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Pharmaceutical Biotechnology in Bangladesh: A Background Report for a “Systems of Innovation” Review

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July 2006

Executive Summary

1. The Pharmaceutical biotechnology sector is generally viewed an industry and an important economic sector that is 'delivering'. What it actually means is that it is a very successful sector of economy which has not only caused import substitution of costly medicines; it has been a net exporter and a good foreign exchange earner for the country. Sheer entrepreneurial competence and vision of the leaders in this sector has enabled to utilise local resources (mainly human resource) to add value to the products.
2. Its contribution to addressing the needs of the local health sector cannot also be under estimated. Because, if the pharmaceutical industry was not able to make available a variety of drugs including many life saving ones at a relatively low cost, a larger section of the population living within low income bracket would be in deep misery. At the same time, one tends to ask, to what extent the industry reflects in its policies the concern about the health needs of common people? Are they driven by pure commercial interests or do they also bear some social responsibilities?
3. The prospect of further growth of the pharmaceutical industry is very good, particularly because of its LDC status which enable them to expand with export of patented drugs until 2016. In this connection the local pharmaceutical firms have established extensive international connections. But their local connections with health service delivery agencies, research and academic institutions, raw material producers and alternative medical care (AMC) institutions (i.e., Unani, Ayurved and Homeopathy) are very limited. Establishment of linkages with these local institutions and selective investment with some of them would provide additional strength and sustainability.
4. It has been suggested by some of the informants that in line with the practice in developing countries, the pharmaceutical sector in Bangladesh can also make profitable Investments in the academic development and R&D process of the local Universities. Because, ultimately, trained local human resource and innovative knowledge will offer the pharmaceutical sector a sustainable competitive edge.
5. NGOs can be a source of important knowledge and experience for the industry on public health needs and demands for innovative approaches to address them. For example, dissemination of oral rehydration therapy and distribution of ORS packets on commercial basis was developed through NGO assistance. This innovation in public health did not only save lives of many million poor people, it has earned international respect and fame for the country. Similar linkage with public health institutions and NGOs is highly recommended.
6. Bangladesh can only produce biotechnological and generic medicines upto 5% of the total need, the rest is imported. Unlike India and China, Bangladesh has been lagging behind in research and development of biotechnologies. As a result, the country is almost totally dependant on the import of such drugs and vaccines at a very high cost. It is reported that even the large and successful pharmaceutical firms do not have research

laboratories to conduct advanced research on drugs. Many of these companies have permission to produce biological drugs, yet they do not use the allowance in this respect. Linkages with the Universities in this respect may particularly produce beneficial results for them as well as the nation.

7. Enhance capacity of the regulatory agencies to verify efficacy of the drugs in the market and ensure that the consumers are not deceived. More drug testing laboratories are needed and the capacity of the Drug Administration has to be enhanced substantially.
8. There are lots of misgivings regarding the way the business of Diagnostic laboratories in the country is going. It non-transparent and exploitative method of operation needs to be brought under control to save common people from deceit.
9. Doctors' lack of knowledge and ability to independently judge and prescribe medicines. There should be knowledgeable and dependable independent bodies who would certify about efficacy or otherwise of the medicines in use. (Ref. Chowdhury p-20 bad influence of Sales representatives p-08)
10. Qualified pharmacists are in short supply, y.p-160 ZC
11. Lack of funding for research is a problem for public Universities. Support both private and public universities that will assure high quality education research.

Acknowledgements

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1. INTRODUCTION

The pharmaceutical industry in Bangladesh is euphorically termed as a “sector basking in glory¹”, citing its recent success in unprecedented growth and expansion. The sector has been achieving an annual growth rate reaching up to 20% recently. It has been exporting an ever increased volume of products to other countries after meeting about 97% of the domestic need. During 2004-05 Bangladesh fetched over \$21 million by exporting pharmaceutical products to different countries, while the previous year it was less than \$13 million (DS 17/04/06, p-8). Bangladesh now exports a wide range of pharmaceutical products (therapeutic class and dosage forms) to about 62 countries, including some of the developed economies. The products include specialised items like inhalers, nasal sprays, injectables and infusions. Over 200 firms of different sizes including a few multinational companies are engaged in the production of these drugs. Bangladesh being one of the least developed countries (LDC), it enjoys exemption from the WTO regulatory regime (Trade Related Intellectual Property Rights - TRIPS) on exporting patented medicines. About 450 generic drugs, in 5,300 registered brands having 8,300 different presentations of dosage forms and strengths are manufactured by 237 registered companies including 5 multinationals. Before 1982, when a new Drug control ordinance restricted wholesale production and marketing of many non-essential drugs, the local manufacturers produced only 20% of the total needs, which is now completely changed. The local companies are reportedly now producing such advanced drugs as anti-cancer, anti-HIV/AIDS and anti Bird Flue drugs including Kidney dialysis preparations. This is indeed remarkable and a matter of pride for a nation which is otherwise struggling to come out of a number of deep rooted social, political and economic problems. The phenomenal progress in this sector must also be contributing to alleviate some of these problems. In this study we shall try to see to what extent is it sensitive and responsive to some of the key health related problems of the country. We shall also try to see, from the perspectives of the “innovation system” (defined below) how does the sector share, exploit and promote learning between the relevant institutions?

Given the highly inequitable social and economic structure of the country, characterised by a high level of poverty for almost half of the 140 million population, the health service consumption rate for the average Bangladeshi is very low compared with other low income countries. Bangladesh has only 19 physicians and 11 nurses per 100,000 populations, whereas the average for the low income countries are 73 and 132 respectively (DS 03/07/06, p-11). Reports say that the inequitable nature of health systems in the country has made it virtually inaccessible for those who need the services most. In fact doubts have been expressed by many if Bangladesh is going to attain the health related millennium development goals, i.e., reduced child mortality, improved maternal health, combat HIV/AIDS, malaria and other diseases (ibid). Indeed, a very large section of the population is vulnerable to these health problems and they are only very inadequately addressed. We shall try to throw lights on the existing capacity of the industry and any gaps it may have in this respect.

¹ Syed Ahmeduzzaman writes in an article in the Financial Express, Dhaka (28 February 2006) with this heading and adds that the Pharmaceuticals was probably the only sector which “sees no hurdle ahead”.

Because of its amazing records of progress, the industry is now known to enjoy a favourable policy environment in the country, although some industrialists do not consider it sufficient to their needs. We shall, however, also look into the key policy issues in this respect and draw some conclusions about them.

The Conceptual Framework

This report is intended to serve as a background paper prior to conducting a survey of the pharmaceutical biotechnology systems of innovation in Bangladesh. This is part of an on going global research programme that analyses different sectors of economies using the analytical *Innovation Systems* framework. The basic idea of the framework is that the capacity for continuous innovation of a sector is a function of linkages, working practices, and policies among all actors within a sector. A culture of increased interactions between the actors should cause to flow knowledge and learning that would promote innovations. Hence, analysis of the pattern of growth, the types of actors and their roles, their competencies etc. will be carried out to see any gaps that exist in the sector. The nature of linkages between the concerned agencies and policies and policy makers - including their 'habits and practices' are expected to give policy directions for a fairer and more efficient growth of the sector. We shall basically undertake a review of the pharmaceutical biotechnology sector in Bangladesh to assess the ability of the fast growing sector to sustain and conduct innovative activities in the context of specific health needs and demands of the population and the country. This is part of a larger Asia-Africa comparison of the relevance of capacity building in the health sector so that the developing countries can and do invest in health innovation for diseases such as Malaria, Dengue, Tuberculosis and HIV/AIDS which generally affect the mass population. Following this background study of the context of the health needs and problems that affects a large section of the population, a questionnaire survey will be carried out to document the available resources and any capacity building needs of the sector. Hence, this report will try to conclude with some key questions for different stakeholders to answer or address.

Methodology

In order to produce a background review of the sector, the study made a literature probe, the list of which is given at the end of the report. The footnotes also refer to the sources of data and some explanations. Although, this is primarily a desk research –a limited field visits were undertaken to interview a few informed people. A list of people met in this connection is given in the annex. Some of our visits needed to be repeated, as the desired interviewees were either absent from the office, or required prior appointment. In some cases even follow-up visits did not produce much result. However, we have tried to collect any available literature or verbal information the office staff could part with us. Some of these have formed a useful basis of our analysis. In the process some useful contact details of the key actors in the field of pharmaceutical biotechnology have been obtained – which is going to be very useful for our subsequent field survey. In sum, we have been able to meet a couple of senior professionals engaged in public health research, a drug testing laboratory, faculty members of both public and a private Universities, spoke with the head of a pharmaceutical firm, visited an NGO operated Hospital and collected useful research materials from each of these institutions. Visit to websites of some of these institutions also proved useful in this respect. Yet, given the vast and complex network of institutions devoted to the service and

promotion of health in the country, we must admit, our (physical) coverage was far from being exhaustive. This report, however, is intended to prepare grounds for further investigations with some pertinent questions. Therefore, we shall have mention in this report the list of organisations of different categories who re directly or indirectly related to the pharmaceutical biotechnology sector in Bangladesh. We have tried to collect names and addresses of all relevant people and institutions in this respect and included them in the annexure.

