The pharma industry, with its vast reservoir of knowledge, can play a major role in making healthcare affordable through various innovative initiatives.

8.1. ROLE OF GOVERNMENT OF INDIA IN HELPING INDIAN PHARMA INDUSTRY

The Indian Pharmaceutical industry has transformed itself over the past three decades in India, being almost non-existing till 1970’s, to now being a prominent provider of Pharmaceutical Products. The Indian Pharmaceutical industry meets approximately 95 per cent of the country’s pharmaceutical needs. The present turnover of the Indian Pharma Industry is approximately $9.0 billion of which the share of exports is 40 per cent. Compared to the global picture, the Indian pharmaceutical Industry ranks 4th in terms of volume, and 13th in terms of value, which is highly significant.

The Indian Government has implemented the new product patent regime in India, as India had signed the World Trade Organization (WTO) agreement and since Trade Related Intellectual Property Rights (TRIPS) was a part of World Trade Organization (WTO) agreement, India was bound to implement the provisions of Trade Related Intellectual Property Rights (TRIPS) agreement. This meant that India had to make significant changes in its patent law and respect the Intellectual Property Rights (IPR’s) as done by other World Trade Organizations (WTO) member countries. India implemented from 1st January 2005 the new product patent regime and hence recognized “European Journal of new product patent regime and hence recognized “product patent” rather than “process patent” which we were following previously.
The new patent law has obvious implications for the entire pharma industry although the hardest hit will be the small scale pharmaceutical manufacturers in India.

8.1.1. Product Patent Law in India-Impact on Pharmaceutical Companies

The Government of India has now implemented the World Trade Organizations (WTO) product patent law. This simply means that the Indian pharma companies which were free to copy and sell patented molecules or drugs will not be able to do so. Therefore, no patented drug launched after 1st January, 2005 can be copied and sold, and also there are patent applications of Multinational Corporations (MNC). If the patent office grants patents rights then Indian pharma companies selling those molecules will have to stop manufacturing and marketing of those drugs or may have to pay royalty if they continue to manufacture and market those drugs. The new patent law grants 20 years to patent holders instead of 7 years which was given to patent holders under Patent act 1970. The government of India is also committed to Current Good Manufacturing Practices (CGMP) norms as specified by World Health Organization (WHO) and now Pharma companies have to follow strict standards in manufacturing practices. All this is being done to under pressure from the World Trade Organizations (WTO), Multi National Companies (MNC) Pharma companies and the International community. It is an open secret that Indian Pharma companies were initially regarded as producers of cheap and substandard drugs. However some big and medium Indian Pharma companies invested in Research and Development and also upgradation of their manufacturing plants and today the world over India’s image have changed. India has around 80 United States (US) Food and Drug Administration (FDA) approved Drug Manufacturing plants, which is the highest outside the United States of America (USA) all over the world. This United States, Food and Drug Administration (USFDA) approved plants are
owned by Multi National Companies (MNC) Pharma companies and big Indian Pharma companies and almost none is in the SME Pharma sector.

Thus in nutshell the future appears very bleak for the pharma sector and the imposition of Product patent will definitely lead to closure of majority of pharma small scale units over a period of time.

8.1.2. Responses of Large Sized Pharmaceutical Companies

The basic problem is of Drug price control order (DPCO) because of which price restraints are there, leaving companies with lesser funds for Research and Development (R&D). Implementation of the product patent regime by the Government is biased in favor of Multi National Companies (MNC) players and due to this the Indian companies will suffer a lot. Rather than helping the Indian companies in raising finance for new drug discovery, the Government is bringing most of the drugs under price control which is a big disincentive for the Industry. The pharma policy is not supportive to the Industry influences and the competitive strength building. The government appears to be indifferent to the Pharma Industry. One large Multi National Companies (MNC) player said that the government has not placed a premium on firms that bolster their Research and Development (R&D) capabilities. Also the stance on recognition and granting patents (patentability) (example: Novartis/Glaxo Smith Kline (GSK) and compulsory licensing is fluid currently. This may be construed as ‘protectionist’ thereby potentially diluting investments into Research and Development (R&D) by both domestic and international players. These developments are not in line with the expectations from the product patent regime. Another company reported that procedures and paperwork involved in Exports and Imports as well as tax compliance are working to their disadvantage.
8.1.3. Responses of Medium Sized Pharmaceutical Companies

Not enough incentives for the companies to invest in Research and Development (R&D). The government should give some monetary benefits for Research and Development (R&D). The Government is increasing controls. Decisions on key policy issues are not matching with industry needs and are delayed.

