$$P = AC$$

Thus, maximising profit we get,

$$a - bQ_{MC} = P_{RD} + P_{MA} + ßQ_{MC}$$

$$\Rightarrow Q_{MC}^* = \frac{a - P_{RD} - P_{MA}}{ß + b}$$

This is the equilibrium quantity.

Substituting the value of Q_{MC}^* into the demand function we get :

$$P_{MC}^* = a - bQ_{MC}^*$$

$$= a - b \left\{ \frac{a - P_{RD} - P_{MA}}{ß + b} \right\}$$

$$= \frac{aß + ab - ab + bP_{RD} + bP_{MA}}{ß + b}$$

$$\Rightarrow P_{MC}^* = \frac{aß + bP_{RD} + bP_{MA}}{ß + b}$$

This is the equilibrium price.

OBSERVATION MADE FROM THE MODEL

Price charged by the monopolist is higher than the price charged in the monopolistically competitive market.

$$P_M^* - P_{MC}^* = \frac{2a\beta + ab + bP_{RD} + bP_{MA}}{2\beta + 2b} - \frac{a\beta + bP_{RD} + bnP_{MA}}{\beta + b}$$

$$= \frac{2a\beta + ab + bP_{RD} + bP_{MA} - 2a\beta - 2bP_{RD} - 2bP_{MA}}{(2\beta + 2b)}$$

$$= \frac{ab - bP_{RD} - bP_{MA}}{(2\beta + 2d)} > 0$$

This implies that, $P_M^* > P_{MC}^*$

Analysis : ***Therefore, a monopolistically competitive market will also force a reduction in the price of medicines produced by the pharmaceutical giants.***

3. GOVERNMENT INTERVENTION

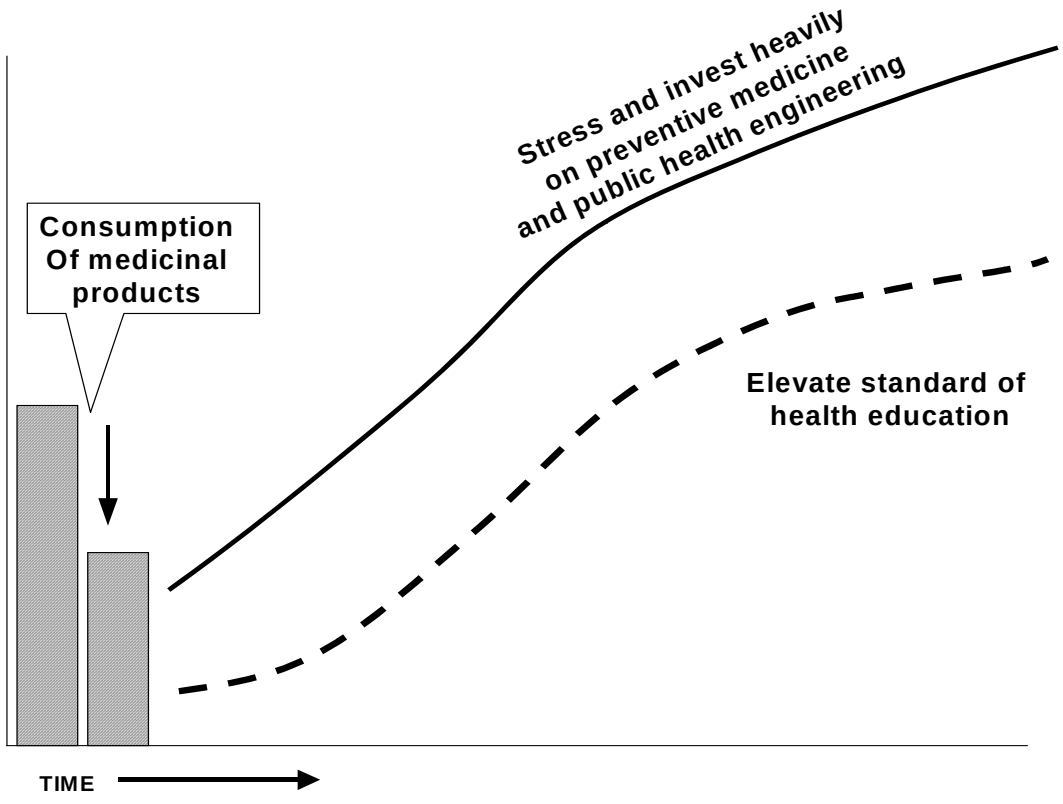
The most important way through which the price of medicines may be reduced and well being of the society may also be ensured is through government intervention, because only this can ensure curtailing of unnecessary consumption of medicinal products, which takes up a pretty large percentage of total medicine consumption in our country.