Some of the limitations we encountered in our study was related to the lack of literature on pharmaceutical biotechnology sector, although there are a wealth of publications on public health and on the health sector. What we have got on the former includes some descriptive articles glorifying the expansion and growth of the pharmaceutical industry. This study would probably be one of the first attempts to present a detailed analysis of the industry using broader social and economic perspectives. The other value addition might be in the recommendations on how to promote increased innovations in the sector through changed practices and behaviour.

2. BRIEF HISTORICAL BACKGROUND

For centuries together, people of this subcontinent relied on traditional herbal medicines. Many of the traditional practices and medicines survive even today, and because of their 'natural' contents and low cost, these formulations are relatively easily accessible to the poor. The study of the genre of 'traditional' medicine in this sub-continent was quite well developed and was capable of addressing contemporary medical problems. During the middle ages, the traditional Indian *Ayurvedic* knowledge was complemented by the Unani school of medicines of the Middle Eastern origin. With the sub-continent coming in contact with the Western powers, the science of homeopathy and allopathy began to take over very fast. In the present day Bangladesh, the dominance of Western medicine and drugs is quite apparent. However, a large section of the people, particularly from the low income groups, still relies on the Ayurveic/Unani medicines and treatment. We shall seek to trace the history of evolution of modern pharmaceutical industry in Bangladesh as well as review the role of different players and their performance.

Since the Ancient Time²

The known history of Indian Medicine is said to be as old as 3,500 years since the ages of the Vedas (c 1500-500 BC). It is known as *Ayurveda*, meaning the 'Science of life'. Atreya (about 800 BC), Charaka, Susruta, and Vaghbata, were famous authorities in *Ayurvedic* medicine. Atreya, the first Indian physician and teacher was a resident of Taxila (now in Pakistan). Charaka is still the most popular name in *Ayurvedic* medicine, was the court physician (200 AD) to the Buddhist King Kanishka. Charaka's famous treatise on medicine is known as *Charak Samhita*. Susruta, a resident of Benaras wrote *Susruta Samhita*, which is known as the main source of surgical treatment of disease in the Indian sub-continent.

With the arrival of the people from the Arabian, Persian and Central Asian countries, since 600 AD, *Ayurvedic* medicine gradually diminished yielding place to *Unani Tibbi* medicines. This had the patronisation of the Pathan and Mughal kings who had subsequently secured their positions in the helms of power in the sub-continent until the British took over during the middle of the 18th century. During the beginning of the 19th century, the Homeopathic system of medicine began to spread over the subcontinent.

The leaders of the movement of freedom of India had pledged revival of the indigenous Ayurvedic and Unani medicines because it suited the cultural and environmental reality of the sub-continent. But in this part of India throughout the period of Pakistani rule saw a period of utter neglect of the traditional medicine sector – which continues till today. Over a decade after the independence of Bangladesh an Ordinance named Bangladesh Unani and Ayurvedic Practitioners Ordinance 1983 was adopted. Following the adoption of the ordinance, a national Board of the practitioners of Unani and Ayurvedic medicines was formed. In keeping with the list of its activities, the Board managed to produce two land mark publications in 1993: Bangladesh National Unani Formulary and Bangladesh National Ayurvedic Formulary. These guides

² The key source of information for this section was the *Banglapedia*, the National Encyclopedia of Bangladesh by Asiatic Society of Bangladesh, Dhaka, CD Edition 2006. Other sources are duly mentioned where applicable.

set standards for the different drugs and sets rules of practice for the doctors. However, because of their low quality of presentations and effectiveness the popularity of these 'natural' medicines did not attain the level it deserved. The sector does not seem to have the dynamism to change and adapt itself with the changing international standards and needs.

The allopathic system of medicine was introduced in the region during the British Rule of India. In the beginning, there were only a handful of trained allopathic doctors. However, as firmer administrative control over the colony was established, the British began to appoint trained English doctors and introduced changes in the health sector. Following a Royal Commission of inquiry in 1859 to inquire about large-scale death of civil population and military personnel, a commission of public health in each presidency of Bombay, Madras and Bengal were established. At district levels, Civil Surgeons were appointed as ex-officio District Health Officers.

The Drug Act 1940 and its rules formed the basis of the country's first drug legislation. Unani, Ayurvedic, Homeopathic and Biochemical medicines were, however, not brought under this regulation. Perhaps, that is how the traditional medicine got marginalised due to lack of state control or patronisation. The Christian Missionary, through their charitable establishments is also known to have played an important role in mainstreaming the modern biochemical or biomedical medicine – which was quite sophisticated and advanced in many ways. However, for majority of people, the traditional medicine continued to serve their needs.

Like all other sectors of economy, the base for pharmaceutical industry during the Pakistan period was only developed at the Western part of the country deliberately leaving the Eastern part (Bangladesh) weak and underdeveloped. Bangladesh was treated as a market for the finished pharmaceutical products produced either in Pakistan or imported from European and American countries. Towards the end of 1971, the new Bengali state of Bangladesh emerged with a huge burden, among other things, of treating an unusually high number of wounded and emaciated people retuning home from the war fronts. It was an uphill task for the new nation, which was drained of its resources by 25 years of exploitation by the Pakistani regime and a costly war of independence that claimed an estimated 3 million lives, to provide means of sustenance. In response to the humanitarian disaster created by all of these, a massive dose of medical supplies begun to pour in to the country. Public medical centres and private charitable clinics dispensed these free medicines even in remote rural areas, where people hardly ever had access to allopathic treatment or medicines before. According to critics, this had created a dependency of common people on Western medicines only to make way for the multinationals to market their products in the country. Although, Bangladesh could not resist the penetration of the global market forces for long, it cannot be denied that the emergency situation created in the early seventies had hastened the process. Indeed, the period was rapidly followed up by a massive expansion of pharmaceutical market with many unnecessary drugs along with the necessary ones. The situation prior to the promulgation of 1982 Drug control Ordinance will amply testify this.

A Turning Point: It is quite a paradox that when the new Drug (Control) Ordinance 1982 was promulgated at the backdrop of high cost of medicines and a plethora of unnecessary drugs that were draining the purse of common citizens, a section of the pharmaceutical industry did not appear to welcome it.

Even many consumers of some of those so called “popular” formulations (e.g., ineffective vitamins, tonics and syrups often with high (40%) contents of alcohol in them) were found unhappy at the ban of these 1,742 drugs out of 4,340. Many of these banned items were imported or produced by the multinational companies in Bangladesh. Most physicians in the country were disappointed that they had to prescribe medicines from a smaller list of 248 basic drugs following a WHO recommendation for developing countries³. However, the benefit was immediately apparent to the common people as the price of the drugs was dramatically reduced and people begun to making savings from their expenditure on health. More importantly, within a few years time, the local entrepreneurs and the existing local firms set out to produce many essential drug formulations including antibiotics at much lower costs than before. This turning point is actually termed by some people as a “Revolution” in the health sector (Sarker, MMR, 2006)⁴.

Although in 1981, there were 166 licensed pharmaceutical manufacturers in the country, 75% of the products were marketed by the 8 multinational companies. The value of locally produced medicines rose from Tk.1.1 billion to Tk.28.42 billion in 2004. The local production of medicines is heavily dependent on imported raw materials though, the increased addition achieved is not a small gain. According to a 2000 statistics, there were 1,495 licensed drug wholesalers and 37,700 drug retailers in the country (FE, 28/02/06). The history of export of pharmaceutical products from Bangladesh actually saw its beginning within a few years before the close of the decade of 1980. It indeed is a glorious example of how an import dependant country so quickly turned into an exporter. There are of course other supporting factors also responsible for this achievement. For example, the opening up of the market, reduced import tariff on production of exportable and import substitutes etc. Although, it is claimed by the industry stalwarts that right at the beginning, they received no incentive from the government; it was purely their own initiatives by which a few of them started exporting to the neighbouring counties like Nepal and Sri Lanka.⁵

The following is a list of some of the important Actions Taken in the Health sector over the last century.

LIST OF MAJOR ACTIONS ON HEALTH CARE DURING 20TH CENTURY

1901	Establishment of <i>Ayurvedic</i> medicine factory Sakti Oushadhalaya in Dhaka.
1912	Full-fledged education and Health Department was created.
1914	Establishment of Sadhana Oushadhalaya in Dhaka.
1919	In the Administrative Reform Act of Montage Chelmsford, the responsibility of health, sanitation and health statistics were bestowed on the provincial government.
1930	Simon Commission recommended the formation of a central health board for coordinating and even development of health services in different provinces.
1930	All India Institute of Hygiene and Public Health was established in Calcutta, the capital of Bengal, with the financial assistance from the

³ Chowdhury. Zafurallah. 1996. *The Politics of Essential Drugs*. University Press Limited, Dhaka, Bangladesh. P-59/63/65.

