Project Report

"Pharmaceutical Education & Practicing Pharmacist Information Systems"

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1. Introduction

The role & contribution of the practicing pharmacist in the healthcare systems is highly well defined in the developed countries and the pharmacists play a meaningful complementary role in healthcare delivery. However, in India, the practice of pharmacy is either in primitive stage or largely non-existent. There is lack of appreciation of the role of the present day pharmacist in the society. Some professionals in India have been demanding that the standards of pharmaceutical services available to the Indian citizen should be upgraded to comparable levels in UK, USA, and Australia etc. It is also equally important to note that some smaller countries like Zimbabwe, Ghana and Kenya have been able to implement 'Good Pharmacy Practices' in their countries.

There are multiple reasons for the poor appreciation of the role of the pharmacists. Thousands of pharmacy graduates who come out from the pharmacy schools every year either choose to work in the pharmaceutical industry or move abroad for higher education; and a very negligible fraction opts for the practice of pharmacy. Those who actually take up the practice, in the areas like retail pharmacy or hospital pharmacy, are the diploma in Pharmacy (D. Pharm.) holders. The D. Pharm. course is a 2-year program; and, it is indeed inadequate with respect to the training needed to provide pharmaceutical care to the patients. There is evidence that trained pharmacists can contribute effectively to better healthcare.

This is particularly important because there is a paradigm shift from the product to the patient. In other words, the pharmacists not only should ensure medicines of the highest quality standards but also be responsible for assisting the clinicians in attaining the goals of the drug therapy. The curriculum currently being followed in the Indian colleges is largely directed to the needs of pharmaceutical industry. With the current trend of mega-mergers, India signing the WTO, emphasis on computer aided manufacturing {CAM} and the use of artificial intelligence {AI} in pharmaceutical industry, the future manpower requirements in

the industrial sector is bound to see a downward trend. And with the increasing number of colleges (& their graduates), planning needs to be done so that this manpower could be meaningfully diverted into the healthcare sector.

The half-hearted implementation of statutes relating to sale of medications has also resulted into preventing the growth of this sector of the profession. The regulatory system has not been able to effectively implement the rules and as a result, many a times, incompetent persons are handling medicine related trade and dispensing.

It is estimated that India has over 5 million registered pharmacists. Even though the average ratio of pharmacist to the population being served is comparable to the developed countries, the services provided by them are negligible or substandard. Further, there is no information as to how many of these are actually still in the profession. In the Five year plan document, there is no information of the available pharmacists in the country. Moreover, the earlier registration of pharmacists was based upon the "experience" criteria. Hence, there is all likelihood that no one indeed knows the number of the registered pharmacists who are actually practicing. It is also a well known fact that several pharmacists get registered with the state pharmacy councils, but they do not renew their registration because they opt for other careers. In this case, the numbers of the registered pharmacists reflected by the Pharmacy Council is likely to be fallacious.

Therefore, there is an urgent need to have accurate & updated information regarding the distribution profile and the services rendered by the registered pharmacists. In view of this, a need was felt to collect the relevant information and create a database incorporating the profile of the registered pharmacists in selected territories.

Finally, due to the paradigm shift from product to patient, India will need a very large number of trained manpower in the area of pharmacy practice with specialization in community pharmacy, hospital pharmacy and clinical pharmacy. To meet the healthcare requirements of the country and to be a part of the

healthcare team, the future pharmacist has to play a more meaningful role, both qualitatively and quantitatively in the coming years.

It is therefore very important to assess the supply-demand relationship for the pharmacists in the years to come. The recent report in the daily "Times of India" highlighted the demand-supply equation in relation to the doctors, dentists and the nurses in the country. Incidentally, whenever a reference has been made of the healthcare system, pharmacists have not been considered.

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India short of 6 lakh docs

Manpower Crunch At Home As Physicians Flock Abroad

Kounteya Sinha & Mahendra Kumar Singh | TNN

New Delhi: Even as India faces an acute shortage of manpower in the healthcare sector, the country holds the top position when it comes to its physicians migrating to developed countries like Britain and the US.

According to a Planning Commission report, while India is short of six lakh doctors, 10 lakh nurses and two lakh dental surgeons, Indian doctors who have migrated to developed countries form nearly 5% of their medical workforce. Almost 60,000 Indian physicians are estimated to be working in countries like US, UK, Canada and Australia alone.

India, on the other hand, has a dismal patient-doctor ratio. According to the report, for every 10,000 Indians, there is one doctor. In contrast, Australia has 249 doctors for every 10,000 people, Canada has 209, UK has 166 and US has 548.

India also faces an acute shortage of dental surgeons. At present, the number of dental surgeons registered in India stands at just over 73,000 against a requirement of 3 lakh. Similarly, the health ministry estimates that there needs to be one nurse for every 500 people. According to this, India required 21 lakh nurses in 2007. But only 11 lakh nurses were available.

This has made the Planning Commission suggest that the medical education sector should be opened up completely for private sector participation and companies should be allowed to establish medical and dental colleges just as they have been allowed to open nursing colleges.

Calling the shortage of human resources a distressing feature of India's healthcare services, the report said, "India ranks at the top of nations whose physicians are working in the major developed countries. India has also emerged as one of the top suppliers of other categories of healthcare professionals, particularly radiologists, laboratory technicians, dental hygienists, physiotherapists and medical rehabilitation workers."

The overriding requirement in the country is for increasing the supply of human resources at all levels from specialists to paramedical personnel and improve their quality.

► 'Pvt sector can help', P 9

2. Objectives

The project was undertaken with the following objectives:

1. To collect and validate the data for the manpower available and validate the already available data, if any.
2. To establish a computerized information system on pharmaceutical manpower as per their specialization, supply demand, deployment, migration etc. (a model of two states and one union territory Punjab, Haryana and Chandigarh).
3. To create a database of pharmacy education imparting institutions at all the levels.
4. To assess the mismatch between out-turn and deployment of pharmaceutical personnel.
5. To evaluate the need of training of registered pharmacists, taking their work profile and educational background into consideration.
6. To estimate the financial requirement(s) of training of such personnel, as required.
7. To assess the impact of such training on the direct healthcare costs of the society and changes in the quality of life (both direct and indirect cost).

3. Methodology

The project had two dimensions - one, the element of computing and the second one pertained to the collection and analysis of the data. The methodologies adopted for achieving the objectives are outlined below.

3.1. Creation of Web based application

The Active Server Pages (ASP) was used to create front end user interface and Microsoft access was used for the back end. Active Server Pages (ASP) is Microsoft's server-side technology for dynamically-generated web pages.

ASP file is just as same as a html file and contains text, html and scripts. Programming in ASP websites is made easier by various built-in objects. Each object corresponds to a group of frequently-used functionality useful for creating dynamic web pages. Microsoft Access as well as ASP is the product of Microsoft; therefore, they are compatible with each other. The back end & storage of all the data and the database design was made using these applications.

3.2. Data collection

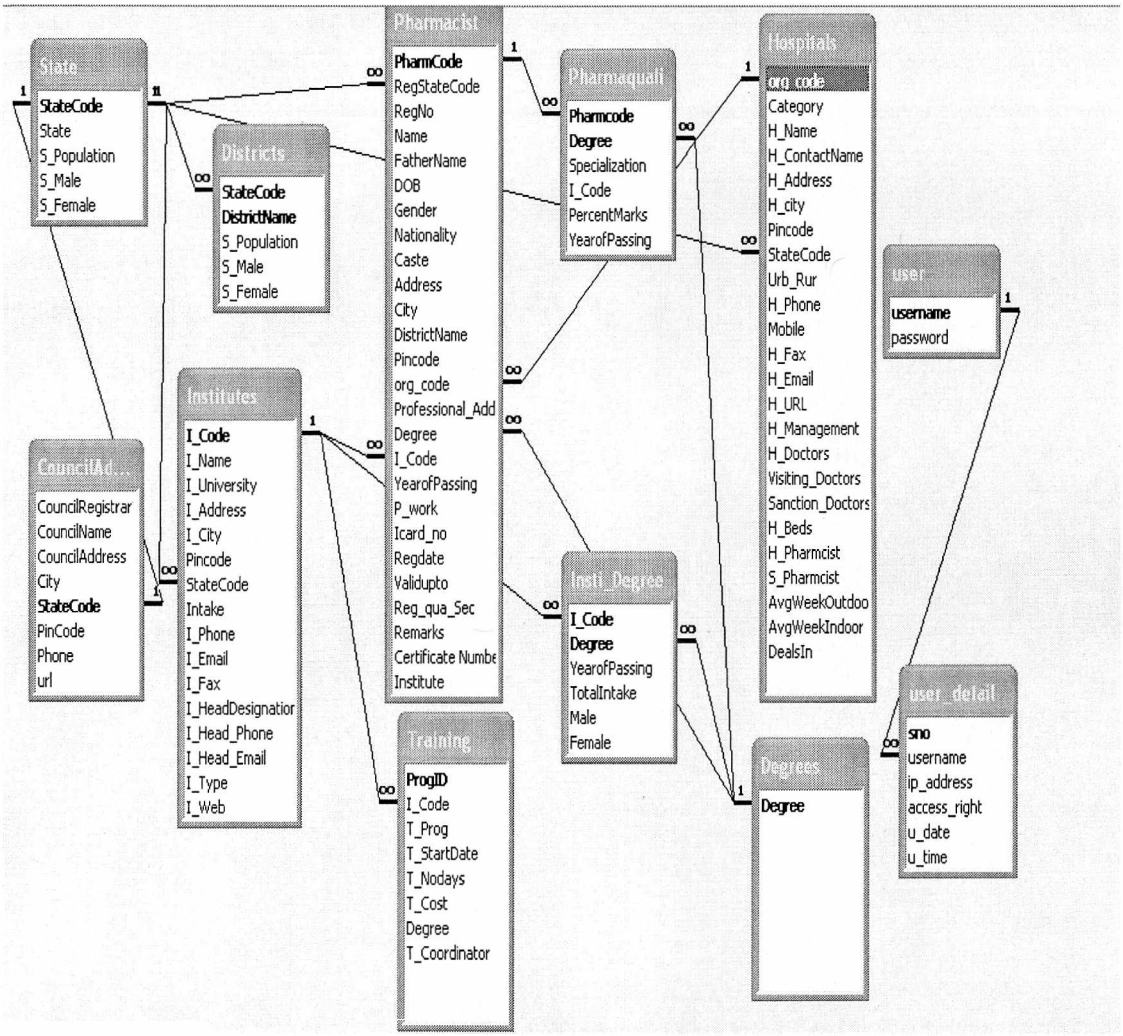
Various modes were used for the collection of data for institutes imparting pharmacy education, hospitals and the registered pharmacists. This included search in the open domain, through directories and lists. Three sets of data were captured i.e. Pharmacy Education imparting institutions, Hospitals and the Registered pharmacists. The data for registered pharmacists has been captured from Chandigarh and Delhi only. The data regarding the institute and hospitals for the proposed 4 states were collected using the web resources and verified by sending structured questionnaire to them. The data has been continuously updated in the computerized information system created.

The data regarding the registered pharmacist from the Delhi and Chandigarh was collected from Pharmacy Council of the respective states and the CD-ROM. The collected data of registered pharmacist from Chandigarh & Delhi were also verified by sending questionnaires to the individual pharmacist.

The questionnaires used for the verification/ updation of data for the pharmacist, hospitals, and educational institutions are enclosed as annexure I, II and III.

3.3. Database design

The physical design of the information system is the formation of tables. The schematic diagram of conceptual schema is given below.



4. Indian Healthcare System: A Review

According to the "*World Health Report 2000 - Health systems: improving performance*", the goals for health systems are good health, responsiveness to the expectations of the population, and fair financial contribution. This chapter deals with a description of the Indian healthcare system.

India is the seventh largest country in the world in area and second largest in population with an estimated 1,103,371,000 in 2005. The second largest population comprises approximately 16% of the world population. Only 29% of the population lives in the urban areas whereas rest of the 71% lives in the rural areas.[1] Catering to the health needs of such a large section of humanity is an awesome task. But after independence in 1947, India took up a massive programme of public healthcare based on establishing primary, secondary and tertiary institutions linked through appropriate referral systems to generate human resources needed by way of medical, dental, nursing, paramedical and complementary services personnel and pharmacists.

With India gradually emerging as a great healthcare hub due to its state- of-art tertiary care hospitals and the outcomes at par to most developed countries is now in a position to offer quality healthcare delivery at competitive costs as compared to the west. Today, a vast health infrastructure and manpower at all levels in government, voluntary and private sectors has been built up.[2] Moreover, the variety of options available in India make it distinct as it offers holistic medicinal service, yoga, meditation, ayurveda, allopathy and this is difficult to match with any other country.

This chapter details the different aspects of the healthcare system in India, namely infrastructure of health system, health insurance & manpower, medicines' availability and delivery of healthcare.