8.1.4. Responses of Small Sized Pharmaceutical Companies

One small Multi National Companies (MNC) player said that the Product patent is not as per World Trade Organizations (WTO) guidelines specifically issues relating to Data exclusivity as well as incremental innovation is not patentable.

It is clear now that majority of the Indian Pharmaceutical companies are satisfied with the efforts of the Indian Government in helping them cope up with the challenges of the product patent regime. However some companies are not happy with the Government that it has not done enough to help them. They want the Government to help them specifically on the issue of drug pricing. They want the removal of the Drug Price Control Order (DPCO) which regulates prices of 74 Bulk Drugs (around 25 per cent of the total pharma market) because they are unable to price some drugs as per their wish and instead the Government fixes the prices of these drugs and pharmaceutical companies cannot enjoy better margins on these drugs. Thus the pharma companies feel that in order to help them face a product patent regime which they perceive is biased towards the Multi National Companies (MNC) pharma companies, the Government should give some concessions. They want the Government to give them incentives for Research and Development (R&D) as well as subsidies in importing sophisticated technology and Machinery. They also want clarity from the Government on
key issues like Data exclusivity, Compulsory Licensing and Incremental innovation.

The Government of India should solve the problems of the pharma companies because the introduction of the product patent has already hit the pharma companies hard. The Indian pharma companies entrepreneurs are already becoming disinterested (example: Ranbaxy which is India’s largest pharma company has sold out to Daiichi Sankyo of Japan) and if slowly Multi National Companies (MNC) pharma companies take over the Indian pharma industry then Multi National Companies (MNC) companies will price medicines higher and the common man of India will be a sufferer.

8.2. HEALTH CARE IN SOUTH INDIA

This region has the best public health infrastructure, when compared to other parts of the country. There is one private sector hospital bed per 398.48 persons in the region and over 5,500 private sector hospitals and nursing homes. Hospitalization rate is observed to be highest in the country (39 per 1000 persons) suggestive of the favorable health seeking behaviour of the people.

Data suggests that large sized hospitals (200 beds and above) planned with well demarcated drainage areas, will be successful in the region. High level of technology will acts as the cornerstone, to beat the existing competition. Specialties institutions emphasizing on ophthalmology, cardiology and oncology need to be planned with caution due to very strong existing competition. For success of a hospital in southern India, it is crucial to have a ‘welfare approach’ to create a brand image and ensure greater penetration. Cost is not a constraint, due to a relatively stronger paying capacity, thanks to the high coverage of private and employer insurance.
8.3. DRUG POLICY 2002

1. The basic objectives of governments Policy relating to the drugs and pharmaceutical sector were enumerated in the Drug Policy of 1986. These basic objectives still remain largely valid. However, the drug and pharmaceutical industry in the country today faces new challenges on account of liberalization of the Indian economy, the globalization of the world economy and on account of new obligations undertaken by India under the World Trade Organizations (WTO) Agreements. These challenges require a change in emphasis in the current pharmaceutical policy and the need for new initiatives beyond those enumerated in the Drug Policy 1986, as modified in 1994, so that policy inputs are directed more towards promoting more internationally competitive. The need for radically improving the policy framework for knowledge-based industry has also been acknowledged by the Government. The Prime Minister’s Advisory Council on Trade and Industry has made important recommendations regarding knowledge-based industry. The pharmaceutical industry has been identified as one of the most important knowledge-based industries in which India has a comparative advantage.