⁴ Sarker, MMR, 2006. *Pharmaceutical Sector in Bangladesh: Opportunities and Obstacles*. The Pharma World, Vol I, Issue I, June 2006, p-19.

⁵ Hasan, Nazmul 2006. *Post WTO Opportunities in pharmaceuticals*. The Financial Express (FE) p-17, Special Supplement, Focus on Pharmaceuticals, 28 February 2006

	Rockefeller Foundation.
1943	In the backdrop of Second World War and the famine, the Government of India appointed a committee under the leadership of Sir Joseph Bhore for survey and development of health services. The Bhore Committee Report used the term comprehensive health care for the first time in India in 1946. By comprehensive services, the Bhore Committee meant provision of integrated, preventive, curative and promotional health services to every individual residing in a defined geographic area.
1946	Dhaka Medical College was established.
1950	Pakistan Legislative Assembly passed Conscription Act thus making obligatory for doctors to serve in the government health sector.
1953	Establishment of Shahid Suhrawardy Hospital.
1967	Institute of Post Graduate Medicine and Research (IPGMR) was established.
1981	RIHD (<i>Pongu</i> Hospital) and Shishu Hospitals were established.
1999	Bangabandhu Sheikh Mujib Medical University was established.

During 1980s Shahid Suhrawardy Hospital complex accommodated the National Institute for Cardiovascular Diseases (NICVD) and National Institute for Ophthalmology. National Institute of Preventive and Social Medicine (NIPSOM) was also established in late 1980. However, Institute of Diseases of the Chest and Hospital (IDCH), Infectious Disease Hospital (IDH), Institute of Public Health, and the Cholera Research Laboratory were established in Dhaka between 1960 and 1970s. During 1980s the Cholera Hospital became International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDRDB). Around this period the Bangladesh Institute of Research on Diabetic and Metabolic Disorders (BIRDEM) Hospital of the Diabetic Association came into being. [Maswoodur Rahman Prince, Banglapedia, 2006]

Status of Healthcare

Bangladesh has come a long way since its independence in 1971; its economy has attained a respectable level of growth, modern healthcare systems have been introduced and the pharmaceutical industry has grown into an internationally competitive sector. Yet, the hard fact is the health care facility for the majority poor has remained as elusive as before. Because, the public health care system did not create an equitable distribution of health services, despite the firm pledges the nation made to meet this basic need of the population. The health chapter of the Fourth Five-Year Plan (1990-95)⁶ began with the theme that access to health is a fundamental right of a person. The Fifth Five-Year Plan (1997-2002) states: 'Providing medical care is the constitutional obligation of the government'. In response to the changing health situation of the country, reforms in the health sector, particularly in the areas of management structure, service delivery mechanisms and utilisation of both public and private sector resources are called for urgently.

During the last decade or so, the spectrum of health situation in Bangladesh has changed as can be imagined from the changing global scenario. The major contributors to these changes are rapid population growth, increasing urbanisation

⁶ All Five Year Plans were produced by the Planning Commission, under the Ministry of Planning of the Government of Bangladesh. The Fifth five Year Plan (1997-2002) was the last plan produced in 1998. This has now been replaced by the 3years poverty reduction strategy paper titled as "Unlocking the Potential: National Strategy for Accelerated Poverty Reduction", General Economics Division Planning Commission, Government of Bangladesh, Dhaka.

and major shifts in disease patterns prevailing in the country. Resurgence of Malaria, Kala-Azar and other emerging and re-emerging diseases such as Dengue, Filariasis, and Tuberculosis are a few examples of these changes. At the same time, the risks of Sexually Transmitted Diseases (STDs), Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS), and other infectious diseases are threatening to cause a serious blow to its delicate socio-economic existence. Increased arsenic contamination of the sub-soil water in many areas of the country also poses a potential danger to public health. Diseases related to metabolic disorders, malnutrition, tuberculosis, reproductive health, diarrhoea, respiratory tract etc continue to influence the health status of the population (Bangladeddia, op.cit).

This is however, also true that the health situation of the population in some of the other areas has improved quite remarkably. Smallpox, Cholera and malaria have been eradicated or at least within control. Life expectancy rose from 45 in 1970 to 64.9 in 2003. The following table gives some of the relevant key social and economic indicators of Bangladesh:

ITEM	1985	Latest Year
Population		
Total Population (million)	97.5	140.5
Annul Population Growth Rate (% change)	2.1	1.3 (2004)
Annual Labour force Growth Rate (Average % 1998-04)	--	2.2
Social and Health Indicators		
Total Fertility Rate (births/woman)	4.7	3.2 (2003)
Maternal Mortality rate (per 100,000 live births)	--	320 (2003)
Infant Mortality Rate (below 1 year/1,000 live births)	112.0	53.0 (2002)
Adult Literacy Rate (%)	33.0	49.6 (2002)
Primary School Gross Enrolment (%)	63.0	97.3 (2003)
Child Malnutrition (% below age 5)	70.0	48.0 (2002)
Poverty		
Poverty Incidence (91 to 2000)	58.8	49.8 (2000)
Percent of Poor to Total Population (91-2000)	58.8	49.8 (2000)
Urban poor (million) (1991-2000)	7.0	12.0 (2002)
Rural Poor		
Income and Growth	2000	2004
GDP per capita (\$, current)	368.0	418.0
GDP per capita growth rate (average annual)	1.6 (84-94)	4.4
GDP Growth Rate (%)	5.9	6.3
GNI Per Capita (Atlas Method US\$)	370 (2001)	440
Agriculture Growth Rate/Annum	7.4	4.1
Industrial Growth Rate	6.2	7.6
Services Growth Rate	5.5	5.7

Source: Compiled from ADB Country Strategy October 2005 and The World Bank Bangladesh Country Assistance Strategy, 2006, World Bank, Dhaka.

3. THE HEALTH PROFILE

The following gives a critical portrayal of the sector with its inadequacies in the face of a complex and massive nature of health problems of the population. We shall see how the existing pharmaceutical biotechnology resources in the country are being used to address the needs of the people and what can be done to improve the situation. The following review is based on primary healthcare need perspectives, keeping in mind the toiling masses rather than the richer urban population and responses to their advanced healthcare needs.

Medical Practitioners: About 40 percent of the population has access to modern primary health care services. Although the figure would be higher if the family planning and immunisation services are included. There is approximately one self-employed private health practitioner per 1,000 people in rural areas of the country. The figure since 1981 does not seem to have changed very much. Referring to the estimates by Claquin, 1981, Perry⁷ estimates that there are about 220,000 private health care practitioners in the country, and most of them are without medical degrees - but prescribe allopathic drugs, including antibiotics. This group of practitioners constitutes 38% of the total group of rural private practitioners. The next largest group is the 24% practitioners of Homeopathic medicines. Allopathic practitioners with proper medical (graduation) degree (MBBS physicians) constitute only 3% of the total. Other practitioners include traditional birth attendants, Ayurvedic or unanic practitioners and spiritual healers (*Fakirs, Sadhus, Pirs etc.*). According to an estimate there are 13 unqualified allopathic practitioners for one qualified physician in the country (Perry, op cit). The reason for their 'popularity' lies in their flexible fee rate - depending on the ability of the patients and their overall approach with the patients which is mixed with fellow-feeling, (blind) trust, knowledge of local belief systems on the 'unknown' or supernatural powers etc.

Over 90% percent of births occur in the homes in Bangladesh, with about 8% of births are attended by qualified doctors or nurses. There are over 52,000 registered traditional birth attendants who attend to about 8% of births, while 57% of births are attended by un-trained traditional birth attendants and 26% of births are attended by women relatives. Over 85,000 drug outlets in country not only sell (mainly allopathic) medical products, the sales persons often provide health advice and treatment – sometimes even with antibiotics.

According to the 1991 census in Bangladesh, 45 percent of the population was below 15 years of age, 52 percent was between 15 and 64 years, and 3 percent was aged 65 years or more. By 2001, the number of married women of reproductive age rose to about 31 million. Although recent estimates indicate relatively lower mortality rates for infant (82/1000 live births), under five children (116/1000 births) and pregnant mothers (about 5/1000 birth), they are still high by international standard. Half of the babies born in Bangladesh are of low birth weight (LBW). Among the new born, 30% receive supplemental foods or feeds when they are less than two months of age. Diarrhoea, respiratory ailments, and different forms of fever are common types of childhood illnesses. Over 50% of children aged less than five years show evidence of stunted growth due to ill health and malnutrition (Banglapedia, 2006).