4.1: Infrastructure

Quality healthcare is vital for the growth of any nation. The key objectives of an effective healthcare system would be to enhance average life expectancy, and to improve quality of life and productivity. Over the last few decades, India's large public infrastructure and national disease control programme have succeeded in eradicating major diseases. There is also a significant improvement on our key health indicators – life expectancy, infant mortality, health & hygiene and morbidity besides the control of TB, Malaria and AIDS.

The health care system in India is characterized by multiple systems of medicine, mixed ownership patterns and different kinds of delivery structures. Public sector ownership is divided between central and state governments, municipal and *Panchayat* local governments. Public health facilities include teaching hospitals, secondary level hospitals, first-level referral hospitals (CHCs or rural hospitals), dispensaries; primary health centers (PHCS), sub-centers, and health posts.

The basic health care delivery system in India is implemented through the Primary Health Centers (PHC).[3] The public health delivery system consists of a large number of dispensaries, primary health care institutions, small hospitals providing some specialist services, large hospitals providing tertiary care, medical colleges, paramedical training institutions, laboratories, etc. (Table 1).

Table 1: Public Health infrastructure in India, 1951-2001

		1951	1961	1971	1981	1991	1998	2000
Hospitals	**Total**	2,294	3,054	3,862	6,805	11,174	NA	15,888
%Rural		39	34	32	27			22
% Private						43	57	71.2
Hospitals/ dispensary beds	**Total**	117,000	229,634	348,655	504,538	664,135	NA	719,861
%Rural		23	22	21	17			11.06
% Private						28	32	38.2
Dispensaries	**Total**	6,600	9,406	12,180	16,745	27,431	NA	23,065
%Rural		79	80	78	69			53
% Private						13	60	57
PHCs		725	2,695	5,131	9,115	18,671	22,149	22,842
Subcentres				27,929	84,736	130,165	136,258	137,311
CHCs					761	1910	2,633	3,043

PHC: Primary health centre; CHC: Community health centre

Source: Health statistics/information of India, CBHI, GOI, various years; Rural Health Bulletin, GOI 2002; National Health Policy, MoHFW, GOI, 2002

The failure to improve the health status, be accountable and responsive to people's needs or protect them for financial risk has brought into focus the functioning of the public health system underscoring its failure in fulfilling such legitimate expectations. This section is devoted to understand the causal factors that have led to such a failure. These causal factors ca be divided into three broad groups:

1. Poor goal setting and lack of formulation of strategic interventions;
2. Management Failures
3. Limited role of the state

The public health system is inaccessible, disconnected to public health goals and inadequately equipped to address people's expectations. For the majority of citizens, the public health system is out of their reach due to distance, lack of money, lack of confidence in the system or the availability of a cheaper alternative.

The segmentation of the health system into primary, secondary and tertiary, administered and monitored by different bodies, with none working in coordination, has resulted in the dilution of the concept of the integral nature of health where curative services are a continuum of the preventive and promotive health care. In 8 states, substantial investments were mobilized from the World Bank to upgrade, strengthen and establish hospitals at the district, sub-district and block levels. Under these projects, the comprehensive definition of the primary health infrastructure[4] got a further distortion with the Community Health Centres (CHCs) rechristened as First Referral Centres, divorcing them from their contextual framework.

Shortage of funds has been primarily responsible for the non-availability of facilities in accordance with the norms set by the government, and inadequate provisioning of critical inputs such as drugs, equipment, facilities such as operation theatre, etc. Due to lack of budgets and the pressure to achieve targets, several states upgraded the two-roomed subcentres to PHCs. With no place for

laboratory, examination, pharmacy, etc, most are non-functional. There are PHCs with over 33 subcentres and there are subcentres, which cover over 200 habitations. It is estimated that 25% of people in Madhya Pradesh and Orissa, and 11% in Uttar Pradesh could not access medical care due to locational reasons. [5]

4.2: Facilities

The term "Medical Technology" is generally taken to encompass the entire set of attributes associated with inputs that go into the provision of medical services. These include pharmaceuticals, medical devices, medical procedures and the organization of health services themselves.[6] In India, policy and research concern with the introduction and spread of medical technology has been limited, thus far. In contrast, in developed countries the subject of medical technology has attracted research and policy attention over a considerably wider area.

Tables 2 and 3 present data on the volume, and the value of imports of a selected set of diagnostic medical devices into India, such as CT-scanners, MRI systems, the linear ultra-sound scanner, angiograph, endoscopes and electrocardiograph (ECG). These devices have the characteristic that they are predominantly manufactured outside India, so that import flows offer a reasonably accurate picture about their pace of diffusion into India.

Table 2: Import of selected medical devices to India by volume, 1991-2003

Device Type	Three Year Totals			
	1991-94	1994-97	1997-2000	2000-03
CT Apparatus	NA	>73	206	1810
CT Scanner (NW)	113	167	181	176
MRI Apparatus	NA	78	113	807
Scanner (whole Body)	68	61	49	116
Cardiac catheters (000s)	1092.54	1000.35	1171.03	1774.93
Electrocardiogram	171	231	3713	9347
Linear ultrasound scanner	742	1135	1737	4733
Endoscopes	1862	2114	2526	9590
Fibroscopes	NA	627	1049	2691
Angiogram	NA	NA	72	176

Note: NW = CT scanner other than for the whole body; measurement units of CT and MRI apparatus are based on Indian Customs definitions. Source: Foreign trade statistics of India

Table 3: Import of selected medical devices to India by value 1991-2003 (Rupees in millions)

Device Type	Three Year Totals			
	1991-94	1994-97	1997-2000	2000-03
CT Apparatus	NA	>53.81	544.01	1647.47
CT Scanner (NW)	357.08	187.41	234.58	464.46
MRI Apparatus	NA	557.75	713.67	2687.96
Scanner (whole Body)	422.94	213.04	12.33	436.45
Cardiac catheters (000s)	542.32	473.47	1621.18	2364.04
Electrocardiogram	102.12	109.60	289.03	226.43
Linear ultrasound scanner	388.63	689.66	806.16	2477.50
Endoscopes	97.00	125.33	108.65	399.02
Fibroscopes	NA	47.55	71.53	90.42
Angiogram	NA	NA	567.05	804.11

Note: NW = CT scanner other than for the whole body; measurement units of CT and MRI apparatus are based on Indian Customs definitions. GDP deflator used to convert Rupee prices into 1883-84 prices. Source: Foreign trade statistics of India

The Indian Radiology and Imaging Association (IRIA) provides an un-sourced estimate of roughly 50 MRIs and 350 CT-scan facilities in India. Table 2 suggests that at least 931 CT-scans and MRIs currently exist in India (it included only non whole-body CT-scanners & whole-body scanners imported since 1991). Thus, the actual number of CT-scans and MRIs in India exceeds IRIA estimates by nearly 133% (Varshney 2004).

4.3: Healthcare finance system

The Indian Healthcare has made rapid strides in recent years both domestically and in global markets. India spends 5.7% of its GDP on healthcare and provides employment to 4 million people. The total health expenditure in India for the year 2001-02 was Rs.1,057,341 million, which accounted for 4.6% of its GDP. Of the total expenditure, 20.3% was public/government expenditure, 77.4% was private expenditure and remaining 2.3% external support. Overall, the per capita health expenditure for the year was Rs.1021.[7]

Indian healthcare system, today, has two major constraints that need to be addressed namely, affordability ad absence of entry barriers. By 2025, Indian population will reach 1.4 billion with about 45% constituting urban adult (15 years+). To cater to this demographic change, the healthcare sector will have to be about $100 billion in size contributing, nearly 8-10% of the GDP. By then, the 10 large national healthcare networks would be able to absorb 30% of the market share. The leaders in the Indian healthcare sector will be benchmarked to international quality and efficiency standards, besides affordability, delivery and treatment.[8]

The cashless medical insurance model will bring about a structural change in the ability to pay of the domestic patient base. Increasing urbanization, superior demographics, better health consciousness and higher life expectancy will push the demand for quality healthcare. The public sector healthcare infrastructure is unable to cope up and is facing challenges in delivering quality health care. These factors combine to create an unprecedented opportunity for the private healthcare system, which is already contributing substantially towards the GDP of the nation.

As the private sector will take lion's share of incremental revenues, the public healthcare system will face its own challenges. The public sector in India offers heavily subsidized medical care to its citizens through a large network of government-operated facilities, to which access is ostensibly free. However, it is unable to cater to the needs of large sections of the population, since the bulk of total health spending – 75 percent of the total – is accounted for by out-of-pocket expenses of households (World Bank 1995).[9]

In India, since financing of health is done from both private and public sources, the progressivity of health care financing in public sector will have to be assessed for different financing sources like direct tax, indirect tax, local tax, social insurance premiums and for private payments like direct payment for fees and medicines or private insurance premiums. In order to understand the redistributive effect, it is not only important to understand the financing mix, that is the relative shares of takes, social and private insurance premiums and direct payment, but

also find out to what degree a financing scheme is horizontally or vertically equitable.

The insurable population in India has been assessed a 250 million and at an average of Rs.1,000 per person the premium amount per year would be Rs.25,000 crores and is expected to triple in ten years. While the insurance product will dutifully reflect the demands of this colossal market and related technological developments in medicine, it should be required to extend beyond hospitalization and cover domiciliary treatment too in a big way, for instance, extending cover to ambulatory maternal and selected chronic conditions like asthma more prevalent among the poor.[10]

4.4: Manpower

The manpower in healthcare system refers to the total number of available physician, nurses, and pharmacist to serve proper and better health care to the community. The detailed information regarding the available manpower in India is as follow.

4.4.1 Physician and Nurses

The available data regarding health personnel in India shows a total of 503,900 physicians giving a ratio of 5.2 per 10,000 population (year 2004). The number of medical colleges has increased significantly over the past decades with the standard of medical education of undergraduates and postgraduates maintained at a high level.[11]

Table 4: Distribution of Health manpower (per 100,000 population)

Country	Physicians	Nurses	Midwives	Pharmacists	Nurse: doctor ratio
Australia	249.1	774.8	60.2	72.1	3.1:1
Canada	209.5	1009.9	1.2	79.7	4.8:1
China	164.2	104.2	INA	29	0.6:1
Cuba	590.6	744.2	INA	INA	1.3:1
India	59.7	79.1	47.4	52.7	1.3:1
Sri Lanka	42.8	79.1	41.9	4.5	1.8:1
Thailand	30.1	161.7	INA	INA	5.0:1
UK	166.5	496.8	43.3	58.9	3.0:1
USA	548.9	772.8	INA	68.8	1.4:1

Nurses and midwives are major health care providers. The total number of registered nurse/midwives is 607,376. Overall, there is a shortage of nurses and midwives in India. In 2004, the nurse to population ratio in India was 1:1264 while in Europe the nurse to population ratio is 1:100-200. The nurse to doctor ratio is about 1.3:1 compared to a ratio of 3:1 in most developed countries (Table 4).

The Mudaliar Committee (1961) recommended a doctor to population ratio of 1:3000. Till September 2004, 633,108 doctors had been registered with different State Medical Councils in India (Table 5). This gives a doctor to population ratio of one doctor for every 1676 population in India (or 59.7 physicians for 100,000 population). In comparison, the number of physicians per one lakh population in Australia, Canada, the UK the USA and Sri Lanka was 249.1, 209.5, 166.5, 548.9 and 42.8, respectively (Table 4).

The doctor to population ratio in India is, however, skewed; with rural, tribal and hilly areas being underserved as compared to urban areas. However, the Medical Council of India (MCI) and State Medical Councils do not maintain a live register with updated figures taking into account attrition due to death, migration outside the country, or non-practising of medicine by qualified doctors. Various committees set up by the government from time to time have recommended that data related to health manpower should be made available to facilitate manpower planning.

Table 5: Cumulative number of allopathic doctors registered with State medical Councils till 30/9/2004

State Medical Council	No. of regd doctors	Projected nos. on 1/4/2004	Regd doctors per 100000
With < 50 registered doctors / lakh population			
Haryana	1285	21,000,000	6.1
Uttar Pradesh	44,927	186,293,000	24.1
North-eastern states	15,723	49,389,000	31.8
Bihar and Jharkhand	35,110	107,362,000	32.7
Madhya Pradesh and Chhattisgarh	29,003	86,681,000	33.5
Orissa	14,712	37,520,000	39.2
Rajasthan	22,506	57,463,000	39.2
With 50-100 registered doctors per lakh population			
Andhra Pradesh	48,402	78,892,000	61.4
West Bengal	52,274	83,079,000	62.9
Gujarat	36,521	514,24,000	71.0
Jammu and Kashmir	7,993	10,716,000	74.6
Maharashtra	90,855	94,839,000	95.8
Kerala	32,412	33,444,000	96.9
With >100 registered doctors per lakh population			
Tamil Nadu	71,157	64,991,000	109.5
Karnataka	65,789	54,692,000	120.3
Goa	2,332	1,768,000	131.9
Punjab	33,705	25,526,000	132.0
Delhi	28,402	16,047,000	177.0
Total	**633,108**	**1,061,126,000**	**59.7**

Source for number of registered doctors: Medical Council of India

4.4.2 Pharmacists

There are over 5 lakh registered pharmacists in India giving a ratio of one pharmacist for 1840 population, with wide inter-state variations ranging from 1:567 in Pondicherry to 1:43,000 in Madhya Pradesh. These pharmacists could work as community pharmacists or as retail pharmacists in retail pharmacy outlets. According to the WHO, the average ratio of pharmacist to the population in industrialized countries is 1:2300.