2. The process of liberalization set in motion in 1991 has considerably reduced the scope of industrial licensing and demolished many non-tariff barriers to imports. Important steps already taken in this regard are:

   Industrial licensing for the manufacture of all drugs and pharmaceuticals has been abolished except for bulk drugs produced by the use of recombinant Deoxyribo Nucleic Acid (DNA) technology, bulk drugs requiring in-vivo use of nucleic acids, and specific cell/tissue targeted formulations.
• Reservation of 5 drugs for manufacture by the public sector only was abolished in February 1999, thus opening them up for manufacture by the private sector also.

• Foreign investment through automatic route was raised from 51 per cent to 74 per cent in March 2000 and the same has been raised to 100 per cent. Automatic approval for Foreign Technology Agreements is being given in the case of all bulk drugs, their intermediates and formulations except those produced by the use of recombinant Deoxyribo Nucleic Acid (DNA) technology, for which the procedure prescribed by the Government would be followed.

• Drugs and pharmaceuticals manufacturing units in the public sector are being allowed to face competition including competition from imports. Wherever possible, these units are being privatized.

• Extending the facility of weighted deductions of 150 per cent of the expenditure on in-house research and development to cover as eligible expenditure, the expenditure on filing patents, obtaining regulatory approvals and clinical trials besides Research and Development (R&D) in biotechnology.

• Introduction of the Patents (Second Amendment) bill in the Parliament. It, inter-alia, provides for the extension in the life of a patent to 20 years.

3. The impact of the policies enunciated, from time to time, by the government has been salutary. It has enabled the pharmaceutical industry to meet almost entirely the country’s demand for formulations and substantially for bulk drugs. In the process the pharmaceutical industry in India has achieved global recognition as a low cost producer and supplier of quality bulk drugs and formulations.
to the world. In 1999-2000, drugs and pharmaceutical exports were Rs.6631 crores out of a total production of Rs.19,737 crores. However, two major issues have surfaced on account of globalization and implementation of our obligations under Trade Related Intellectual Property (TRIP’s) which impact on long-term competitiveness of Indian industry. These have been addressed in the Pharmaceutical Policy -2002. A reorientation of the objectives of the current policy has also become necessary on account of these issues:-

(a) The essentiality of improving incentives for research and development in the Indian pharmaceutical industry, to enable the industry to achieve sustainable growth particularly in view of anticipated changes in the Patent Law, and

(b) The need for reducing further the rigours of price control particularly in view of the ongoing process of liberalization.

4. It is against this backdrop, that Pharmaceutical Policy-2002 is being enunciated.

5. The main objectives of this policy are: -

(a) Ensuring abundant availability at reasonable prices within the country of good quality essential pharmaceuticals of mass consumption.

(b) Strengthening the indigenous capability for cost effective quality production and exports of pharmaceuticals by reducing barriers to trade in the pharmaceutical sector.

(c) Strengthening the system of quality control over drug and pharmaceutical production and distribution to make quality an
essential attribute of the Indian pharmaceutical industry and promoting rational use of pharmaceuticals.

(d) Encouraging Research and Development (R&D) in the pharmaceutical sector in a manner compatible with the country’s needs and with particular focus on diseases endemic or relevant to India by creating an environment conducive to channelising a higher level of investment into Research and Development (R&D) in pharmaceuticals in India.

(e) Creating an incentive framework for the pharmaceutical industry which promotes new investment into pharmaceutical industry and encourages the introduction of new technologies and new drugs.

8.3.1. Foreign Investment

Foreign investment up to 100 per cent will be permitted, subject to stipulations laid down from time to time in the Industrial Policy, through the automatic route in the case of all bulk drugs cleared by Drug Controller General (India), all their intermediates and formulations.

8.3.2. Imports

Imports of drugs and pharmaceuticals will be as per Export and Import (EXIM) policy in force. A centralized system of registration will be introduced under the Drugs and Cosmetics Act and Rules made there under Ministry of Health and Family Welfare will enforce strict regulatory processes for import of bulk drugs and formulations.
8.3.3. Encouragement to Research and Development (R&D)

(a) In principle approval to the establishment of the Pharmaceutical Research and Development Support Fund (PRDSF) under the administrative control of the Department of Science and technology, this will also constitute a Drug Development Promotion Board (DDPB) on the lines of the Technology Development Board to administer the utilization of the Pharmaceutical Research and Development Support Fund (PRDSF).