Seventy three percent of pre-school children in Bangladesh are reported to be anaemic. Older children also manifest high prevalence of anaemia (40-74%). Most

⁷ Perry, B., Henry. 2000. *Health for All in Bangladesh - Lesson in Primary Health Care for the Twenty- First Century*. University Press Limited, Dhaka, Bangladesh

mothers (75%) do not receive antenatal care and 57% of the births are assisted by untrained traditional birth attendants. Like young children, malnutrition is also a serious problem of mothers in Bangladesh. Seventeen percent of mothers with children under five years are less than 145 cm in height, an indication of malnutrition. Many of them are acutely malnourished. A high prevalence (52-60%) of anaemia has been observed among women of reproductive age. At least 22 percent of women in rural Bangladesh suffer from reproductive tract infections (RTI). In addition to these problems, 10 percent of country's population have blindness, deafness, mental retardation, and other forms of physical disabilities. Disabled individuals including many young children suffer from loss of productivity, depressive manifestation and loss of self-esteem.

The Role of Ayurvedic and Unani in Health care:

In order to ensure production and sale of alternative medicines of a high standard, the Drug Administration of the government of Bangladesh is responsible to monitor production and marketing of the products, while the Board of Unani and Ayurvedic Practitioners is to produce and update Formulary or Pharmacopia. In 1993, two separate Formulary for Unani and Ayurvedic were produced. There is serious shortage of research studies and relevant literature in this field of medicine which needs to be urgently filled (Ahsan Ullah, HSM. 2002)⁸ Moreover, it does not appear that this sector of medicines in Bangladesh has any effective linkage with developments in this field in other countries of the world. The Chinese, Korean and Indian herbal medicines are now coming into the country with an ever increased volume. Because of their quality of presentations and publicity, they are gaining grounds while the local industry is losing out. This is in sharp contrast with the allopathic system of medicine and the pharmaceutical sector in Bangladesh which flourishing under global competition. Development of the Ayurvedic and Unani medicines in keeping with the modern needs and demands. With a thoughtful and scientific approach, it can actually play a complementary role in the public health care system.

At present there are 10 Unani and 6 Ayurvedic (government recognised) educational institutions and health centres in the country. A list of the these institutions is given in the Annex No.??.

The Institutional Profile of the Public Healthcare Sector

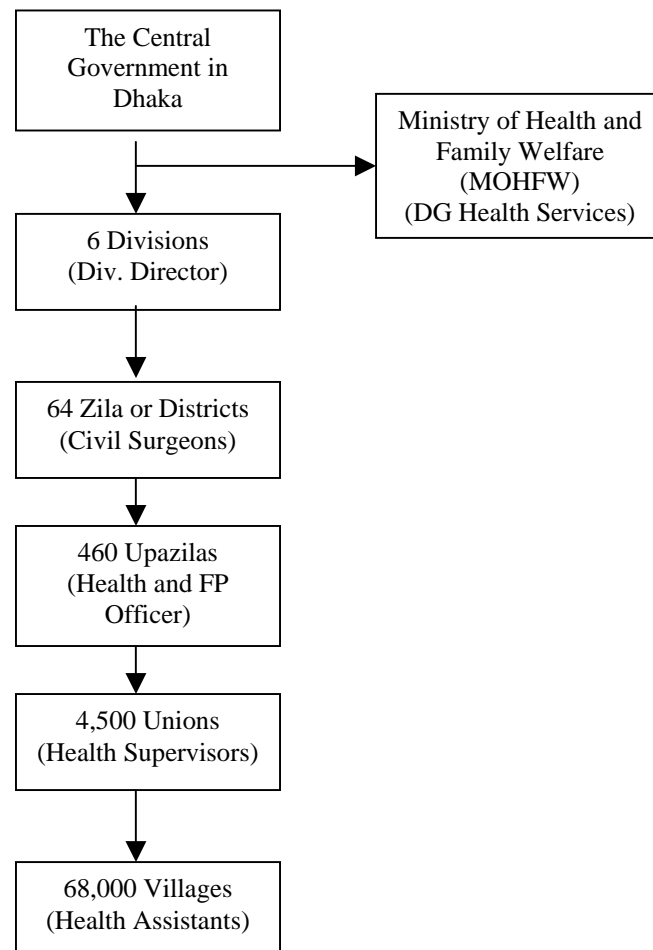
The basic administrative structure of the Bangladesh is as follows. It is divided into 6 Divisions, which includes 64 Districts, 460 Upazila, 4,500 Unions Parishads, (app.) 40,500 Wards and 68,000 Villages, excluding the Municipalities and City Corporations. The flow chart in the next page shows the hierarchy of the administrative units of the country and how the health service delivery channel is linked with them.

The Ministry of Health and Family Welfare (MOHFW) has two major Directorates through which the major health related policies and operations are carried out. They are the Directorate General of Health and Directorate General of Family Planning. The Drug Administration and Nursing Directorate also come directly under the MOHFW. The Directorate of Primary Health Care oversees the functioning of 13 public medical colleges, 6 post graduate institutes, 3 specialised hospitals/institutes,

⁸ Ahsan Ullah, Hakeem Syed Muhammad. 2002. *Unani Chikitsa Bigyaner Itihash* (History of Unani Medicine). Bangladesh Board of Unani and Ayurvedic Systems of Medicine, Dhaka.

2 institutes of health technology and 5 medical assistant training schools in different parts of the country

The Administrative Structure of the Country with Key Public Health Offices



The government adopted a new Health and Population Sector Strategy (HPSS) and launched a 5-year Health and Population Sector Programme (HPSP) in July, 1998. HPSP was a sector-wise programme approach for a package of essential health services. The strategy initiated the reorganisation of the Ministry of Health and Family Planning and unified separate health and family planning staffs for building greater capability for programme management and service delivery, and for decentralising management of health facilities. The essential service package focuses on improvements in the design, coverage (particularly) of unserved groups, and quality of reproductive health care, child health, and communicable disease control services. A national health policy was framed in 1998 but awaits final approval and adoption. The 5-year HPSP was undertaken in the light of the proposed health policy. [Maswoodur Rahman Prince, Banglapedia 2006, AS, Dhaka)

Delivery Channels of Health Services

The main public sector services delivery mechanism normally follows the administrative tiers mentioned above, but the linkages often vary according to the nature of particular programme. For example, there are special health programmes which are carried out in conjunction with NGOs or international aid agencies that form their own delivery channels and mechanisms as appropriate to the programme design. These special programmes often require particular kinds of social motivators and mobilisers – who are often recruited locally for the duration of the project life. Some of these health and population programmes are jointly initiated by the government of Bangladesh and international development partners. Henry Perry (2000) gives the details of different primary healthcare programmes undertaken in Bangladesh in recent years. This is a compilation of a variety of experiments in Bangladesh in coping with its unique problems of health, population and nutrition. In fact, the array of special projects overshadows the main health service delivery approach of the government. For example, the District and Upazila based health centres or hospital are becoming increasingly inadequate and ineffective in meeting the increased health needs of an ever growing population. Under the situation, besides the government and foreign aided health programmes, many private health establishments are also coming up in response to the unmet needs. Some of those are useful to the people who can afford to purchase health services, but the quality of services here is often not satisfactory.

A bulk of household expenditure by the majority low-income population of the country is consumed by the drugs and diagnostic services. It is generally believed that the quality or standard of diagnostic services is at best dubious if not outright useless. There are also allegations about the existence of unholy alliances between the prescribing doctors and the diagnostic centres.

A recent report in the Daily New AGE (21 April 2006) notes that there was a corruption nexus between diagnostic centres and the health ministry that was “eating the medical profession from the inside out”. In Dhaka itself, there are over 2,000 illegal diagnostic labs. The office of the Director General of Health is accused of allowing these illegal labs to operate in exchange of bribes. Doctors are reportedly receiving up to 60% commission for referring patients to labs. Most labs give patients pre-prepared results for tests they did not do. Quoting Dr. Zafrullah Chowdhury of Gonoshasthaya Trust (author of *The Politics of Essential Drugs* 1996), the paper says that the institution of the Directorate General of Health needs serious reform before it can function properly. The government needs to employ a special body to monitor their work and ensure that people receive quality services from these establishments. A similar report was published in the Daily Star, Dhaka, on the 30th April 2006 which recommended establishment of a Central Reference Laboratory and Institute of Pathology to monitor Quality Assurance (QA) and Quality Control (QC) of all diagnostic centres and their work.

The Key Resources in the Health Sector

	1996	1998
Total no. of hospitals	933	1273
Government hospitals	645	647
Non-government hospitals	288	626
Government dispensaries (number)	1,397	1,397
Total hospital beds (number)	37,131	41,877

Beds in government hospital	29,106	30,143
Beds in non-government hospital	8,025	11,371
Persons per hospital bed	3,288	3,249
Registered physicians (number)	24,638	29,613
Persons per physician	4,955	4,102
Registered nurse (number)	11,200	16,104
Registered midwives (number)	--	14,312
TB Clinics (number)	44	44
Maternity & child welfare centres (number)	96	97
Government medical college (number)	13	13
Private medical college	5	11
Medical university	1	1
Post graduate medical institute	5	5
Paramedical institute	2	--
Medical asst. training institute	5	--
Homeopathic college (number)	24	26
Pharmaceutical industries (number)	203	207
Homeopathic medicine producing firms	74	76
Medicine producing firms (number)	405	412
Life expectancy at birth (both sexes)	59	61
Total government expenditure on health incl.family planning (crore Taka)	1,535	1,480
Per capita government expenditure on health and family planning (Taka)	126	117
Source: Compiled from Bangladesh Bureau of Statistics, 1999/Banglapedia.		