In the public sector in rural areas, every PHC and CHC should have a pharmacist. Out of a requirement of 25,885 pharmacists for PHCs and CHCs, there is a shortfall of 25.8% in sanctioned posts at these levels; 10.7% of the sanctioned posts were vacant in 2002.

The practice of pharmacy around the world is quite diverse in most of the developed countries such as USA, UK and Australia where the pharmacist takes the responsibility of the patient in increasing the effectiveness of the drug therapy through pharmaceutical care services and they are unique blend of businessman and professional. Pharmacists, especially of developed countries, are well poised to assume the role of caregiver in rendering pharmaceutical care through health screening services.

Pharmaceutical care has been successfully implemented in developed countries through services such as blood glucose estimation, recording blood pressure, estimation of cholesterol and assessing the lung function in order to monitor the drug therapy. Health screening services are popular in European countries and Australia and these were effective in increasing medication adherence and monitoring of glucose.

Health promotion is another important activity of the pharmacists is developed countries. Health promotion activities include, smoking cessation, alcohol quitting and healthy living styles. Smoking cessation is a potentially appropriate role for pharmacists because they are encouraged to advise on the

correct use of nicotine replacement therapy (NRT) products and to provide behavioral support to aid smoking cessation.

4.4.3 Laboratory Technicians

Laboratory Technicians (LTs) are an important human resource. Although some institutions offer graduate (BSc) courses for Laboratory Technology Technicians, most institutions continue to impart a nine-month diploma course. However, in the absence of a regulatory body, there is no information on the number of diploma and graduate LTs. Any XII-standard pass student can take up this course, even students with an Arts/Humanities background in the short duration of nine months, the student, especially one with an Arts background; will not be able to acquire the skills required of him/her.

There is a need, therefore, to upgrade the training courses for LTs to graduate level B.Sc. (Laboratory Technology). There are a large number for LTs at PHCs and CHCs although as per norms, every PHC and CHC should have one. There is a shortfall of 48.9% in the number of sanctioned posts for LTs, out of a requirement of 25,885 LTs for PHCs and CHCs. Of the sanctioned posts, 15.2% were vacant in 2002.

4.5: Asian Scenario

Asia is the largest and most populous continent and it contains more than 60% of the world's population. As per location, it can be divided into six territories and regions e.g., Northern Asia, Central Asia (Kazakistan, Tajikistan etc.), Western Asia (Armenia, Bahrain, Cyprus, Georgia, Israel, Jordan, Kuwait, Saudi Arabia, Syria etc.), Southern Asia (Afghanistan, Bangladesh, Bhutan, India, Iran, Nepal, Pakistan, Sri Lanka etc.), Eastern Asia (China, Hong Kong, Japan, Korea etc.), South Eastern Asia (Bruner, Indonesia, Singapore, Thailand, Vietnam etc).

In these various regions, healthcare system depends on the development of the country. There are many undeveloped counties like Nepal, Bhutan, Afghanistan, Armenia, Tajikistan, Iran, Pakistan, Georgia, Srilanka, Bangladesh, Cambodia, Indonesia, Philippines etc. The pharmacy services are deprived in

these particular countries i.e. people of these countries don't get sufficient benefits from pharmacists as compared to the peoples of countries like Japan, Jordan, Korea, Lebanon, Singapore, Hong Kong, Qatar, China, Taiwan, Thailand, Israel etc.

The table 6 represents the total population and the total number of registered pharmacist in some Asian countries. From this distribution, the pharmacist density can be calculated which is the number of pharmacist present per 1000 total population e.g. in Kazakistan 0.67 density means 0.67 out of 1000 population.

The pharmacist ratio which is high in countries like Japan, Jordan, Lebanon, Korea is comparable with the better services provided by the pharmacist in their respective countries. The different services provided by the pharmacist are summarized in table 7.

Table 6: Asian region pharmacist density among population

#	Country	Total population	Total No. of Pharmacists	Density per 1000	Year
1.	Kazakistan	13,472,593	10,390	0.67	2003
2.	Armenia	3,330,099	126	0.04	2003
3.	Azerbaijan	3,479,127	1,842	0.22	2003
4.	Bahrain	656,397	460	0.62	2004
5.	Georgia	2,032,004	352	0.07	2003
6.	Iraq	24,001,816	13,775	0.53	2004
7.	Israel	6,029,529	4,480	0.7	2003
8.	Jordan	5,307,470	17.654	3.14	2004
9.	Kuwait	2,111,561	722	0.31	2001
10.	Lebanon	3,677,780	3,359	0.95	2001
11.	Afghanistan	27,755,775	525	0.02	2001
12.	Bangladesh	133,376,684	9,411	0.06	2004
13.	Bhutan	2,094,176	79	0.03	2004
14.	***India***	***1.045,845,226***	***592,577***	***0.56***	***2003***
15.	Iran	66,622,704	6,229	0.09	2004
16.	Nepal	25,873,917	358	0.01	2004
17.	Pakistan	147,663,429	8,102	0.05	2004
18.	Sri Lanka	19,576,783	1,066	0.06	2004
19.	Hong Kong	7,303,334	1786	0.24	2001
20.	China	1,284,303,705	359,000	0.28	2001
21.	Taiwan	22,548,009	14,769	0.65	2002
22.	Japan	126,974,628	154,428	1.21	2002
23.	Korea	NA	50,623	1.08	2000
24.	Cambodia	12,725,324	564	0.04	2000
25.	Indonesia	227,026,560	7,580	0.03	2003
26.	Philippines	84,52,639	2,482	0.03	2000
27.	Singapore	4,452,732	1,141	0.28	2001
28.	Thailand	62,354,402	15,480	0.25	2000

NA = Not Available; Central (1), Western (2-9), Southern (10-17), Eastern (18-22), Southeastern (23-27)

Table 7: Services provide by pharmacists in Asian countries

COUNTRY	Services Provided By Pharmacist													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Kazakistan	P	NA	P	P	NA	A	A	P	A	A	P	A	A	A
Armenia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Azerbaijan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bahrain	P	P	P	P	A	A	P	P	A	P	P	P	P	NA
Georgia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iraq	P	NA	P	NA	A	A	NA	P	A	P	P	NA	P	NA
Israel	P	P	P	NA	A	A	P	P	NA	NA	P	P	P	A
Jordan	P	P	P	P	P	P	P	P	NA	NA	P	P	P	P
Kuwait	P	NA	P	P	P	A	P	P	NA	P	P	P	P	P
Lebanon	P	NA	P	NA	P	A	NA	P	NA	NA	P	P	P	P
Afghanistan	A	A	P	A	A	A	A	P	A	A	P	A	A	A
Bangladesh	A	A	P	A	A	A	A	P	A	A	P	P	A	A
Bhutan	A	A	P	NA	A	A	A	A	A	A	A	A	A	A
India	*P*	*P*	*P*	*P*	*A*	*A*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*A*
Iran	A	A	P	A	A	A	A	P	A	A	P	A	A	A
Nepal	A	A	P	A	A	A	A	P	A	A	P	A	A	A
Pakistan	A	A	P	A	A	A	A	P	A	P	P	P	P	A
Sri Lanka	P	A	P	A	NA	A	A	P	A	P	P	P	A	A
Hong Kong	P	P	P	NA	P	P	P	P	A	P	P	P	P	P
China	P	P	P	NA	A	A	P	P	P	P	P	P	P	A
Taiwan	P	P	P	NA	A	P	P	P	P	P	P	P	P	A
Japan	P	NA	P	P	P	P	NA	P	P	P	P	P	P	NA
Korea	P	P	P	P	NA	P	P	P	NA	P	P	P	P	P
Cambodia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indonesia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Philippines	A	A	NA	A	A	A	A	P	NA	A	P	P	A	NA
Singapore	P	P	P	P	NA	P	P	P	A	P	P	P	P	NA
Thailand	P	P	P	A	A	A	P	P	A	P	P	N	NA	NA

NA=Not available, A=absent, P=present, 1=compounding, 2= inner city pharmacy services, 3= prescribing in pharmacy, 4= compliance device services, 5= prescription filling services, 6= physical assessment in pharmacy, 7= BP, BG, Blood Cholesterol screening, 8= Sexual health, 9= Aromatherapy in pharmacy, 10= Acupuncture in pharmacy, 11=internet pharmacy, 12=24 hour emergency dispensing services, 13= clinical pharmacy services, 14= computerized patient profile, drug interaction alert etc.

In many Asian countries like Afghanistan, Philippines, Indonesia there is very low density of pharmacists. The sufficient numbers of registered pharmacists are not available at pharmacy: therefore, there is lack of the services. On the contrary, even though the density of pharmacist is low in countries like Singapore, Hong Kong, Kuwait, but the pharmacists are able to provide the sufficient services to the public. This reflects the better management of healthcare system in these countries.

4.6: Indian Scenario

The role & contribution of the practicing pharmacist in the healthcare system is well defined in the developed countries and the pharmacists play a meaningful complementary role. However, in India, Pharmacy Practice is either in primitive stage. There is a lack of appreciation of the role of the present day pharmacist in the society. Some professionals in India have been demanding that the standards of pharmaceutical services available to the Indian citizen should be upgraded to the comparable levels in UK, USA, and Australia etc. A smaller country like Zimbabwe, Ghana and Kenya has been able to implement Good Pharmacy Practice in their countries.

There are multiple reasons for the poor appreciation of the role of the pharmacists. The number of institutions and the number of pharmacists in India are not the main problem.

The graduates who come out from degree awarding pharmacy schools every year either choose to go abroad or the pharmaceutical industry, and a negligible fraction opts for the practice. With a growing pharmaceutical industry capable of providing higher remuneration, pharmacy graduates are attracted to industry in preference over community and hospital pharmacy where the remuneration is very low. Thus, the diploma holders are the main stay in community and hospital practice and the degree-trained pharmacists take up position mostly in industry, quality assurance or regulatory and academic areas. Pharmacy education in India for the past several decades has been industry

centered. It does not meet the requirements of patient care and pharmacy practice.

If the pharmacists in India strive for social relevance, justice must be done to the curriculum. In developed countries, pharmacy curriculum (undergraduate) gives more emphasis to patient care and students spend considerable time in the community or in the hospital pharmacy. They acquire good knowledge of anatomy and physiology, biochemistry, pharmacology & toxicology, clinical data analysis, pathophysiology, drug information and interactions and social pharmacy. This kind of knowledge and skill enhancement prepares the graduates to practice confidently in the community and in the hospital setting. They also have the advantage of interacting with other health care professionals.

Harmonization of curriculum, at undergraduate level, is essential so that it will judiciously focus on industry, community and hospital settings. So that future pharmacist is prepared by knowledge centers of today to serve global market/community confidently.

In spite of these numbers of pharmacists, in India, a pharmacist has no public image. In hospitals, pharmacists are still serving as compounders rather than counselors. The pharmacists do not play any meaningful role in the healthcare of the country. Even the new Health policy of the Government of India (2002) has not recognized the services of pharmacist. This is the reason why pharmacy graduates are attracted towards the industry or abroad. Those who actually take up the practice, in the areas like retail pharmacy or hospital pharmacy, are the Diploma holders. Currently in India, the curriculum of pharmacy has very little emphasis on issues like community & hospital pharmacy, patient education and counseling and is inadequate with respect to providing pharmaceutical care to the patients.

The professional part of pharmacy education is very important. But learning and working in harmony with other members of healthcare are the immediate needs for the ideal role and social relevance of pharmacist in the health care system of our country. So, the curriculum must be revised taking into

consideration the position of undergraduate and the postgraduate to meet the demands of hi-tech pharmaceutical industry, at the same time confidently serve the requirements of patient care and pharmacy practice.

The World Health Organization (WHO) and the Commonwealth Pharmaceutical Association have also highlighted the need for a graduate level education followed by one year of practical training before one is capable of effectively performing the role of a pharmacist. The WHO has recommended that countries that have not already moved towards a University degree education for pharmacist should do so as quickly as possible. If a citizen of a country like Zimbabwe, Kenya, Malaysia, Fiji, Cyprus, Indonesia etc can get the benefit of the services of a graduate pharmacist, why should an Indian citizen receive a pharmaceutical service, which is substandard?