(b) With a view to encouraging generation of intellectual property and facilitating indigenous endeavours in pharma Research and Development (R&D), appropriate fiscal incentives would be provided.

8.3.4. Quality Aspects

The Ministry of Health & Family Welfare would:

(i) Progressively benchmark the regulatory standards against the international standards for manufacturing.

(ii) Progressively harmonize standards for clinical testing with international practices.

(iii) Streamline the procedures and steps for quick evaluation and clearance of new drug applications, developed in India through indigenous Research and Development (R&D), and

(iv) Set up a world class Central Drug Standard Control Organization (CDSCO) by modernizing, restructuring and reforming the existing system and establish an effective net
work of drugs standards enforcement administrations in the States with the Central Drug Standard Control Organization (CDSCO) as a nodal centre, to ensure high standards of quality, safety and efficacy of drugs and pharmaceuticals.

8.3.5. Pharma Education and Training

The National Institute of Pharmaceutical Education and Research (NIPER) have been set up by the Government of India as an institute of “national importance” to achieve excellence in pharmaceutical sciences and technologies, education and training. Through this institute, Government’s endeavour will be to upgrade the standards of pharmacy education and Research and Development (R&D). Besides tackling problems of human resources development for academia and the indigenous pharmaceutical industry, the institute will make efforts to maximize collaborative research with the industry and other technical institutes in the area of drug discovery and pharma technology development.

8.4. FUTURE DIRECTIONS OF THE PHARMA INDUSTRY

The pharmaceutical industry has been widely criticized for high markups, high profit margins, and high and rising prices on its most popular products. Data on the 200 most frequently used drugs in 1993 show drug prices increasing at a rate of 3.1 per cent. According to Wilkerson and Easton (1993), patient costs for eight most widely used drugs increased at an annual rate of 1.6 per cent between 1985 and 1992. At the same time generic drug prices fell by 12.8 per cent. The same year, prices of the top 500 outpatient drugs increased by 4.6 per cent.

Consumer advocates and certain members of Congress have long called for aggressive public policy to control the industry’s ability to raise prices, thus limiting profitability. According to United States (U.S)
Government Accounting Office (GAO) report (1992), price controls on prescription drugs in Canada have resulted in substantially lower prices than in the United States. Price controls have had a choking on effect on pharmaceutical research in Canada. Since price controls on prescription drugs were adopted in 1969, virtually no new pharmaceutical products have been developed in that country. In general, countries with the most stringent controls on pharmaceuticals prices, for example France and Austria, also do the least amount of research. Another Government Accounting Office (GAO) study (1994) compared prices of 77 leading branded pharmaceuticals in the United States and abroad and concluded that United States (U.S) prices are substantially higher than those found in the United Kingdom and other European countries.

Research by Danzon (1994) probes the validity of this finding by examining the methodology on which it is based. Danzon concludes that Government Accounting Office (GAO) results are based toward finding higher prices in the United States (U.S) market. First, Government Accounting Office (GAO) research was based on an unrepresentative sample of drugs marketed in the United States. Second, it ignored the importance of generics that account for 47 per cent of the dispensed prescriptions in the United States (U.S) market in 2001, up from 18.6 per cent at the end of 1984. Four of the five largest selling drugs in the world have already lost their patent protection. Branded drugs with combined 2001 sales of more than $30 billion lost their patent protection by 2004. Finally, the Government Accounting Office (GAO) study also ignored the practice of discounting and rebating that is a common practice, especially in managed care, Medicaid, and other government programmes.

Danzon’s 1996 study of drug prices in nine countries, taking these issues into consideration, reached far different conclusions. When unit prices (price per dose) were compared to Canada, Germany, Switzerland, and
Sweden all had higher prices than the States, and prices in France were even lower.

Much of criticism of the medical care delivery system in the United States deals with the high levels of overall spending. Analysts agree that one of the primary reasons for increased spending is the third-party payment system. Individuals, patients, and providers fail to practice economizing behavior because there is very little direct benefit to the individual who economizes. The availability of insurance, public or private, and the social mandate of providing free care to those who cannot afford to purchase it themselves result in patients demanding and physicians supplying a level of care that, at the margin, provides little benefit for the resources expanded.