Indian consumers have certain unique characteristics which may be summarised into the following :

1. **Low dependence on modern medicines and modern medical treatment procedures and more inclination towards traditional medicines and therapies.**
2. **Level of expectation from State is low.**
3. **Low GDP resulting in poor spending capacity for health.**
4. **Poor preventive services, environmental sanitation and other public health engineering services make the people highly vulnerable to diseases. Improvement of these will cause dramatic improvement in health status of the nation.**
5. **Inadequate educational background results in poor health consciousness.**

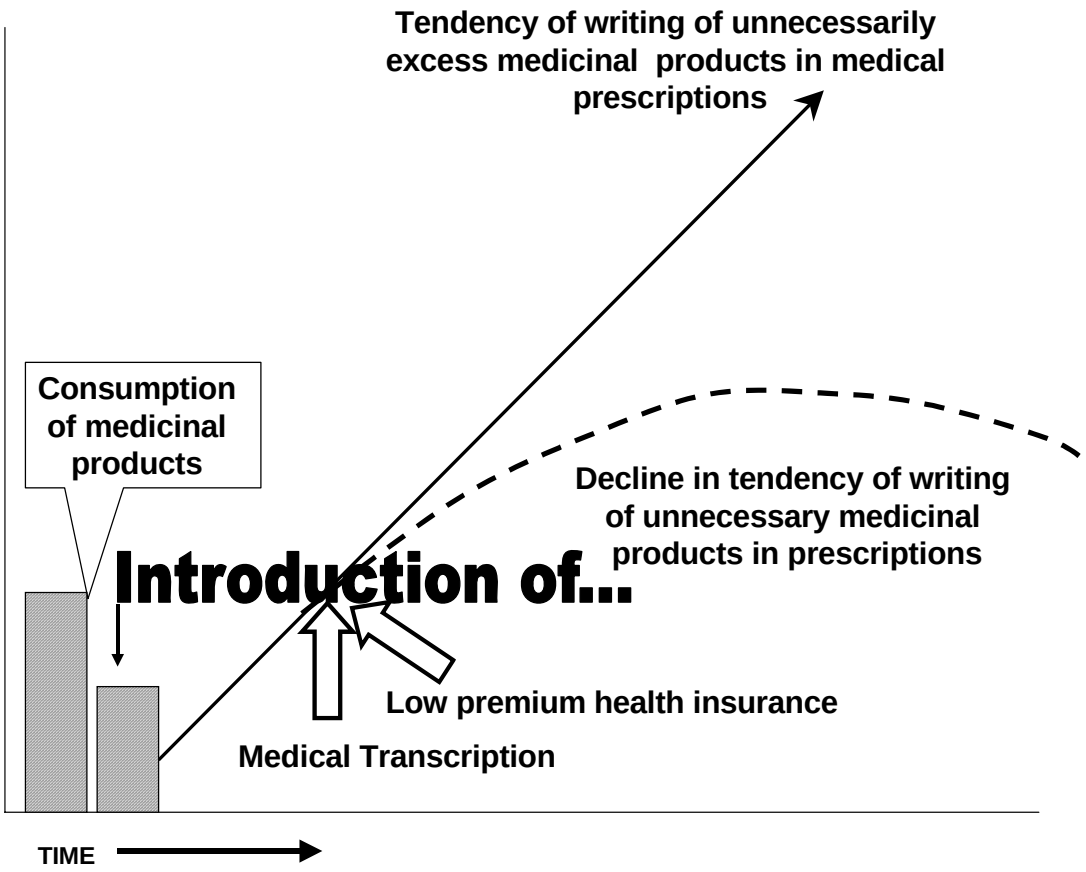
The govt. can adopt two measures either simultaneously or sequentially to reduce the effect of the above mentioned unique characteristics on the health of the people.

Method 1 :



As we can see in the above figure, elevation of the standard of health education, that is, the level of health consciousness in the society, and proper encouragement of preventive medicine and public health engineering by the govt. will effectively improve health status of the society and, thereby, reduce the necessity of consumption of medicines.

Method 2 :



Nowadays, the practice of excessive prescription is very much in vogue. Introduction of medical transcription and low premium cashless health insurance may help to check this tendency to a large extent, as is suggested by the figure. Since, excessive prescription normally leads to unnecessary consumption of medicinal products, these measures will help to further cut down on unnecessary consumption.

Therefore, proper govt. intervention will help to reduce consumption of medicinal products, especially consumption that is unnecessary, which is very harmful. As demand goes down, the demand curve will become more elastic and this will automatically pull down the price of medicinal drugs.

In the grim scenario of rising price of medicines, the afore-described three remedial strategies are the possible means of achieving our mission of reduction of imperfectness in the pharmaceutical market in search of a near-perfect market.

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