The Health Services and the Use of Pharmaceutical Products

The excessive cost of health services can indeed be a cause of poverty as much as ill health. Both may cause loss of income and low level of living standard. The practice of drugs sale without prescription around the country has caused all sorts of problem for the poor people. In the absence of qualified doctors (There were 19 physicians and 11 nurses for every 100,000 patients in 1998), the sales persons in the drug store dispense with drugs to patients including anti-biotics. This not only drains the meagre income of poor people, it causes many other health problems including serious side effects. The traditional healers are also known to be prescribing allopathic medicines in order to avoid losing patients, and to supplement their treatment. Needless to say that, it may help the drug business flourish in the short term, but its future effects can be quite serious. (Ahmed, SM, 2006 in DS 03/07/06)

In a recent round table meeting in Dhaka,⁹ the experts commented that when the public sector failed to meet people's healthcare needs, the private sector is also facing a number of challenges against its full-fledged flourish in the country due to lack of proper policy, sufficient medical experts and policy makers. The opined that lack of professional skills and quality of healthcare services have forced a lot of patients to go abroad for better treatment, causing losses of huge foreign exchange every year for the country (The Daily Star, June 25, 2006, p-16). The experts observed that a large number of poor people of the country do not have access to proper healthcare while many others are subject to harassment or cheat in the name of treatment at some diagnostic centres in the absence of a proper regulatory body. Under the circumstances, it was recommended that the country rethinks about the private sector's healthcare system, analyse the problems critically and take proper actions to reshape the total health sector. This particularly crucial, because public sector share of healthcare services is increasing very fast. It now covers more than 60 per cent of healthcare, which was mostly a public sector until the 1980s. The private health institutions are, according to one speaker, becoming centres of exploitation. The authorities need to be look into the problem urgently.

According to the report, there are a little over 42,000 (against the need of 150,000) registered doctors, 20,000 nurses, and 4,000 technicians in the country. There is a huge shortage of nurses and technicians in the country, which is not filled in by trained personnel.

Health care in Bangladesh, according to common perceptions and as reported in a print media, is in shambles. Even for a small minority of well off citizens who can afford to purchase care, the prevailing standard of services in the sector is far from satisfactory. Most of these people prefer visiting a neighbouring country (mainly India and Thailand) for treatment of complex health problems. The majority "poor have to grapple with low quality health services that are often out of reach", reports one weekly newsmagazine. In the rural areas, it is certainly worse with no scope for qualified medical advice. At the sub-district level (Upazila, there 450 of them), there are health complexes established with the aim to reaching the poor masses, are mostly in pitiable conditions. Absence of qualified physicians, lack of essential medical equipment, medicines and other supplies has turned these centres into virtually useless places. It is sadly remarked that more people in these areas die from lack of treatment than bad treatment.¹⁰

This report on a private hospital built in a remote rural area highlights the health care needs of poor people, and how a private initiative can be efficiently run. But that was exception than a rule. Because, we cannot expect similar private initiatives are taken up by rich benevolent citizens everywhere.

Problem of 'Unearthly Diseases': According to a recent report (by AFP, Geneva in DS, p-4, 31 May 2006) the Indian sub-continent is a major worry in AIDS 'pandemic'. India, with whom Bangladesh has a long border, is known to have overtaken South Africa with an estimated 5.7 million infected by 2005. The Geneva based UN body, UNAIDS compared this figure with that of the South Africa which had an estimated 5.5 million HIV victims during the same period and had the highest infection rates per capita in Africa. With an ever growing number of population travelling (both legally and illegally without any travel documents) between the two countries, the threat of proliferation of the disease in Bangladesh is very real. With a relatively improved

⁹ "Rethinking Private Healthcare in Bangladesh, Reaching Health to the People", A Round Table jointly organised by Health 21 and the Daily Star at the latter's conference room, 25 June 2006.

¹⁰ Star Weekend Magazine, (2006) *Taking Care of Bancharampur's Health*. 26 May 2006, Dhaka.

health care system in India, certainly in comparison to Bangladesh, the country could treat only seven percent of the patients who needed anti-retroviral HIV/AIDS drugs in 2005. With a dismal performance scenario of the public health outposts in Bangladesh outside the district headquarters where the majority of the people lives, and those who have a very low per capita endowment for healthcare, chances for rapid spread of the disease is as high as the chances of not receiving any treatment at all! It is particularly worrying for women and pregnant mothers who need treatment to prevent mother-to-child HIV transmission. In a rather 'conservative' social environment with strong influence of *purdah*, they are most likely to remain excluded from any intervention (in India only 1.6% of such women were receiving any treatment).

The Challenges Ahead

The rate of prevalence of HIV/AIDS in Bangladesh is currently not high though (less than 0.20%), prevention and counselling services in both rural and urban areas needs to be expanded. The emergence of drug-resistant malaria and tuberculosis is another major concern. Under the current health care system the TB case detection rate is as low as 34% of the total. The maternal mortality ratio is 320 per 100,000 live birth. The antenatal care rate in Bangladesh is very low, and only 6% of deliveries are taking place in health facilities. High rates of malnutrition persist and micronutrient deficiencies are still widespread despite some progress in this area during the past decade. An estimated 78% of children (6-11 months old) and almost half of all women in the country suffer from anaemia (ADB, 2005). The World Bank in a recently published document (WB 2006, Op.cit) expresses doubts if Bangladesh can attain its MDG goals related to child malnutrition and maternal mortality. The current ratio of maternal mortality is in the range of 320-400 per 100,000 live births (2001), which is said to be one of the worst in the world. This needs to be reduced to 143 per 100,000 live births (by 2015?).

The Major Institutional Landmarks in the Health Sector Since 1971

1972	Formation of Bangladesh Medical Association (BMA). Conversion of Dhaka Medical School and Mitford Hospital to Sir Salimullah Medical College and Hospital. Establishment of Bangladesh College of Physicians and Surgeons. Establishment of Bangladesh Medical Research Council (BMRC). Upgrading of Rural Health Centre to Thana Health Complex. Establishment of National Health Library and Documentation Centre.
1973	Proclamation of Medical Council Act.
1974	Est. of the Institute of Public Health Nutrition and Food Science. Amendment of Pharmacy Act, 1957 Proclamation of Children Act. Amendment of Drug Act, 1940
1975	Formation of Bangladesh National Nutrition Council. Proclamation of Prevention of Blindness Act. Approval of Bangladesh Red Cross Society (now, Bangladesh Red Crescent Society) Order; amended in 1985.
1976	Est. of Institute of Epidemiology, Disease Control and Research. Approval of the project for increase of beds in Thana Health Complexes. Proclamation of Pharmacy Ordinance.
1977	Enforcement of Environment Pollution Control Ordinance. Establishment of Directorate of Nursing Services. Est. of National Institute of Population Research and Training (NIPORT).
1978	Signature to Alma-Ata declaration after the approval by WHO to the programme Health For All-2000 (HFA-2000). Establishment of National Institute of Ophthalmology Formal introduction of Diploma in Public Health (DPH) and Diploma in Community Medicine (DCM) in NIPSOM. Establishment of National Institute of Cardiovascular Diseases.
1979	Beginning of Expanded Programme of Immunization (EPI)
1980	Upgrading of the post of Director of Health Services to Director General of Health Services.
1981	Introduction of Village Practitioner Scheme (this scheme was discontinued a few years after). Adoption of a pilot plan for upgrading primary health care services in six Upazila Health Complexes.
1982	Creation of post of specialized physicians for Thana Health Complex Proclamation of Drug Policy Proclamation of Drug (Control) Ordinance.
1983	Establishment of Bangladesh Institute of Child Health.
1986	Establishment of National Cancer Institute & Research Hospital.
1989	Establishment of Bangladesh Breastfeeding Foundation.
1990	Enforcement of Narcotics Control Act.
1992	Establishment of Institute of Child and Mother Health.
1998	Est. of Bangabandhu Sheikh Mujib Medical University (BSMMU).

[ARM Saifuddin Ekram, Banglapedia, 2006]

4. THE KEY ACTORS AND INSTITUTIONS

Pharmaceutical industry is fondly termed as a “white-collar-intensive industry”, because it employs highly educated and skilled human resources. This includes, pharmacists, chemists, Biochemists, microbiologists, Engineers, MBAs, Doctors and a variety of other professionals.¹¹ In order to comply with the industry standards (GMP or General Manufacturing Practice), compromising with the standard of its labour is not possible. But the only local external body which monitors the compliance of standards of its products and manufacturing process is the Drug Administration of the government. This institutions is said to be beset with many problems including shortage of human resource and inadequate laboratory facility. The existing lab facilities (in Dhaka and Chittagong) can test about 3,500 samples of medicines a year. About 12,000 samples of different brands of medicines remain without test every year- whereas it is necessary to test quality of each medicine twice a year.