Over the past 50 years insurance coverage has expanded to a larger segment of the population, providing a growing array of medical benefits. That expansion has also created a powerful incentive for industry to develop new, and often more expensive, technologies to deal with maladies of modern society.

Medical research has accomplished countless miracles over the years. The most important innovation include developments in the areas of diagnostics such as Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) scanning, the treatment of heart disease like Angiotensin Converting Enzyme (ACE) inhibitors, cardiac angioplasty, and Coronary Artery Bypass Graft (CABG) surgery, cataract removal and lens replacement, hip and knee replacement, ultrasound technology, laparoscopic surgery, and pharmaceuticals including statins to treat high cholesterol and inhaled steroids to treat asthma.

Using history as a guide, concluding that rapid technological change in medical care will lead to increased spending. If biotechnology provides for
the effective treatment of genetic diseases, however, we could see a shift from cost-increasing halfway technology to cost-saving high technology.

With the above backdrop, the thesis is carried out with the following objectives.

**8.5. OBJECTIVES OF THE STUDY**

1. To study the allocation of public funding in health care.
2. To study the development of pharmaceutical industry.
3. To study the public and private partnership in health care.
4. And finally to study the relevance of the growth of pharmaceutical industry in Tamil Nadu along with healthcare practices.

During 2000 there are 1,63,181 Sub Centre/Primary Health Centre/Community Health Centre) SC/PHC/CHC; 43,322 Dispensaries 8,70,161 beds in both private and public health hospitals. 7,37,000 doctors; 5,03,900 nursing personal respectively. Public health care has noticed and achievement of small pox and guineaworm cases in India and Tamil Nadu. It is noteworthy to mention that life expectancy has increased from 54 years in 1981 to 64 years in 2000. Total expenditure on health is steadily declining inspite of the repeated signals of wide spread of diseases.

During 1997-98 there were 309 hospitals, 187 dispensaries and 8,601 doctors in Tamil Nadu. And during 2009-10, 323 hospitals are established with 216 dispensaries and 13,421 doctors respectively.

Health Sub Centre as on 2012 are 8,706 in number whereas the requisite subcentres 7,057 only. With regard to the establishment of primary health centre 1,215 centres were installed. There is a deficiency of 87 community health centre. Altogether 5,428 shortage of health workers were observed are in shortage of health workers were observed in the study area.
Besides this 912 health associated are in shortage primary health centres. Similarly there is a shortage of 72 pharmacist and 512 laboratory technicians.

It is saddening to observe that the health inventories are very short in Tamil Nadu. Establishment of public pharmaceutical enterprises are seeking government help in terms of subsidies and tariff relaxation. Much has to be done on the development of public health and pharmaceutical development in the study area.

Thanks to the policies of liberalization and privatization through which the focus on education and health has become minimum. Over the years the allocation of public outlays on education and health is reduced to a minimum level. Negligence of education will darken the society. Education sector is carried over by competition and quality indicators. Policies should be framed to overcome these difficulties. Public investment in these fields is essential.

Nearly 209 Small Scale Industries (SSI) units are producing Orals, tablets, capsules, Syrup, Powder, 6 units are producing Injectables, 6 units are producing topical Ointment, Lotions and 55 units are producing Indian system of medicines.

50 medium and Large units producing Orals, tablets, capsules, syrup, powder, 4 units are producing injectables, nearly 20 units are producing bulk drugs.

**In the study area pharmaceutical units are not established based on public and private partnership.**

The annual per capita government expenditure on medicines in India and Tamil Nadu is almost same, i.e. about Rs.28/- Within the same budget, Tamil Nadu provides all medicines free to outdoor patients in government health facilities and hence now 40 per cent of patients seek care in these
centres. India’s performance about supply of medicines to patients is not even one third of Tamil Nadu. This arises from the following lacunae in the system:

- Most problematic aspect of the system in India is that purchase of medicine is done at different levels by different agencies. Multiplicity of sources and level of purchase causes delays and makes it difficult to monitor the procurement process. For example, medicines are supplied to Primary Health Centres (PHCs) from three different routes – from Central government for national programmes, from Zilla Parishad and from Directorate of Health Services (DHS). This makes it difficult to track the flow of medicines. There is no provision for ensuring transparency or monitoring. Basic information such as name of medicine, its rate and name of selected manufacturer is not available on the website. Obtaining data regarding procurement process was quite difficult as there is no standard manual available describing the process. Further, there is no provision for quality check and pre or post-dispatch inspection of stock. The health department does not have single manual to define the process of procurement. There is no computerized linkage among Primary Health Centres (PHCs), between Primary Health Centres PHCs and District Health Office (DHOs) office, between District Health Office (DHOs) office and the state level and further between Primary Health Centres (PHCs) and state level.

- In addition to the problem of understaffing, there is also lack of trained, professional cadre for the procurement work. The health officers involved in procurement of medicines have their own job responsibilities: procurement related activities become additional burden for them. Secondly, they are not trained about procurement.
• Currently Rate Contract is done for around 1,800 products whereas there are only 350 medicines in Ministry of Health’s National List of Essential Medicines (NLEM) and the Tamil Nadu Medical Service Corporation, which is renowned for its procurement work, has a list of 260 medicines for procurement.

• Finally the supply of medicines to Public Health Foundation (PHF) is not demand responsive (i.e. not need based) partly because in Primary Health Centre (PHC). All Primary Health Centres (PHCs) get a standard quota of medicines irrespective of their needs and the indent sent by Medical Officers is more often ignored.

With respect of fixed capital small scale pharmaceutical industries are assisted by financial agencies to the tune of 76.76 per cent, and the remaining amount is borne by entrepreneurs themselves. Likewise in medium scale industries 75.19 per cent of the investment is done by the financial agencies and the remaining 24.81 per cent was managed by self. In large scale industry 75.5 per cent of the fixed capital is assisted by financial agency and the remaining 24.82 is managed by entrepreneurs itself.

Similarly with respect to variable capital 16.23 per cent, 17.82 per cent, 21.48 per cent is assisted by financial agencies and the two remaining 83.77 per cent, 82.12 per cent and 78.52 per cent of the variable capital is supplied by the entrepreneurs themselves.

Age wise classification clearly signifies the importance of age of incumbents at entry point. It is observed that the senior executives are migrating to Europe. Work experience criteria are hindering the growth and performance of pharma industry in Tamil Nadu. During the last couple of years pharmaceutical management is following a principle of performance criteria to eliminate high wage and senior executives.
49 per cent of the sample employees are in less than 25 years of age; 38.5 per cent of the employees are in the age group of 25 to 35 years of age; and 12.5 per cent of the are above 35 years of age.

Management is following a principle of performance criteria to eliminate high wage and senior executives.

58 per cent of the consumers are welcoming the efforts made by the government and 54 per cent the respondents are depending upon allopathy medicines for immediate relief and cure.

16 per cent of the respondents are getting less than 5,000 rupees as remuneration; 56 per cent of the respondents are getting 5,000-10,000 rupees as remuneration 24 per cent of the respondents are getting 10,000-15,000 rupees as remuneration and the remaining 4 per cent are receiving above 15,000 rupees as remuneration respectively.

It is observed by the research scholar that income criteria are making them to stay in or stay out from the industry. Anyhow work experience is sharing a lion’s share in stepping into the job.

A comparative analysis is made in this table with chemical and chemical products with pharmaceutics. Pharmaceutical development includes the development of biotechnology and drug industry. Production chemical and chemical products requires a fixed of Rs. 29,126 per year to produce 12,23,209 worth of product. Similarly pharmaceutical industries require Rs. 68917 per year to produce 4,74,718 worth of goods. Investments in pharmaceutical industries are higher.

In 1978 Apex Laboratories was established; 1996 Grandix was established; in 1938 Tablets India limited was established; 1980 Malladi Drugs and Pharmaceuticals was established; in 1999 Medisearch India was
established; in 1988 Piramal Healthcare was established; 1992 Orchid Chemicals and Pharmaceuticals was established; 1979 The Madras Pharmaceuticals was established; in 1977 Fourrts India Laboratories was established; in 1990 Caplin point Pharma was established; 1970 Medopharm was established; in 1982 Sresan Pharmaceuticals was established.