4.7: Other Systems of Medicine

Ayurveda, Unani, Siddha and Homeopathy are the four broadly recognized Indian Systems of Medicine (ISM). Ayurveda was defined uniquely by Charaka: "Wherein the beneficial and adverse influences leading, respectively, to happiness and misery and to life healthy or ill are described, beside the respective helpful and harmful measures are descried and quantified that system is called *Ayurveda*. It is an integral vision that retains fidelity to the fundamental principles of *gunas*, *doshas*, *dhatus* and *malas*.

The evidence-based practiced and products of other Indian systems of medicine (ISM)-Siddha, Unani, Yoga, Homeopathy, etc.-also offer unique opportunists to fulfill unmet medical needs. The Unani System of medicines has been active in India for hundreds of years. Handbooks of simple Unani remedies for common ailments have been published by the Council and can easily be referred to for integrative medicine. Yoga in daily life offers advantages of health, equanimity and longevity, which are tangible, safe and economically viable.

The current official status of ISM need a quantum jump in terms of (i) the quality of professionals, (ii) academic examination in teaching, (iii) path-breaking research and (iv) development of high performance in clinical services. Several

reports exist on the manpower, number of colleges, hospitals and dispensaries, specializations, etc. in Ayurveda, Siddha, etc. As per the provisional State-wise distribution provided by the Department of ISM and H, there are more practitioners of Ayurveda, Yoga and Neuropathy, Unani, Siddha and Homeopathy (AYUSH) than of allopathy in India. This widespread resource needs to be strengthened, retrained and effectively utilized in the national health care delivery system. Table 8 shows the profile of Ayurveda, Unani, Siddha, Yoga, Neuropathy and Homeopathy as per the Department of AYUSH Annual Report (2003-04).

The number of practitioners of Ayurveda and Homeopathy are far larger than those of Unani, Siddha and Naturopathy. This is obviously due to a much smaller number of educational facilities for these three systems. It is recommended that a task force be urgently commissioned to establish more educational institutes for the Naturopathy, Unani and Siddha systems, with appropriate leaning modules of integrative medicine (IM) useful for primary health care (PHC), including emergency obstetrics.

Table 8: Manpower and institutional profile of AYUSH in India

Facilities	Ayurveda	Unani	Siddha	Yoga	Naturopathy	Homeopathy
RMPs	432,625	42,833	17,550	0	532	201,484
Dispensaries	13,925	881	399	70	52	5,398
Hospitals	2,253	255	276	8	17	290
Bed strength	43,803	5,031	2,386	115	922	14,087
Teaching Institutions (UG)	209	36	6	-	8	180
Upgraded postgraduate	59	8	2	-	-	27
Departments						
Specialization/ post graduation	16	7	8	-	-	3

Registered medical practitioners of AYUSH in India (number)

Currently, ISM incorporates several diagnostic and other modalities of modern medicine (MM), a practice that needs to be encouraged. Ayurveda

teaching hospitals must have excellent diagnostic facilities, including imaging and endoscopy. Operation theatres and obstetric units must be well equipped and functional. All ISM practitioners need in-depth training in emergency obstetrics and first-aid care, as well as in cardiopulmonary resuscitation. Life-saving drugs, of any system, must be understood and their rational usage taught to all practitioners.

5. Analysis & Results

A computerized information system containing the information of hospitals, educational institutions and registered pharmacists was created. The total number of entries in the hospital database is 2603. The educational institute database has 987 records. The pharmacists' database has 13038 entries. In addition, the database also has address of the state pharmacy councils and the relevant portions of the Pharmacy Act, 1948.

During the course of the project, it was noted that each state council had a different mechanism for keeping the registers of the registered pharmacists. While some of them had updated the data more regularly and even digitized it (for example, Delhi), there were councils where the lack of infrastructure/manpower has led to the crippling of the day to day function.

The various sources used for the collection of data are mentioned below:

5.1. Sources of Data

a) Pharmacists

I. Delhi State Pharmacy Council – Total Number of Registered Pharmacists - 11032

II. Chandigarh Pharmacy Council - Total Number of Registered Pharmacists -2006

b) Institutes

The data was entered from Pharmacy Bulletin of the Pharmacy Council of India (2004) and the results of the web search made. In addition, various search engines were used to find the name, addresses, phone number, e-mails, web addresses, etc. of the pharmacy education imparting institutes. Some of the websites accessed were:

www.google.com	www.lycos.com	www.pci.nic.in
www.indmedica.com	www.websearch.com	www.aicte.ernet.in
www.a2zcollege.com	www.helplinedatabase.com	www.dte.org.in
www.altavista.com	www.excite.com	www.punjabgovt.nic.in
www.yahoosearch.com	www.indiastudycenter.com	www.ugc.ac.in
www.webindia123.com/career	www.medistudies.com	www.education.nic.in/higedu.asp

c) Hospitals

The information of 2603 hospitals is available in this database. The information regarding the hospitals entered in this database was obtained from the various websites listed below. The data were also collected from the CD-ROM entitled "Hospitals directory".

a) www.helplinedatabase.com
b) www.dir.indiamart.com/indianservices/s_medicl.html
c) www.indmedica.com
d) www.indiacom.com
e) www.yellowpages.webindia123.com
f) www.medindia.com (limited access)

d) Pharmacy Council Address

The list of addresses of State Pharmacy Councils was collected from the website of Pharmacy Council of India. (www.pci.nic.in/address-of-councils.htm).

5.2. Verification of collected data

For the verification of data which was entered in the database, the structured questionnaires were sent to the different hospitals, pharmacy education imparting institutions and individual pharmacists.

The total numbers of questionnaires sent to the hospitals in Chandigarh was 63. Only 27% (17 hospitals) updated their information. The total numbers of questionnaires sent to the different educational institutions of 4 states (Delhi, Haryana, Punjab and Chandigarh) were 74. Out of total 74 questionnaires sent, only 34 institutions (46%) updated their information by returning back the questionnaires with current information to the investigators.

The verification for the information available from the Chandigarh Pharmacy Council regarding individual pharmacist was performed using questionnaires. The questionnaires were sent to all the pharmacists of Chandigarh. Out of total questionnaires sent, only 261 pharmacists updated their information. Approximately, 10% (n=205) letters were returned due to the incomplete or

incorrect address. For the state of Delhi, the questionnaires were sent to 2000 randomly selected registered pharmacists. A total of 217 pharmacists (11%) returned the updated information as sought through the questionnaire. A total of 97 questionnaires were returned back to the investigator on account of non-delivery. A clear fact that emerges here is that the rate of return of undelivered questionnaires from Delhi is only half of what was noted for Chandigarh.

The investigators were unable to access the data of registered pharmacists of Haryana and Punjab. The State Pharmacy Council of Haryana has been non-functional for quite sometime and its office in Sector 17 of Chandigarh had been sealed. It has recently been reactivated and operates from a totally new location in Panchkula. The request to access the old records of the registered pharmacists could not yield results as it is understood that due to some litigation within the department, the old records have been sealed. The Punjab State Pharmacy Council was unable to support the project due to issues pertaining to the sharing of the data with the investigators.

The data obtained from Chandigarh Pharmacy Council showed a total of 2006 registered pharmacists up to year 2006. Out of these, 1102 (54.9%) pharmacists were male. The distribution is represented in the figure 5.1.

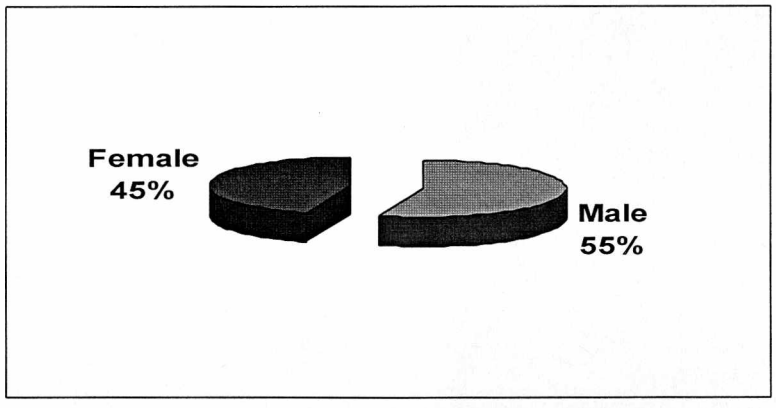


Fig 5.1: Gender wise distribution - Registered Pharmacists of Chandigarh

The population of the Chandigarh was 9,00,635 (census, 2001) and the total number of registered pharmacists in 2001 was 1566. Therefore, of 2001, one registered pharmacist of Chandigarh served approximately 575 persons. This is a

marvelously impressive statistic for pharmaceutical services. The year-wise distribution of registered pharmacists and their cumulative strength in Chandigarh is given in table 5.1.

Table 5.1: Year-wise distribution of registered pharmacist of Chandigarh

Year	No. of regd. pharmacists	Total available regd pharmacists
1985	11	11
1986	33	44
1987	90	134
1988	91	225
1989	73	298
1990	118	416
1991	96	512
1992	111	623
1993	92	715
1994	191	906
1995	20	926
1996	38	964
1997	108	1072
1998	113	1185
1999	115	1300
2000	130	1430
2001	136	1566
2002	91	1657
2003	122	1779
2004	80	1859
2005	135	1994
2006	12	2006

The data obtained from the Delhi Pharmacy Council revealed that a total of 11032 pharmacists were registered with the council upto 2006. More than 3/4th of them were male. The female pharmacists constituted only 14% of the total. The gender-wise distribution of registered pharmacists of Delhi is given in the figure 5.2.

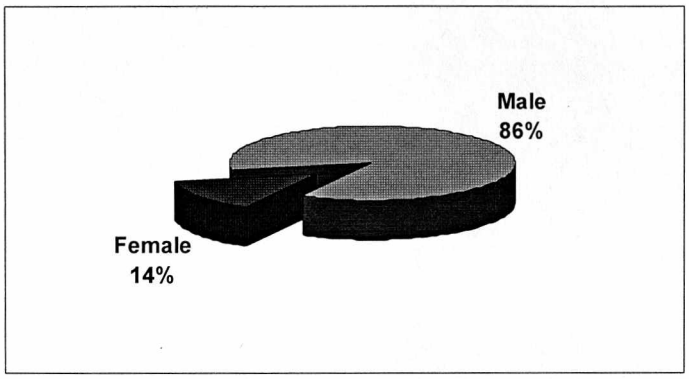


Fig 5.2: Gender-wise distribution registered pharmacists of Delhi

A comparison of the gender profiles of the two territories showed high preponderance of male pharmacists in the state of Delhi. Chandigarh fared much better in gender equality of registered pharmacists.

As per the data of the census 2001 and the electoral roll of the Delhi state Pharmacy Council (Population 13,850,507 and regd. pharmacists 7295), the number of population served by one pharmacist in Delhi was very close to 1900. This is at least three folds higher than the ratio for Chandigarh. Compared with any other data across the globe, this is an acceptable ratio. However, this mathematical ratio is highly misleading if seen in isolation. A cursory glance at the services provided by the registered pharmacists at the retail outlet will reflect the inadequacy of this number as an indicator.

In 2006, the total number of registered pharmacists had grown to 11032. One can say that during the period 2002-2006, a total of 3737 new registrations were made. On an average, 747 new registrations took place every year in this period. An analysis of the growth of the registration and educational institutions is made in the following sections.

The Educational institutions database had 987 records. This includes institutions offering Diploma in Pharmacy (D. Pharm.), Bachelor of Pharmacy (B. Pharm.) & Master of Pharmacy (M. Pharm.) courses.

The growth in the number of institutes offering D. Pharm. course and B. Pharm. Course from 1947 to 2007 is presented in figures 5.3 and 5.4, respectively.