The Drug Administration is the key institution and a very important actor to ensure people and concerned organisations (i.e., hospitals, clinics, pharmacies etc.) the quality of pharmaceutical products. The inadequacies of this institution is the reflection of the overall institutional weakness of the (mainly) public sector bodies. We shall try to see below who are the other key actors of the sector and what is the situation with them?

The main Actors and Organisations

The main actors can be categories as follows:

- a) **The Pharmaceutical Companies:** These companies include specialised multinational companies, local large companies with international links and smaller local companies. The Association of the pharmaceutical industries in Bangladesh is a strong body with about 150 member companies which lobby with the government for policy changes, among other activities. Some of the pharmaceutical companies have recently been seen to branch out to other areas of commodity production. For example, at least 3 such companies have now entered into agro-processing industry, apparently because it holds out a favourable policy environment and future prospect.
- b) **The Academic and Research Institutions :**Although, very little direct links were detected between these institutions and the pharmaceutical firms, the bulk of the human resources in the sector is the product of these public and private universities. Lots of research is carried out in these (mainly public) Universities related to pharmaceutical biotechnology, but they are mostly for academic reasons than of direct practical production purposes. The standard of education and quality of research (if any) in the private universities in this area of academic discipline are known to be of not so high until now. But because there is a growing demand for chemists, pharmacists, and the like, more and more private Universities are starting up study courses in these areas without much preparation. There are also public sector specialised

¹¹ The Pharma world, June 2006, p-16 Interview with MD, Beacon Pharmaceuticals Ltd.

research institutions on drugs and biotechnology, but very little has so far been known about their activities. One of such laboratories visited was found to be inadequately equipped and resourced.

- c) **The Government:** The Ministry of Health and Family Welfare (MHFW) of course is one of the most important actors. The key departments through which it oversees its activities in the area of pharmaceutical biotechnology are grossly under resourced, incompetent and full of many vices. The Drug Administration is the key actor, but with only two lab facilities to do justice to such a large industry with huge amount of products – is expecting simply too much! A major review of the functions and roles of this department is urgently needed. There have been many recommendations in this respect in the Drug Ordinance and other policies, but nothing seems to have moved so far.
- d) **The Public Health Centres:** The government hospitals and clinics are a major consumer of the pharmaceutical products. But the public sector health facilities are on the decline in every respect. Being in the key demand domain, these institutions need to be strengthened particularly given that the majority of the poor people in the country cannot afford treatment in the private hospitals and clinics. Some of the large public hospitals have also been the key academic and research institutions on health and medicine. But unfortunately their roles in this respect have been watered down by lack of resources, interest of the authority and linkages with similar other institutions. The pharmaceutical companies can very profitably invest into these institutions for applied research and product development, as happens in the advanced economies
- e) **The Private Health Centres:** With lots of investment in the private sector hospitals, clinics and diagnostic centres in recent years, the pharmaceutical industry is being benefited greatly. They are now an important consumer of pharmaceutical products though, the industry does not seem to have a mechanism to receive feed back on the use and efficacy of their products. This is like a lost opportunity for the sector according to some informants. There are however, isolated stories of innovation in development of health technology and medicine in the country by individual initiatives of physicians. This certainly deserves praise and recognition, but no one seems to know how such efforts can be given institutional form?
- f) **NGOs and Special Health Programmes:** Different special health programmes sponsored by the government and donor agencies often use NGOs as key intermediaries and social mobilisers. Some of these agencies have innovated approaches and products in health service delivery in the country which has earned international acclaim. For example, the ICDDR, B and BRAC's contribution in finding a popular solution (oral re-hydration technology) to the problem of diarrhoeal diseases has saved many lives of common people. NGOs are both consumers and producers of pharmaceutical products. Their health centres probably attend to more people with health and FP problems than all the other health centres put together. And they do create a huge demand for pharmaceutical products, while produce products ORS packets. However, linkages between the pharmaceuticals and NGOs are very limited to cause any innovation to take place in the sector.

- g) **Alternative Medicines:** Although, the Drug Ordinance of 1982 expressed intentions in bringing Ayurvedic, Unanic and Homeopathic medicines under the controlling umbrella of the Drug Administration, nothing seems to have moved so far. These medicines are a small competitors to the modern pharmaceutical industry. In other countries (e.g., South East Asian countries, China and India) the linkage between the two broad schools of medicines has now been very close. They complement each other in many different ways. But in Bangladesh there is very little linkage between them. As a result, both are losing the benefit of knowledge and experience gained by each of them. On limitation of the Alternative Medicines is the lack of publications on their work, research findings and products. There is also a serious shortage of research studies and relevant literature in this field of medicine (Ahsan Ullah, HSM. 2002)¹² While the allopathic system of medicine and the pharmaceutical sector in Bangladesh is flourishing very fast under global competition, the Ayurvedic and Unani medicines are struggling to survive due lack of patronage, support and innovations. With a thoughtful and scientific approach, it can actually learn a lot from the allopathic pharmaceutical sector and play a complementary role in the public health care system.

Further Readings : For further readings on different actors and institutions please see Annex XXX

¹² Ahsan Ullah, Hakeem Syed Muhammad. 2002. *Unani Chikitsa Bigyaner Itihash* (History of Unani Medicine). Bangladesh Board of Unani and Ayurvedic Systems of Medicine, Dhaka.

5. HABITS AND PRACTICES

It seems that the whole sector of health and medicine suffer from a chronic lack of cohesion and coordination with its direct and peripheral stakeholders. It is hardly to be wondered at when an exasperated University professor remarked, “Alas, we don’t seem to have acquired the culture of interaction and coordination (within our institutions), either because some of us think too highly of ourselves or because some of us are insane”. The graduates the academic institutions are producing hardly have any exposure to the real world. The practice of internship of students is extremely limited; in fact some of the private Universities do not even offer proper library and laboratory facilities to the students¹³. The uptake of the research findings of the academia by the industry or vice versa is almost negative.

The new drugs the pharmaceutical firms introduce into market are mostly based on borrowed formulas from other countries. Some of the multinational firms also select Bangladesh for production of new drugs for different strategic and business advantages. For example, Eskayef Bangladesh Limited has launched “Oseltamivir” under the brand name SK-flu for prevention and treatment of Bird Flu.

In a recent (11 April 2006) discussion forum in Dhaka organised by the Physicians for Social Responsibility (PSR) exchanged views on how to improve “Doctor-Patient Relationship,” which has been a matter of great concern across the board. While some “ill-behaved and impatient” patients are to be blamed for this problem, the meeting also underscored the need for Doctors to earn the confidence and trust of the patients¹⁴. This partly reflects the problem of isolation of the institutions and stakeholders. If the service providers and the recipients do not know clearly what to expect from each other, the quality of service is bound to suffer. That is why the Physicians for Social Responsibility suggested the government to include in the curriculum of the medical education a special subject on “behaviour and etiquette” of doctors.

There is a serious lack of interactions between the relevant organisations – organisations seems to work in isolation. The academic institutions and the commercial drug manufacturing firms undertake research independently.

- **The students coming out of the Universities often lack the knowledge of field realities.**
- **NGO lobby organisations are hardly taken seriously. The powerful business lobby gets government to formulate policy mostly to benefit their own business interest.....**

¹³ Recently (May-June 2006), students of the department of Pharmacy of a private University in Dhaka went on strike in protest of the authority’s deliberate failure to provide library and laboratory facilities despite charging very high fees on this account.

¹⁴ Reported in The Pharma World, June 2006, p-10.

- **There are no consumers' lobby. The government on its own cannot protect the interest of the poor consumers. Government's capacity to test medicine and their quality is extremely limited..**

6. POLICIES FOR INNOVATION

The National Drug Policy (2005).

The main objective of the policy is to ensure, through domestic production and import, adequate supply of safe, effective and useful drugs at affordable prices. The Drug Act 1940 and the Drugs (control) Ordinance 1982 regulate the activities in drug sector. These outdated regulatory instruments need to be updated

Biotechnology Policy

Based on the national biotechnology policy framework, the Ministry of Health and Family Welfare has produced a “National Guidelines on Medical Biotechnology” in December 2005. The key objectives of the document was to 1) judiciously harness the opportunities of medical biotechnological applications for health and livelihood improvement; 2) to prepared a detailed inventory of medically important bio-resources in order to promote conservation of biological diversity and sustainable exploitation of those bio-resources; 3) and to conduct genome sequencing of Bangladesh population for determination of variation in human DNA level of our population from that in other nations with a view to understand the overall future health and nutritional implications.¹⁵ Among the other objectives, the guidelines speak about encouraging R&D in medical biotechnology, development of human resources in this area, creation of an enabling environment for biotech industries, and creation of public awareness about the safe handling of this technology.