It is observed that from the year 1938 till now there is number of industries are establishing.

Establishment of pharmaceutical units is based on the profit margins the industry is deriving competition and quality of the product ensure the stability of the industry. Anyhow, it is observed that the impact of recession is found adversely on the pharmaceutical industry.

Thanks to the efforts of government of India and Tamil Nadu that the prices are comparatively cheaper or life saving drugs. Extensive research is required on cancer medicines.

It is observed that a thorough research is required in the extensively usage of medicines. Quality of the product is commanding a major market share.

The industry is classified into small, medium and large scale unit. In a small scale enterprise 32.28 per cent of B.Sc. Pharmacy graduates are working followed by Biotechnology to the tune of 20.68 per cent. Likewise in a medium scale industry 28.09 per cent of B.Sc. Pharmacy and Biotechnology students are working followed by engineering graduates. In a large scale units 24.51 per cent of B.Sc. graduates are working followed by master of engineering in Bio-technology

Priority of skill pooling in small and medium units are linked to remuneration and in the large scale skill and specialization is preferred.
Tamil Nadu (TN) model has resulted in savings in the outlay on drugs to the extent of 36 per cent of the allocation. As per National Sample Survey Organization’s survey in 2004, (NSSO 2004) in rural Maharashtra, for admitted patient in a Public Health Facility, out of pocket expenditure was Rs. 2243 while it was only Rs. 667 in Tamil Nadu. It should be noted that more than 50% of these out-of-pocket expenses are on medicines. National Sample Survey Organization’s survey (NSSO) 2006 shows that the proportion of patients not receiving medicines from public health facilities in 12 times (12.2 per cent) in Maharashtra compared to Tamil Nadu (1 per cent).

There are totally 151 skilled employees in small scale units; 223 skilled employees in medium scale units and 363 skilled employees in the large scale units of pharmaceutical industries respectively.

Likewise 168 unskilled employees are in small scale units, 229 unskilled employees in medium scale units and 302 unskilled employees in large scale units respectively. Operation and presence of economies of scale are enhancing the human resource criteria.

There are totally 151 skilled employees in small scale units; 223 skilled employees in medium scale units and 363 skilled employees in the large scale units of pharmaceutical industries respectively.

Likewise 168 unskilled employees are in small scale units, 229 unskilled employees in medium scale units and 302 unskilled employees in large scale units respectively. Operation and presence of economies of scale are enhancing the human resource management criteria. There is no specialised agency which is promoting training and skills of the employees. Target achievements are the specialization drives of the employees.

Tamil Nadu government has made a tremendous effort of creating two medi cities worth of 4,000 crores. The state is spending nearly 2,000 crores on
addition of 15 new medical colleges by upgrading District hospitals; Rs. 1,500 crores is invested for the establishment of ten new private colleges; likewise Rs. 400 crores is invested in quality improvement of public hospital institutions. Of late Rs.300 crores is invested on electronic medical record facility.

During 2011 KKR ENT Hospital and Research institute is consuming more pharmaceutical than the other competitive hospitals. This is followed by Ramachandra Medical Hospital and College and subsequently followed by Billroth Hospital and Frontier Life Line Hospital. Growing care on aged and child security are the major reasons for the increasing consumption of pharmaceuticals.

Of personnel and facilities for healthcare. Number of physician, nurses, mid wives and hospital beds per 1000 population in India were 1, 0.9, 2, and 0.7 respectively during 1990-98. In low-income countries the corresponding percentage was 1, 1.6, 0.3 and 1.5 respectively. Similarly the utilization of health care facilities in India is also lower in other low-income countries.