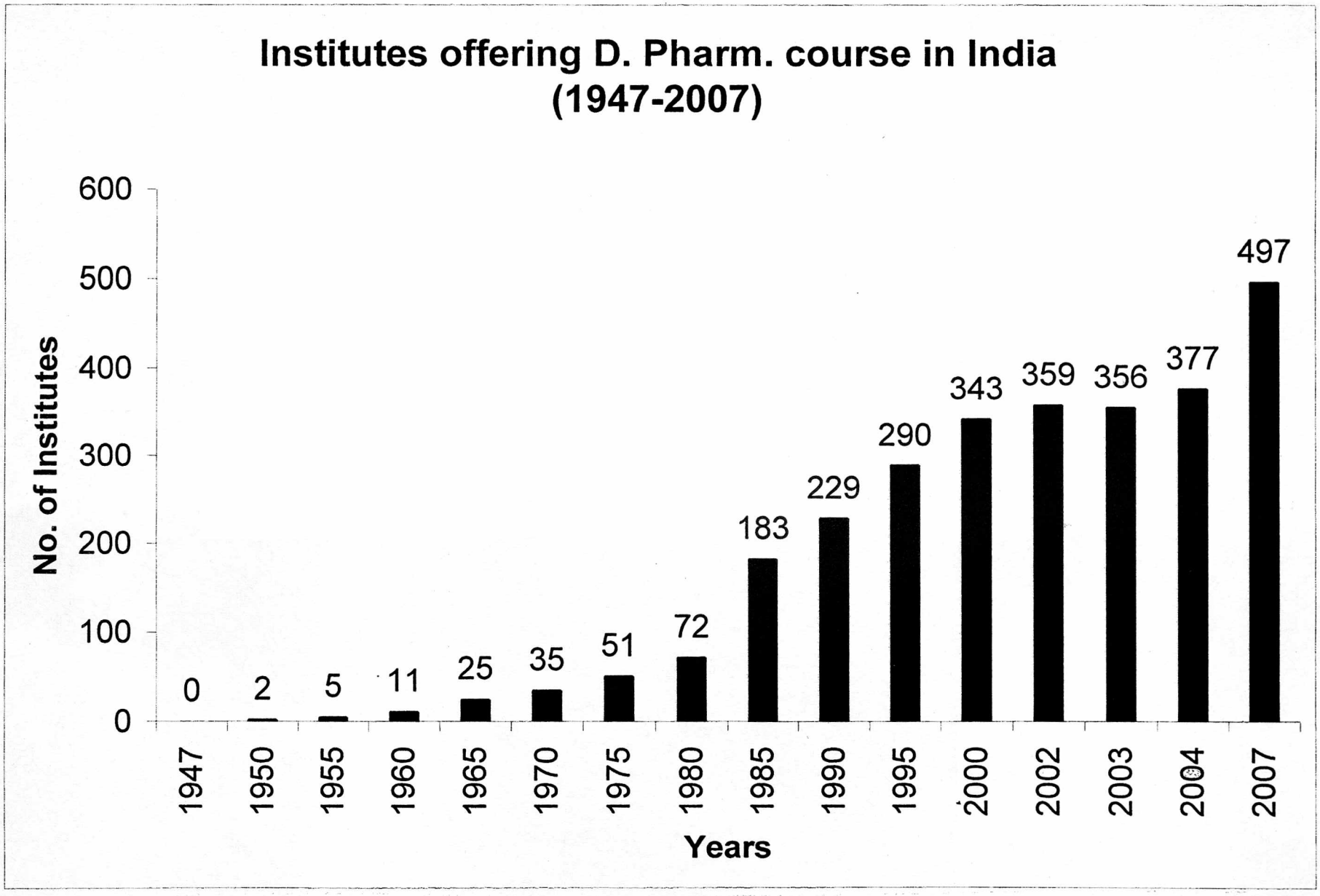


Fig 5.3: Institutes offering D. Pharm course in India

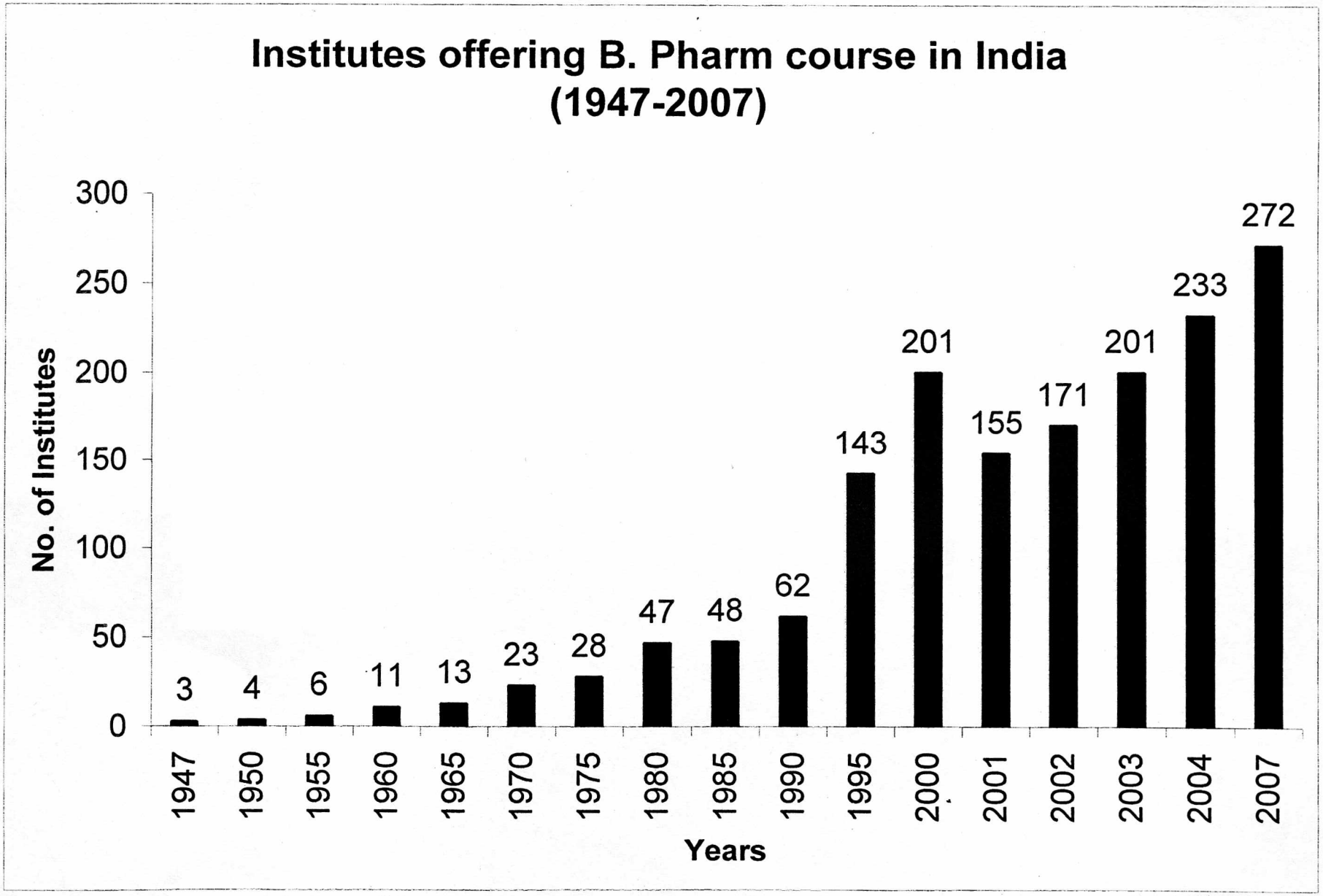


Fig 5.4: Institutes offering B. Pharm course in India

It is evident from figure 5.3 that there has been a very steep growth in the number of institutions offering D. Pharm. course in the last 27 years (from 1980 to 2007). The number of such institutions has risen from 72 (in 1980) to 497 in 2007 which reflects close to 7-folds increase. Especially remarkable is the spike of 2.5 times between 1980-1985 when the number of these colleges had risen to 183. From 1985 onwards, it has taken almost 20 years for the number of D. Pharm course offering institutions to double (377 colleges in 2004). While there were no Pharmacy Diploma Colleges in 1947, the student intake has touched 29855 in 2007.

Likewise, the growth in the number of institutions offering B. Pharm. course from 1947 to 2001 is over 90 folds (from 3 to 272). Unlike the spike seen in 1985 for Pharmacy Diploma Colleges, the Pharmacy Degree colleges have witnessed the same spike in 1995 (Fig 5.4). The number of colleges had shot to 143 in 1995 compared to 62 in 1990. In 2007, the Pharmacy Council data reflects 15465 admissions to B. Pharm. course.

In comparison to 67 students being admitted to D. Pharm. and B. Pharm. pooled together, 45320 students are admitted to these courses in 2007. This shows an increase of over 600 folds in 60 years of time. The increase in pharmaceutical manpower is indeed tremendous and planning for absorption of this workforce has to be done very judiciously.

5.3. Computerized information system

A computerized information system covering registered pharmacists of Chandigarh and Delhi, Hospitals & Educational institutions was created. A user-friendly interface was developed for this information system.

A proper authentication is given to the user i.e. the administrator who has the right to add/delete/modify a record. The administrators are given the username and password through which they will be proficient to use their rights for addition or deletion in the database. This information system provides the detailed

information of the registered pharmacists, which includes their name, address, contact number, degree and name of the state.

An appropriate SEARCH criterion is developed in the web pages to retrieve the information pertaining to the pharmacist(s), Institutes and Hospitals. The detailed information of the institutes which offer pharmacy degrees (D. Pharm., B. Pharm., and M. Pharm.) were covered in this database. The database also contains the information of 2603 hospitals/clinics on an All India basis.

This information system provides the detailed information of the registered pharmacists under 21 different fields.

The colour scheme and the layout of the current interface were revised according to the recommendations made in the Local Project Advisory Committee (LPAC) meeting.

The information system developed is a user-friendly interface to general user and the administrator. The interface page has several links, search portion and the login portion. The login page navigates the user to the different links and options.

The links given on the page are as follows:

1. About Us
2. Pharmacists
3. Hospitals
4. Institutes
5. Contact Us

The different aspects of the database are outlined below.

5.3.1. Administrator

The login is made for the administrator only. The administrator has the right to make addition, deletion and modification in the entries of this information system. Administrator can login by using correct user name and password. After login, the welcome 'admin page' will come into view which has the following specific options.

- Add
- Modify/Edit
- Delete

Using these options, an administrator can easily add, delete or modify the information. The options available in the database are given in the fig 5.5.

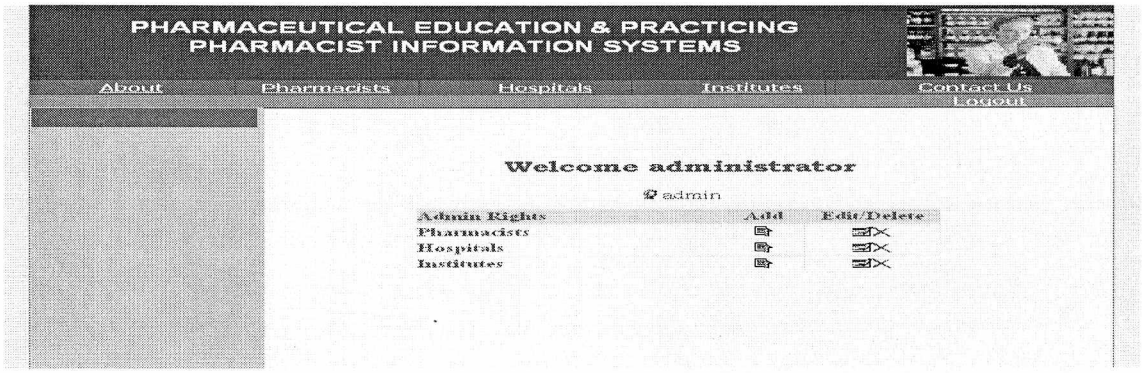


Fig 5.5: Welcome page for the administrator

Each option available to the administrator is described below.

a) Add

If the administrator wants to add a new pharmacist in the database, he/she has to click the add button. The "Add" page will show input boxes, where administrator can enter the required information. After making the addition(s), administrator clicks the SUBMIT button to complete the process. The examples of for the pharmacists, hospitals and institutes are specified below in figures 5.6, 5.7 and 5.8, respectively.