Its short term work strategy includes (2006-7) establishment of a regulatory framework through consultation of authorities and enforcement of regulatory systems. These authorities will include a) Genetic Engineering Approval Committee, b) Pharmaceutical and diagnostic biotech products licensing authority (DGHS with an expert group), c) Medical biotech research and diagnostic laboratory, d) Medical biotech products’ hazard inspection, monitoring and surveillance authority and a e) Medical biotechnology promotional committee.

Health policy The national health policy of Bangladesh has a long history mostly of development through intellectual input of physicians and scientists, but as yet (year 2001) no formal policy has been enacted by the parliament. After the independence of Bangladesh in 1971, nearly a decade elapsed during which the government had to dedicate efforts to providing health services under the existing administrative structures that were inherited from Pakistan. During the early 1980s, however, a drug policy was adopted by the executive decision of the government. It attempted to rationalise drug use manufacture and import. The policy put some restrictions on multinational drug companies as to the types of drugs they need not manufacture, and prohibited altogether the manufacture of certain drugs that had been in use in the country for a long time. The drug policy was followed by the preparation of a national health policy document in the late 1980s, which was again adopted and certain parts implemented through executive power of the government, not enactment by the parliament.

¹⁵ MOHFW 2005. *National Guidelines on Medical Biotechnology*. Ministry of Health and Family Welfare, Government of Bangladesh, Dhaka.

During the early 1990s, major political and economic changes took place in the country. Of particular significance was the adoption of a strong free market policy and transition of the country to parliamentary democracy. These naturally put both the drug policy and the health policy in a newer context and throughout the later part of the 1990s, work on development of a National Health Policy has been in progress in the light of changed national and global circumstances. The draft policy has been reviewed by the Cabinet and approved, but its consideration by the Parliament has not yet been initiated. [Zia Uddin Ahmed, Banglapedia 2006]

Globalisation

According to GATT act LDCs countries can export their all goods to developing country where as India and china has not such opportunity so we should utilize that opportunity up to December 2016.

Drug Policy

We had a very old drug policy but new policy has recently been introduced that is quite helpful for our drug companies.

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ANNEXES

ANNEX – 1: Schedule of Visits to Key Organisations/People

Date	Name of Organisation	Name of Contact People and Address
02/04/06	Ayurved College	Dr. Jashim Section-14, Mirpur, Dhaka
02/04/06	Ayurved Board	Dr. Ruhul Amin 75/B, Indira Road, Dhaka-1215
01/04/06	University of Dhaka	Professor ABM Faroque Chairman, Dept of Pharmaceutical Technology. Tel. 9661920-73 Extn.4837, 01711-855214. e-mail: prak@bdcom.com
07/04/06	Department of Public Health	Dr. Mir Iskandar Ali. Asstt. Director (Research & Planning), DG Health, Mohakhali, Dhaka.
07/04/06	Drug Testing Laboratory (NCL), Institute of Public Health, GOB.	Dr. Md. Kabir Ahmed, Deputy Chief., Drug Testing Laboratory, Mohakhali, Dhaka-1212 Tel. 9899315, email: ka-dtl@yahoo.com
13/04/06	BRAC University	Dr. Shahaduz Zaman, Program Coordinator, Dept. of Public Health, Mohakhali, Dhaka. Tel. 9881565, Ext-484, zaman.s@bracuniversity.ac.bd
13/04/06	Rangs Pharmaceuticals Ltd.	Dr. ASM Habibur Rahman, Vice President & Director, Rangs Bhaban, 113-116 Old Airport Road, Dhaka-1215, Tel: 8153701-5 email: rangspharma@rangsitt.net
17/04/06	Bangladesh Association of Pharmaceutical Industries	Md. Wahidur Rahman, H-F31, R-4, Banani, Dhaka, Tel.: 8816767, www.bapi-bd.com
	Office Staff (Valery Tailor)*	Centre for Rehabilitation of Paralysed (CRP), Chapain, Savar, Dhaka.
	Office Staff (Dr. Zafrullah Chowdhury)*	Gana Shasthya Kendra, Dhanmondi, Dhaka.
	Institute of Public Health	Mohakhali, Dhaka.
	Bangladesh Medical Research Council (BMRC),	Dr. Iskander Ali, Asstt. Director, Research and Planning (Dr. Harun Ur Rashid, Chairman)*, Mohakhali, Tel. 8811395
	ICDDRDB	Centre for Health and Population Research, Mohakhali, Dhaka. Web: www.icddrb.org
	Shadhan Oushadhalaya	
	Hamdard Research Laboratory	Sonargaon Road, Dhaka.
	Asiatic Society of Bangladesh	Nimtali,

* People within parenthesis s were absent during the visit of the organisations, but they are the important institutional contacts whose names need to be on record for any future use.

ANNEX-2: NOTES ON DIFFERENT HEALTH CARE SYSTEMS

Healthcare System system of medical practices to provide people with proper medical and other healthcare services. Different healthcare services differ in their philosophy and concept as to the causes of disease, their approach to healing, methods of treatment, and composition and preparation of medicinal products. As they exist in Bangladesh, they can be broadly classified into (i) Traditional and (ii) Modern systems.

Traditional system an art of healing based on traditional use of plants, animals, and other natural substances, and cultural habits, social practices, religious beliefs, and in many cases, superstitions of the present and previous generations of people (Ghani 1990). The basic concept of traditional medicine has been very comprehensively described by the World Health Organisation (WHO 1976) in the following way: "Traditional medicine is the sum total of all knowledge and practice, whether explicable or not, used in the diagnosis, prevention and elimination of physical, mental or social imbalance, relying exclusively on practical experience and observations handed down from generation to generation, verbally or in writing." The forms of traditional medicine practiced today vary from highly organised and long established *Ayurvedic* and Unani systems to various folk medical practices, such as herbalism, spiritualism, and religious medical practices. Because of their origin in the remote past and the fact that most of them are practiced almost in the same way as in the past they are collectively called traditional medicine. The basic principle involved in traditional medicine is that it strives to treat the whole person rather than his isolated parts and thinks of him in relation to his emotional sphere and physical environment.

The traditional system of medicine is now being taken seriously by the World Health Organisation, Western medicine establishments, and Governments of many Third World countries. Thus traditional system of medicine is now a recognised system of medical practice in many countries of Asia and Africa. In some Asian countries, eg, Bangladesh, India and China, it has undergone tremendous modernisation over the years and is now practiced side by side with modern allopathic medicine as an alternative and supplementary system of medicine. Traditional medicinal products, particularly those of the Unani and *Ayurvedic* systems, are now prepared by using both indigenous and modern pharmaceutical technology and under strict quality control measures. These medicinal products are dispensed as broken pieces or coarse and fine powders, pills of different sizes, in the form of compressed tablets, as liquid preparations, as semi-solid masses, and in the form of creams and ointments neatly packed in appropriate sachets, packets, aluminum foils, plastic or metallic containers and glass bottles. The containers are fully labelled with indications/contra-indications, doses and directions for use and storage.

The traditional healthcare systems practiced in Bangladesh include the *Ayurvedic*, Unani, Homeopathic, and Folk medicine systems. *Ayurvedic* system is one of the oldest systems of medicine which has been practiced in this subcontinent for over 3,000 years. Ayurveda, meaning the science of life, is rooted to the social, cultural and philosophical principles that prevailed in India during the period 600 BC to 700 AD. Ayurveda considers the human being as a miniature universe. The properties found in the universe are believed to be

present in the human body, which like the universe, consists of five gross elements: earth, water, fire, air, and the ethereal parts of the sky. These body constitutions are taken into consideration while treating a patient under this system. Curative treatment in *Ayurvedic* system consists of administration of medicine both internally and externally, minor surgical operations and psychosomatic treatment. The medicinal preparations employed in this system are mainly derived from plant materials and are presented in the form of powders, semi-solid preparations, decoctions, elixirs and distillates. Many of them also contain inorganic chemical substances, minerals, and animal products. Alcoholic extracts and alcoholic solutions of the ingredients, tinctures and elixirs are also frequently used in *Ayurvedic* medicine. The *materia medica* of *Ayurvedic* medicine contains some 8,000 published recipes. Many more are held as secret information among certain families.

Unani system originated in Greece and was named after the name of Unan province, which is regarded as the original place of development and practice of this system. Hakim Iskalibus of Greece was the first person to propagate the Unani system of medicine. However, this system flourished only when Arabian and Persian Muslim intellectuals like Al-Razi, Ibne-Sina, Al-Rashid, and others enriched it with newer scientific knowledge and discoveries in the 7th century. Because of the significant contributions of Arabian physicians to the development of this system, the Unani system is also known as the Greeco-Arab system. The famous medical book, 'Al-Kanun' (based on the Unani system) of Ibne-Sina (980-1037 AD) was the most prescribed book of medicine in Europe for several centuries. After the 13th century, although Muslim civilization declined, the Unani system of medicine was in full vigour and widely practiced as an effective system of treatment throughout the world.