Trend in healthcare infrastructure available in India can be seen from table 7.21. The number of institutions imparting medical education, number of doctors, nurses and the availability of beds in hospital are much larger than before. The number of hospital beds has went up from 1.17 lakhs in 1951-9.15 lakhs in 2002 and number of doctors (modern systems) has went up from 62 thousands in 1951 to 6 lakhs 25 thousands in 2004. The number of nurses personnel climbed up from 18 thousand in 1951 to 8.36 lakhs thousand in 2004. Similarly total number of dispensaries and hospitals zoomed up from 9,209 to 38,031 during 1951-2002.
8.6. TESTING OF HYPOTHESIS

1. Government spending is reduced on public health care

2. Pharmaceutical units are contributing extensively for the promotion of health care.

3. The researcher has applied simple statistical and mathematical tools for the analysis simple linear regression is used to validate the hypothesis.

\[ Y = \infty + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \mu \]

\[ Y = \text{Government Expenditure} \]
\[ X_1 = \text{Plan Outlay} \]
\[ X_2 = \text{Duration of the Plan} \]
\[ X_3 = \text{Budget Allotment for Health} \]
\[ X_4 = \text{Public Health} \]
\[ X_5 = \text{Education} \]
\[ X_6 = \text{Total Outlay} \]

Table No.8.1. Simple Linear (step-wise Regression)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Plan Outlay</th>
<th>Duration of the Plan</th>
<th>Budget Allotment Health</th>
<th>Public Health</th>
<th>Total Outlay</th>
<th>(R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model I</td>
<td>40.72*</td>
<td>-.171</td>
<td>.125</td>
<td>-0.59</td>
<td>.005</td>
<td>.714</td>
</tr>
<tr>
<td>Model II</td>
<td>(35.678)</td>
<td>(-6.376)</td>
<td>(5.27)</td>
<td>(-2.506)</td>
<td>(.228)</td>
<td>.735</td>
</tr>
<tr>
<td>Model III</td>
<td>45.094*</td>
<td>-425.884*</td>
<td>.119</td>
<td>-0.69</td>
<td>.004</td>
<td>.748</td>
</tr>
<tr>
<td>Model IV</td>
<td>(34.795)</td>
<td>(-6.376)</td>
<td>(5.216)</td>
<td>(-3.031)</td>
<td>(.178)</td>
<td>.753</td>
</tr>
<tr>
<td>Model V</td>
<td>43.723*</td>
<td>-412.613**</td>
<td>1.807*</td>
<td>-.066</td>
<td>-0.04</td>
<td>.756</td>
</tr>
</tbody>
</table>

*1 per cent level of significant, **5 per cent level of significant.

Source: Primary Data
This study is concluded that the budget allotment on health plays an important role in the determination of demand for public health and, at the same time, pharmaceuticals also. Public and private joint venture are absent in the study. And finally investments of multinational corporations are discouraged.

8.7. POLICY FRAME WORK

- Government of India should be ready both at central and state level to meet the challenges of natural calamities like Tsunami and Earthquakes.

- Routine emergencies and emergence of bird flu should be properly taken care. Extensive research and mass awareness should be created on the importance of public health care.

- Pharmaceutical industry should widely conduct a research on the emergence of tropical diseases and suitable medicines should be found out.

- Resource management especially personnel should be identified and reserved crisis.

- Casualities in cancer and cardiac arrest and the other water borne diseases are alarmingly increasing in Tamil Nadu state. Public and private partnership is required in the arena.

- Tracking of Acquired Immune Deficiency Syndrome (AIDS) patients no doubt is difficult; anyhow, widespread publicity on medical advancement and role of governance should be clearly drawn.
• Government of India should be prepared itself for the attack of bioterrorism.

• Pregnant women should not only be immunized keeping in view of the spread of Hemagglutinin 1 Neurominidase 1 H1N1 flu.

• Health care workers and emergency service personnel should be brought into the emergency service channel to control absenteeism.

• Safer and healthier foods have almost eliminated major nutritional deficiency diseases.

• Fluoridation of drinking water has reduced tooth decay therefore; a necessary arrangement should be made.

• Recognition of Tobacco use as a health hazard and subsequent public health anti smoking agencies should be formulated.

• Still public health faces many challenges in the 21st century some of these challenges come from new forms of familiar public health problems such as infectious diseases and environmental pollution. Other is posed by efforts to change people’s unhealthy behaviour, the factor that now contributes the most to premature mortality.

• A trend toward decentralizing governmental responsibilities and authority has prompted health to adopt a planning process called “management by objectives”.

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