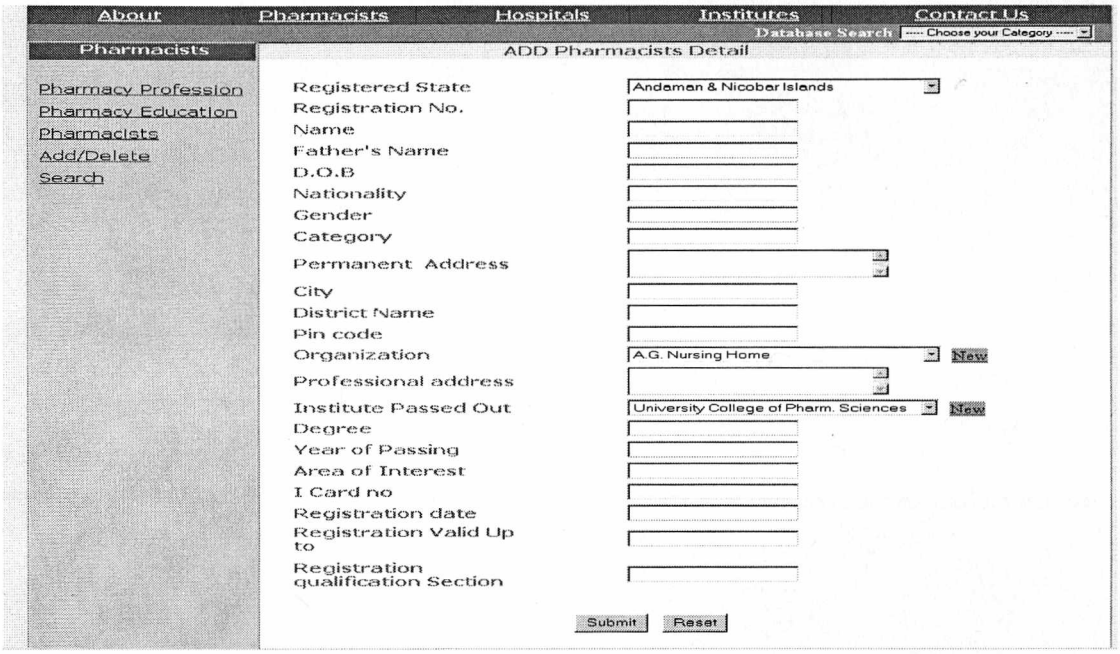


Fig 5.6: Entries available for the addition in the pharmacist details

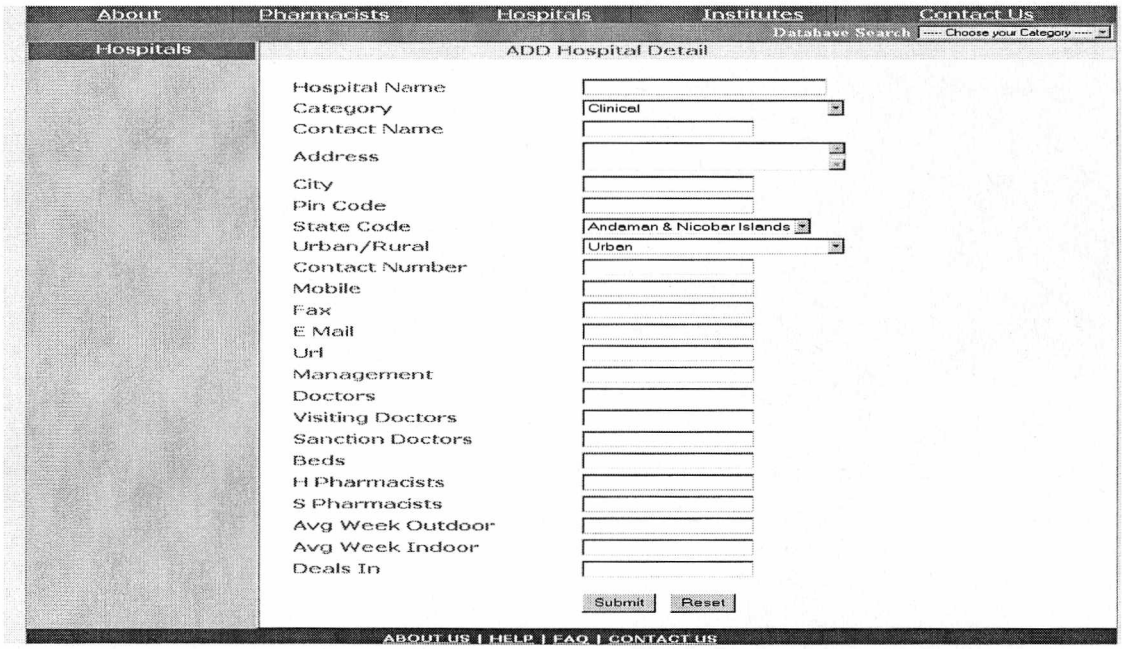


Fig. 5.7: Entries available for addition in the hospital details

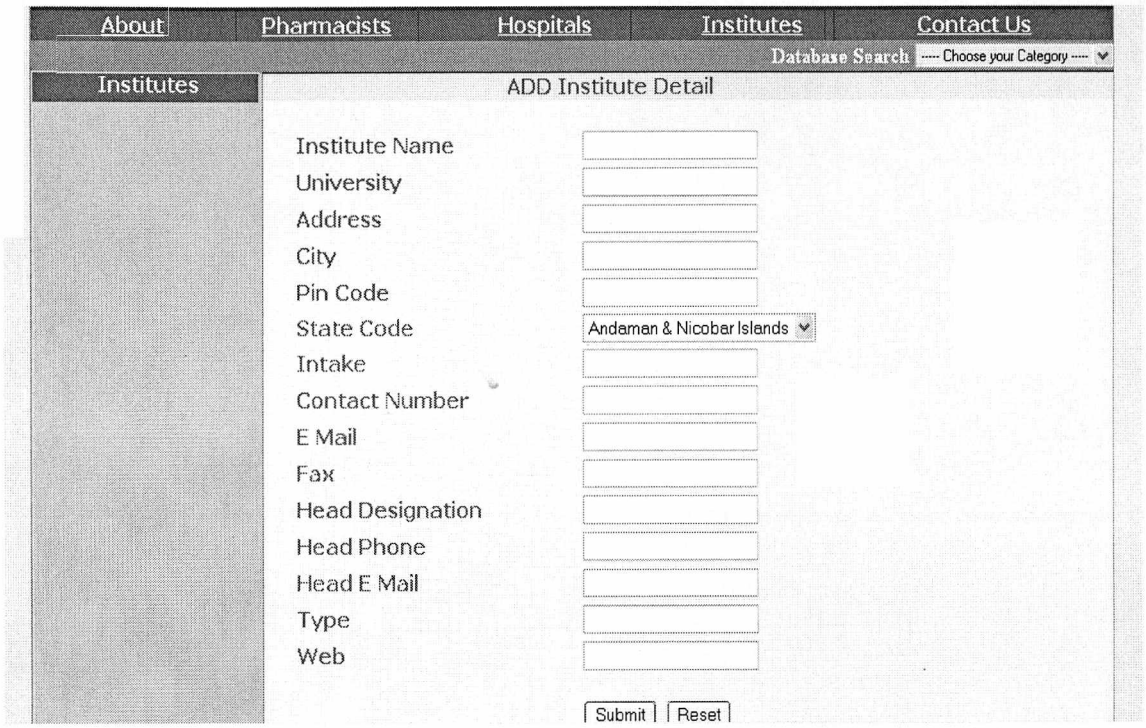


Fig. 5.8: Entries available for addition in the institute details

b) Edit/Modify

If the administrator wants to edit/modify the details of a particular Pharmacist or Hospital or Institute, then clicking the edit/modify button initiates the process. An example for Edit/Modify in the hospital details is shown in fig 5.9.

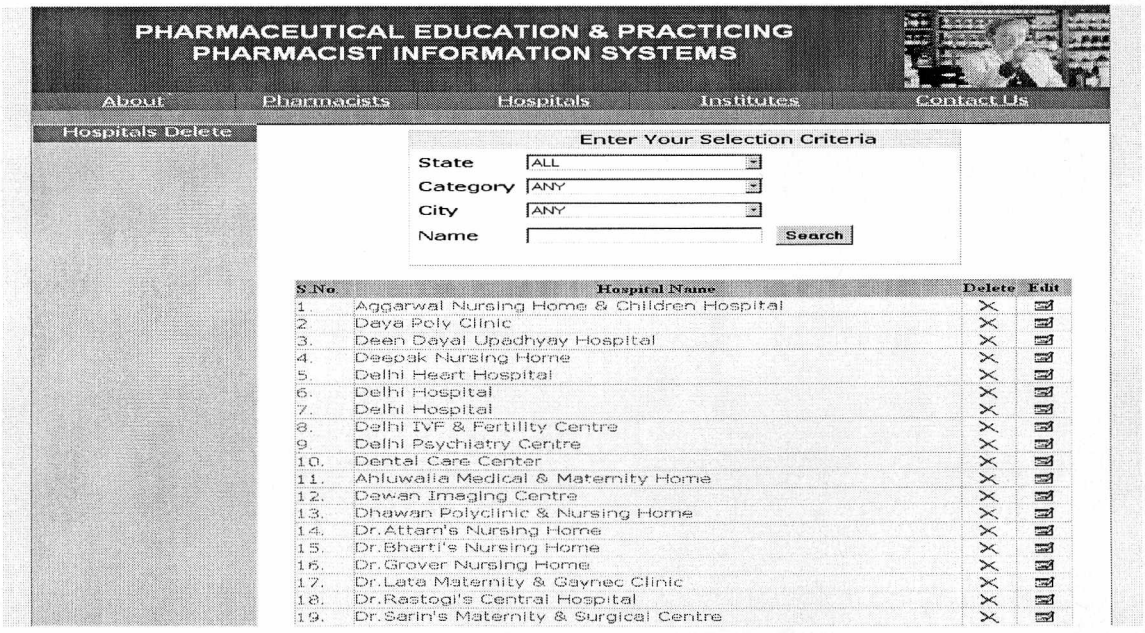


Fig. 5.9: Options available for the Edit/Modify menu

c) Delete

The Delete option deletes a selected record from the database. The data of the particular hospital, institute and pharmacist can be obtained on the basis of the search criteria require input of name or city or category or state. The stepwise deletion and addition is explained below in the form of block diagram. In the step 1, user can search all the hospital whose name start from letter "u" of the Delhi. Any particular hospital can be identified from the step 2 and clicking the provided link show the detail of the selective hospital and then deletion can be made

Step 1

Enter the search criteria

State	Delhi
City	
Category	Hospital
Name	U

Search

Step 2

#	Name	Edit	Delete
1	Uma Sanjivani Hospital		
2	Uma Sanjeevani Hospital		
3	Uma Sanjeevani Health Centre		

Step 3
Modify Hospital Detail

Name	Uma Sanjeevani Hospital
Category	N
Contact Name	
Address	1, Dakshin Marg, DLF- Qutab Enclave- II
City	Delhi
Pincode	
State Code	DEL
Urb/Rur	
Phone	350960

Mobile	
Fax	
Email	
URL	
Management	Private
Doctors	
VisitingDoctors	
Sanction Doctors	
Beds	
H Pharmcist	
S Pharmcist	
AvgWeekOutdoor	
AvgWeekIndoor	
DealsIn	
	Modify

5.3.2. General User

A general user, other than administrator, has the right only to use the links in the database and retrieve the information contained therein. A general user can use the following links:

1. Pharmacists
2. Hospitals
3. Institutes
4. About
5. Contact us

Another way of using database is the search option, using the dropdown menu:

Search the database

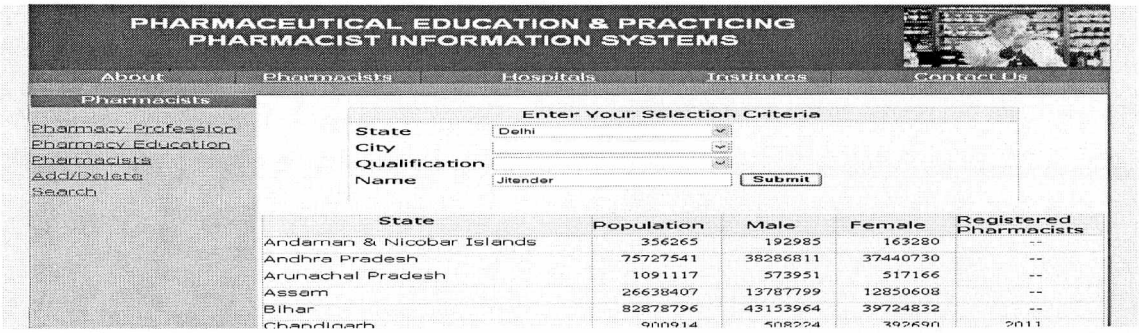
Pharmacists
Institutes
Hospitals

The stepwise information can be retrieved by using different hyperlinks which are described in detail below with suitable examples:

a) Pharmacists

The hyperlink to **Pharmacists** navigates the user to another page (The Pharmacists Query page). The number of different search options like name or city or qualification or state is given on this page. The users can retrieve all the listed information of the registered pharmacists by using search options, mentioned in step 1.

Step 1



Beside this, the page also offers information about all the states. The information are available in the form of name of the state, population, number of male & females and the number of registered pharmacists.

State	Population *	Male	Female	Registered Pharmacists
Delhi	13782976	7570890	6212086	11049
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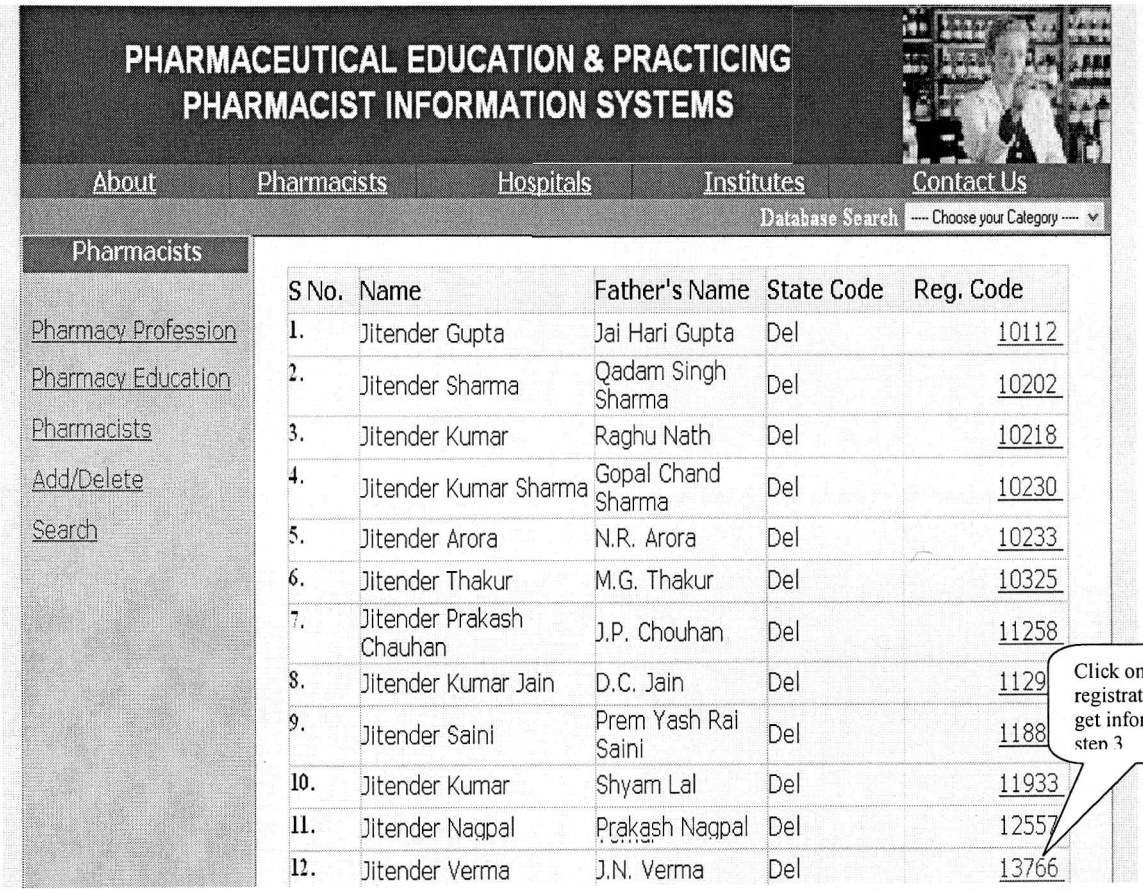
* Data from census 2001

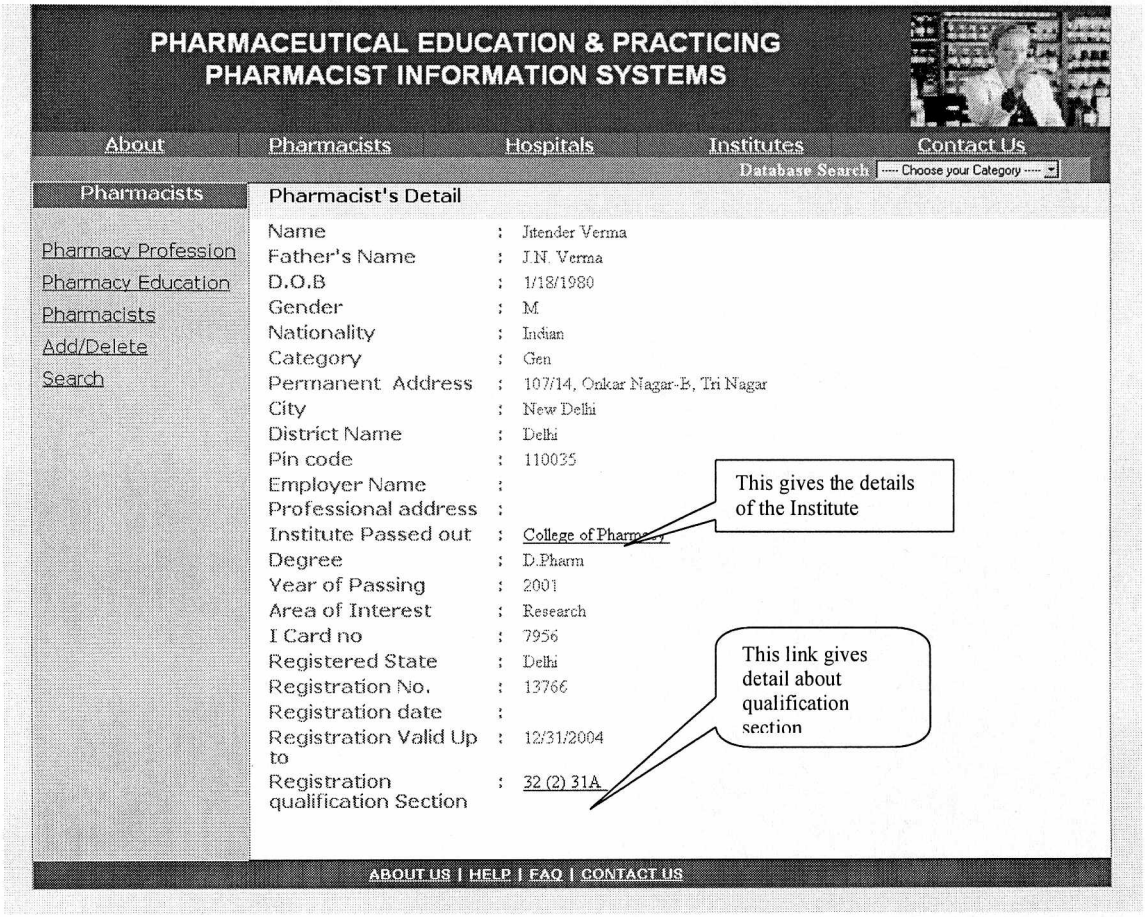
The search is based on the selected option on the search query page. For example, if the user selected the particular state as Delhi and typed (J) in the name text box, it will give list of all the pharmacists whose name starts with the letter "J". When the names appear on the page, then user can retrieve detail of particular pharmacist by clicking the registration code.

Step 2



The registration code of the particular pharmacist provides other details given in step 3.

***Step 3**



"College of Pharmacy" – Further to the Registration qualification section, provide particulars of the pharmacists and details of the section 32(2), 31A of The Pharmacy Act under which the pharmacist is registered. Further to this page user can get other information's given below:

32 (2), 31A – This link provides the information of act under which pharmacist is registered. For example, section 32 provides all information's required for registration.

b) Hospital

The other section provides wide range of information regarding hospitals of particular state through "**Hospital**" Link. This link navigates the user to Hospital Search query page which is shown in fig 5.10. This page provides search options as well as detailed information of the number of hospital per state and number of registered pharmacists per hospital & total population.

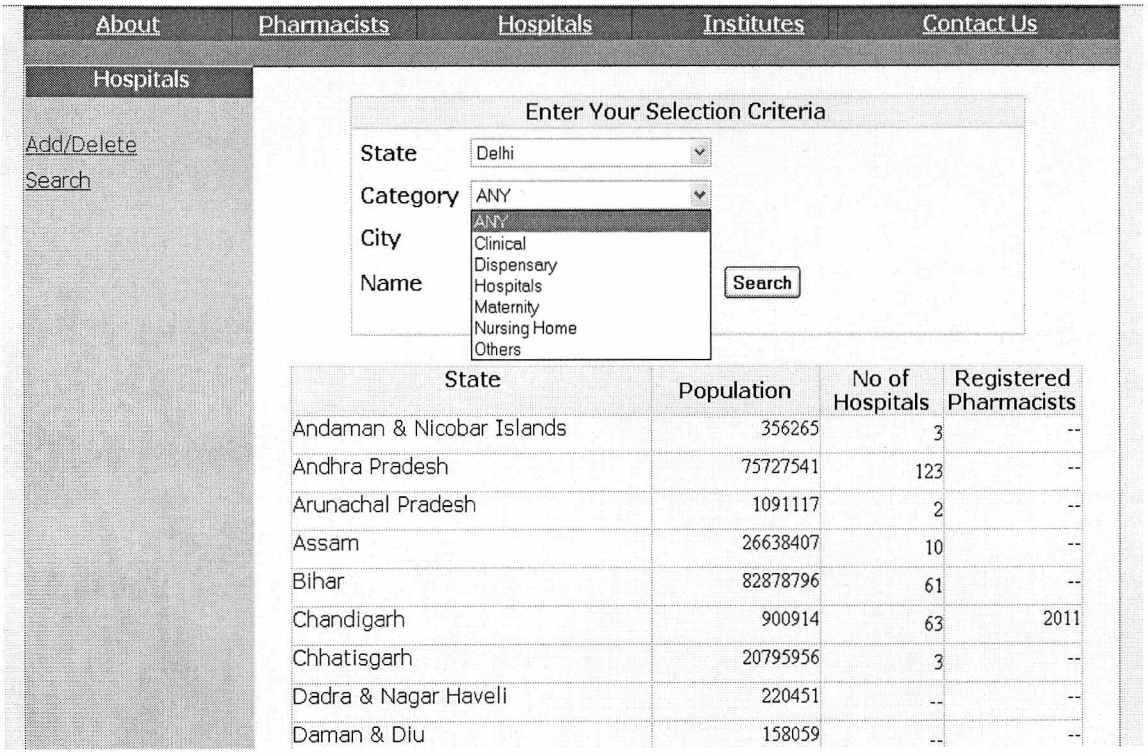


Fig 5.10: Hospital search query page

Using a search criterion, like state or category or city or name, a user can retrieve the list of the hospital mentioned in the particular category (fig 5.11). This provides the name of hospital, address and the city to which the particular hospital belongs to. The name of hospital is further hyperlinked to provide other details.

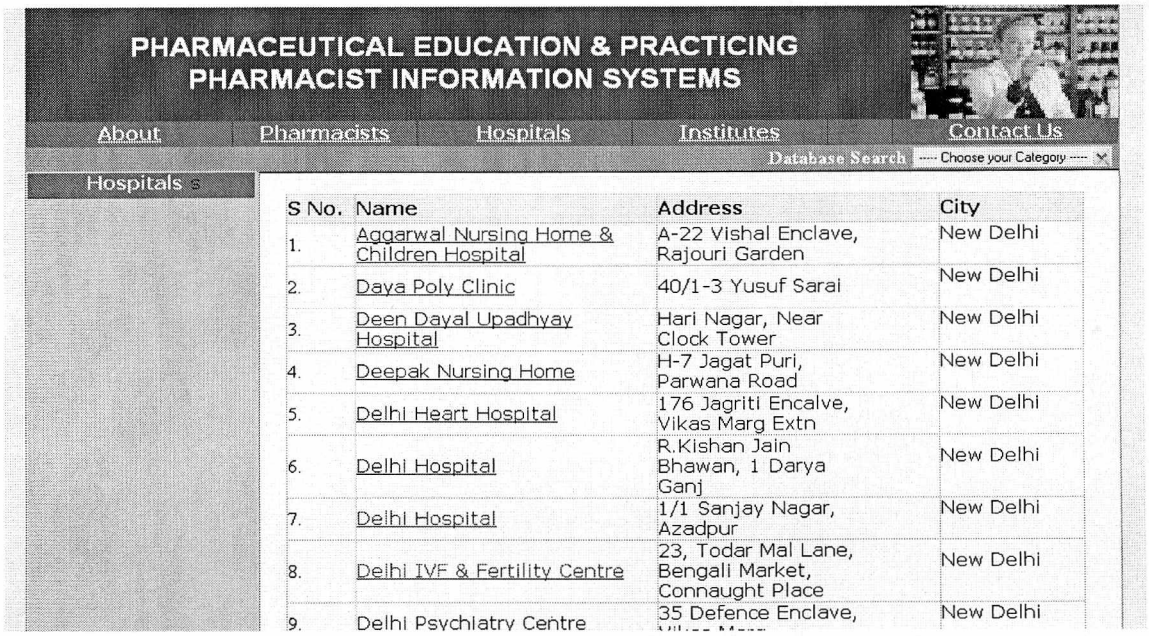


Fig 5.11: List of the hospitals

The data can be filtered by using the search strategies mention in the steps below. In first step, the list of the hospital named of the letter "U" from Gurgaon city can be obtained.

Step 1

Enter the search criteria

State		
Category		**Search**
City	Gurgaon	
Name	U	

In the "category" option given in step 1, the different categories of hospital are given and one can retrieve information about hospital of specific category.

Clinic
Dispensary
Hospital
Maternity
Nursing Home

Using specific search strategies, user can get the detailed information related to the hospitals.

Step 2

#	Name	Address	City
1.	Uma Sanjeevani	1 Phase II, Daksh Marg Mehrauli – Gurgaon Road, DLF City, Opp Central Shopping Arcade	Gurgaon

Step 2 – shows the list of the hospitals- name, address and city. The detail information's of the hospitals can be retrieve by clicking the link" Uma Sanjeevani ". This will provide information of particular hospital which is mentioned in step 3.

Step 3

Name	Uma Sanjeevani
Address	1 Phase II, Daksh Marg Mehrauli – Gurgaon Road DLF City, Opp Central Shopping Arcade
City	Gurgaon
Pin Code	122002
State	HR
Urban/Rural	Urban
Phone	0124-2350960
Fax	0124-5053775
E-mail	info@umasanjeevani.com
H_URL	www.umasanjeevani.com
Management	Dr. A. P. Singh
Doctors	45
Visiting Doctors	
Sanction Doctors	
Beds	20
H Pharmacist	
S Pharmacist	
Avg Week Outdoor	
Avg Week Indoor	
Deals in	Orthopedics (limbs)

c) Institutes

This link provides information about the different educational institutions of pharmacy in India. The front page appears on the click of link "Institutes" is shown in figure 5.12.

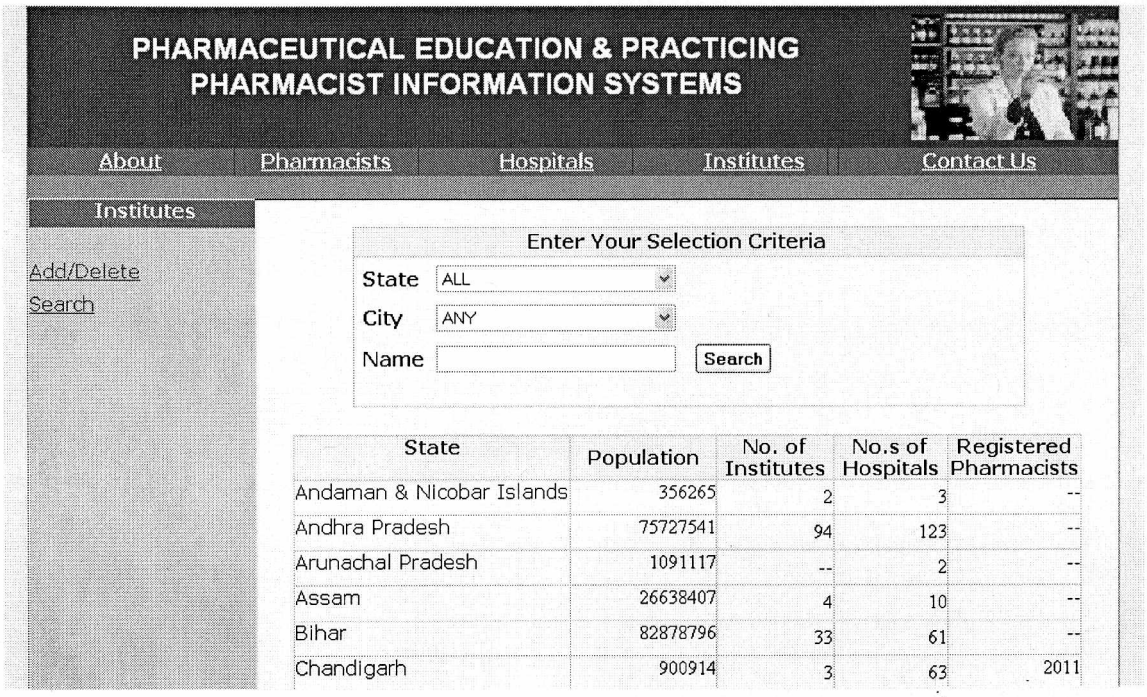


Fig 5.12: Institute search criteria page

The search criterion to retrieve the information of the various educational institutions is given in the steps below. In step 1, the user can get the names of all the pharmacy education imparting institutions of using search option of the state or city or name.

Step 1

Enter the search criteria

State

City Chandigarh **Search**

Name S

Step 2

#	Institute's Name	University	Address
1	Sri Guru Gobind Singh College of Pharmacy *	Punjab University	Sector - 26

The list of institutes will be put on view in the second step and on the click of the particular institute name; detail of the institute will be exhibit. The information will appear in the format shown in the step 3.

***Step 3**

Name	Sri Guru Gobind Singh College of Pharmacy
University	Punjab University
Address	Sector - 26
City	CHANDIGARH
Pin Code	160 026
State Code	Chandigarh
Intake	60
Contact No.	0172-2791874
E-Mail	sggscollofpharmacy@yahoo.co.in
Fax	0172-2791874
Head Designation	Mrs. Jaswinder Kaur (Principal)
Head Contact No.	9417069382, 0172-2631252
Head e-mail	jaswinderchhatwal@yahoo.co.in
Type	Diploma
Web	www.sggscollege.ac.in

5.4: Mismatch between out-turn and deployment

The study also aimed to assess the mismatch between out-turn and deployment of pharmaceutical personnel. To achieve this objective, a structured closed-ended questionnaire was sent to the different colleges. The questionnaires were sent to colleges where the college principals have been in office for a long period of time and therefore could provide meaningful inputs. Of the 25 colleges chosen for the purpose, 8 colleges completed the questionnaire and provided some leads which are discussed below.

The courses offered by the respondent colleges are represented in the table 5.2.

Table 5.2: Profile of the responding colleges

#	Courses offered	Institutions
1	D. Pharm. alone	1
2	B. Pharm. alone	1
3	D. Pharm. + B. Pharm.	5
4	B. Pharm. + M. Pharm.	1
5	D. Pharm. + B. Pharm. + M. Pharm.	4

It can be seen that there is a large variation in the pharmacy courses offered by a college. This is important because it will have reflections on the training received by the student. It is fair to accept that the colleges will have faculty members on a joint (sharing) basis and this would show in terms of the output of the college.

On the options for the diploma in Pharmacy students, it was found that approximately 2-40% of the diploma students opened their own chemist shop. The mode was found to be 20%. The diploma holders who worked in a chemist shop as an employee was in the range of 10-36%. The mode was found to be 15%. Upto 10-30% preferred to work in a hospital. Nearly one third of the D. Pharm. students (10-30%) opted for higher studies. It is a well known fact that the D. Pharm. students have an option of lateral entry in the B. Pharm. course. It was interesting to note that the D. Pharm. students from Gujarat chose non-pharmacy careers (25-63%). This might be due the enterprising nature of natives of an interest in other profession.

However, the scenario is entirely different for the B. Pharm. students. The students having B. Pharm. degree have minimal inclination towards jobs in hospital and chemist shops (close to 5%). This is a major reason behind the non-availability of B. Pharm. pharmacists in the hospitals. A very reasonable proportion of students (40%) choose the pharmaceutical industry for their career. Thirdly, a majority of students opt for higher studies (80%; upper limit). But this trend was missing in the responses obtained from other colleges.

Based upon the responses received, it appears that the proportion of students of D. Pharm. course opting for higher studies and work at the chemist shop are very close. But in case of B. Pharm students, the most preferred option is

higher studies. As expected, the M. Pharm. Students prefer to go for the jobs in pharmaceutical industry. These results only confirm the hypothesis that the prospects in professional pharmacy practice do not appeal to the students. It is also known that the education and the training of the B. Pharm. and M. Pharm. are largely oriented towards the pharmaceutical industry.

6. Summary

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5. NSS-India Health Report 2003.
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6. Summary

1. A computerized information system containing the information of hospitals, educational institutions and registered pharmacists was created.
2. The pharmacists' database has a total of 13038 entries. The data of registered pharmacists of Delhi (11032) & Chandigarh (2006) was obtained from their respective State Pharmacy Council. The data from the state pharmacy councils of Haryana and Punjab could not be obtained.
3. The data obtained from Chandigarh Pharmacy Council showed a total of 2006 registered pharmacists up to year 2006. Out of these, 54.9% pharmacists were male. In year 2001, one registered pharmacist of Chandigarh served approximately 575 persons. For verification of data captured on registered pharmacists, questionnaires were sent to all of them in Chandigarh. The response rate was close to 13%. An additional 10% questionnaire were received back due to the incomplete or incorrect address.
4. The data obtained from the Delhi Pharmacy Council revealed that a total of 11032 pharmacists were registered with the council upto 2006. The female pharmacists constituted only 14% of the total. In year 2001, one registered pharmacist of Delhi served 1900 persons. For the state of Delhi, the questionnaires were sent to 2000 randomly selected registered pharmacists. A total of 217 pharmacists (11%) returned the updated information as sought through the questionnaire. A total of 97 questionnaires were returned back to the investigator on account of non-delivery.
5. The pharmacy education imparting institutions database had 987 records. This includes institutions offering D. Pharm., B. Pharm. & M. Pharm. courses.
6. The number of institutes offering D. Pharm. in 1950 was 2 only. The number of diploma institutions has risen from 72 (in 1980) to 497 in 2007,

which reflects close to 7-folds increase. The student intake has touched 29855 in year 2007.

7. Likewise, the growth in the number of institutions offering B. Pharm. course from 1947 to 2007 is over 90 folds (from 3 to 272). In 2007, the Pharmacy Council data reflects 15465 admissions to B. Pharm. course.

8. For verification of institute's data, the total numbers of questionnaires sent to the different educational institutions of 4 states (Delhi, Haryana, Punjab and Chandigarh) were 74. Out of total 74 questionnaires sent, only 34 institutions (46%) updated their information by returning back the questionnaires with current information to the investigators.

9. The total number of entries in the hospital database is 2603. The verification of data, which is in the database, was performed using the structured questionnaires. The total numbers of questionnaires sent to the hospitals in Chandigarh was 63. Only 27% (17 hospitals) updated their information.

10. A structured closed-ended questionnaire was sent to the different colleges for the assessment of mismatch between out-turn and deployment of pharmaceutical personnel. Of the 25 colleges chosen for the purpose, 8 colleges responded sent back the updated questionnaire. Approximately 2-40% of the diploma students opened their own chemist shop. Nearly one third of the D. Pharm. students (10-30%) opted for higher studies. A majority of B. Pharm. students opted for higher studies (80%; upper limit). The M. Pharm. Students preferred to go for the jobs in pharmaceutical industry.

11. The analysis clearly demands that the pharmacy education at various levels be re-looked if the pharmacists are to become a meaningful part of the healthcare team. The state pharmacy councils need to be more cautious in maintaining the records.

12. It will be equally useful to elicit inputs from the stakeholders in the healthcare team on the envisaged role of the pharmacists in the next 25 years of time.

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Pharmacist's Questionnaire

Name: _____

Father's Name: _____

Father's Occupation: Service ☐ Business ☐

Date of Birth: _____

Address: _____

Village/City: _____

Tehsil/District: _____

State: _____ PinCode: _____

Gender: Male ☐ Female ☐

Category: General ☐ S.C ☐ S.T ☐ OBC ☐

Qualifications:

Degree	Name of Degree	College/Institute	State	Pass-out Year
Diploma				
Bachelor				
Master				
Any Other				

Present Area of Work: Hospital ☐ Nursing Home ☐ Dispensary ☐
Clinic ☐ Chemist Shop ☐ Industry ☐
Educational Institution ☐ Others (Please specify) _____

Preferred Area of Work: Hospital ☐ Nursing Home ☐ Dispensary ☐
Clinic ☐ Chemist Shop ☐ Industry ☐
Educational Institution ☐ Others (Please specify) _____

Registration No.: _____

ID-Card No.: _____

Date of Registration: _____

State in which registered: _____

Registration valid upto: _____

Present Organization: _____

Address: _____

Designation: _____

Job Profile: _____

Income (P.A. in Rs): Up to 1 Lac ☐ Up to 2 Lac ☐ Up to 3 Lac ☐

****

Healthcare Institution's Profile

Name of the Hospital: _____

Address: _____ City /Village: _____

Distt: _____

State: _____

Phone: _____ Fax: _____

Email: _____

Urban/ Rural: _____

Category: Hospital ☐ Nursing Home ☐ Dispensary ☐

Clinic ☐ Maternity Centre ☐

Others (Please specify) _____

Management (Govt. / Private / NGO / Others) _____

Number of Beds: _____

Average number of in-patients admitted in a week: _____

Average number of out-patients in a week _____

	(Sanctioned)	(In position)
No. of Pharmacists:	_____	_____
No. of Doctors:	_____	_____
No. of Visiting Doctors:	_____	
No. of Chemist Shop:	_____	

Pharmacist's Job Profile: Dispensing ☐ Manufacturing ☐ Counseling ☐

Research ☐ Teaching ☐ Regulatory ☐

Administration ☐ Others (Please specify) _____

****

Pharmacy College / Institution's Questionnaire

Name: _____

Address: _____ City /Village: _____

Distt: _____

State: _____

Phone: _____ Fax: _____

Email: _____

Director / Principal: _____

Phone: _____

Email: _____

Reference Year: 2002☐ 2003☐ 2004☐ 2005☐

Degree/ Diploma	No. of Seats	Pass out	
		Male	Female

Training Programs Conducted:

Name of Training	Type (Ad-hoc/Regular)	Place	Duration	Commencing Date	Fees

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