According to the Unani system, the basic factors composing the human physique are four elements (fire, air, water, and earth), four types of temperament (hot and dry, hot and wet, cold and dry, and cold and wet), four humours (blood, phlegm, yellow bile and black bile) organs, vital spirit, powers and functions. Whole plants or their powders or pastes or products and their extracts, infusions, decoctions and distillates are major constituents of Unani medicine. Minerals, inorganic chemicals and animal products are also frequently used in preparing these medicines. However, tinctures or elixirs (which are alcoholic preparations) are not used in Unani medicine.

Both *Ayurvedic* and Unani systems of traditional healthcare have taken firm roots in Bangladesh and are widely practiced all over the country. There are about 6,000 registered and 10,000 unregistered practitioners (Kavirajes of the *Ayurvedic* system and Hakims of the Unani system) of these two systems of medicine in Bangladesh. A total of 15 government recognised and funded educational institutions are currently engaged in the teaching of traditional medicine in the country. Of them, 10 institutions are involved in teaching the Unani system and 5 in *Ayurvedic* system. Each of these institutions has an attached out-patient hospital which imparts internship training to graduates while giving medical services to out-door patients. These institutions offer a four-year diploma course and six-month internship training. Annual intake of these institutions currently stands at about 400 students. Since the 1989-90 academic session a Government Unani and *Ayurvedic* Degree College, affiliated to the University of Dhaka, has been established in Dhaka. This college offers a five-year degree course and one-year internship training in an attached 100-bed Traditional Medical Hospital.

Homeopathic system of healthcare is not strictly an eastern medical system as it was developed in Europe by a German allopathic physician named Samuel Hahnemann (1755-1843) in the early 19th century from the allopathic system. In this system drugs are applied in very small and diluted doses. It is believed that the strength or curative power of a drug increases mathematically with the increasing degree of its dilution. There are about 1200 medicines in homeopathy, of which more than 500 are obtained from medicinal plants, a few from animals, and the rest from pure chemicals. Plant derived medicines in this system are used as mother tinctures. No excipient (preservative, colour, sweetener, flavour, etc) is used in preparing homeopathic medicine. This system of medicine is very popular in many Asian countries including Bangladesh.

Folk medical practice a simple form of traditional medical practice which offers healthcare services to the rural people with or without the use of medicinal preparations. This practice is based on traditional beliefs, social cultures and sometimes superstitions of the people, and does not involve the use of any specific medical system. The medicines of this practice mainly consist of plant and animal parts and their products, which are dispensed usually in raw forms as and when needed. Other items commonly used in this practice are 1. *religious medicines*, which include the use of religious verses written on papers and given as amulets; religious verses recited and blown on the face or body of the patient or on water to drink or on food to eat; sacrifices and offerings in the name of God and gods, etc and 2. *spiritual medicines*, which include methods like communicating with the spirits or ancestors through human media to inquire about disease and its remedy, torturous treatment of the patient along with recitation of incantations to drive away the imaginary evil spirits and many other similar methods.

Folk medical practice also includes treatments like blood-letting, bone-setting, hot and cold baths, midwifery, minor surgery, therapeutic fasting, hydrotherapy and heat therapy, including cauterisation. Practitioners of folk medicine are not normally professional people. The elderly people of the communities, religious leaders, '*bedes*', or even ordinary people often prescribe folk medicine. Folk medicine is widely practiced in rural and even urban areas of Bangladesh.

Modern system the highly advanced system of health management used in Bangladesh and the rest of the world. This system does not limit itself to only curative treatment of the patient but also endeavours to extend its services to the prevention of diseases by immunization and improving the personal and environmental hygiene of the patient and the community. Well-educated and professionally trained experts practice this system of medical treatment. Technologically advanced highly sophisticated equipment and methods are used in this system to attain precise diagnosis and treatment of diseases. Highly efficacious medicinal preparations prepared from purified synthetic or natural chemical substances are used in this system. It has developed sophisticated and precise method and technology of surgical operations and performs critical operations like open-heart surgery, heart transplant, and transplantation of other vital organs of human body with high degree of precision and safety.

Organised and well-equipped hospitals and clinics have been developed to effectively and properly offer healthcare services to people under this system. However, because of inadequacy of medical equipment and shortage of manpower and infra-structural facilities, benefits of modern system of

healthcare services cannot be extended to rural areas as adequately as needed. The cost involved in offering healthcare services under this system is also much higher than that of any other system of healthcare services available in Bangladesh. [Abdul Ghani]

Ref.: WHO, *African Traditional Medicine*. AFRO Technical Report Series, No. 1, 1976; Abdul Ghani, *Traditional Medicine (Origin, Practice and State-of-the Art)*. In: *Traditional Medicine* (ed Abdul Ghani, Jahangirnagar University, Savar, Dhaka, 1990).

Herbal Medicine preparations or derivatives of plants that are used in the treatment, cure, mitigation and management of various physical and mental diseases or ailments, and external or internal injuries of man and other animals. These are composed of powders, pastes, infusions, decoctions, extracts, and distillates or naturally produced products of various medicinal plants, and may also contain some additional inactive or neutral ingredients (such as other substances or plant-animal-and mineral origin). The plant drug in the preparations is the active therapeutic agent, which cures the disease or heals the wound or injury.

Herbal medicine preparations are prepared and dispensed in a number of dosage forms, such as liquids (infusions, decoctions, extracts, oily mixtures, gargles, etc), solids (broken pieces, powders, pills, tablets, etc), semi-solids (pastes, ointments, creams, etc) and gases (steam inhalation preparations, fumigants, incenses, etc). These preparations are used both externally (topical application) and internally (by oral administration). However, the intravenous route of administration is not used in the application of herbal medicinal preparations. This is because of the fact that most of these preparations are not suitable for this route due to their less refined forms.

Usually, local technology is used in preparing herbal medicines. However, modern technological know-how and pharmaceutical machinery are now being gradually introduced and used in manufacturing herbal medicines.

In Bangladesh herbal medicines are now officially recognised as alternative medicines and some of them are being produced in commercial scale by a number of manufacturers such as Sadhana Aushadhalaya, Sakti Oushadhalaya, Hamdard, etc. Commercial manufacture of herbal medicines in Bangladesh is done according to two recognised traditional systems, viz, Unani and *Ayurvedic* systems. Raw forms of herbal medicines are also used in the rural areas of the country as a part of folk medicine. All these forms of herbal medicines have wide acceptability among the general populace, particularly in rural areas of the country. Many herbal medicines here have reputation as good and efficacious remedies for a number of diseases. The practitioners of herbal medicine are Hakims (who practice the Unani system), Kavirajes (who practice the *Ayurvedic* system) and Quacks.

Currently, the World Health Organisation (WHO) has officially recognised and recommended large-scale use of herbal medicines, particularly in the developing countries, as an alternative system of medicine to provide health care services at the primary health care level. An estimated 1.5 billion people of the world's population, according to WHO, are now getting treatment with Herbal medicines. [Abdul Ghani]

ANNEX-3: FURTHER READINGS ON ACTORS AND THEIR ROLES

Health manpower trained personnel that include doctors, medical technologists, nurses and paramedics. In Bangladesh and in many other developing countries, another category of workers is closely associated with delivery of health services to the villages. These comprise field-level health workers who are trained in specific areas, generally non-technical, and are dedicated to offer specific services related to community health, reproductive health and family planning, including awareness creation activities. In addition, there are homeopathic doctors and doctors practising *Ayurvedic* medicine. Bangladesh has a population of about 130 million.

At present, most doctors are based in cities and towns serving a meagre 20% of the population. The bulk of the population of Bangladesh lives in rural areas and is thus away from easy access to the service of these trained doctors. The reason for this is poor economic condition of people living in rural areas.

The bulk of the nation's health manpower is under government control because provision of health care is government's responsibility. Only in cities and towns there are doctors available in private practice and in recent years, diagnostic services and hospital care have witnessed good growth in the private sector particularly in the capital city of Dhaka and a few other major cities. The bulk of the population living in rural Bangladesh and too poor to afford private medical facilities have to be cared for by government facilities which admittedly are victims of chronic funding and manpower shortage. Most rural hospitals operated by government lack adequate number of doctors and technicians; moreover, the doctors are permitted to engage in private practice which often takes away their time, time that they could otherwise devote to hospital work and medical research. Biomedical research manpower is one of the least developed sectors in the country's health manpower scenario. [Zia Uddin Ahmed]

Medical education and research The major component of health education system in Bangladesh is the country's 13 government medical colleges. These offer a 5-year MBBS degree to students who have passed higher secondary examination representing 12 years of study or equivalent to class XII in the North American system of education. This is followed by a 1-year internship before the MBBS graduates are allowed to enter into private practice. These government medical colleges have been established over a period of nearly half a century. Traditionally all of these colleges except one (Sir Salimullah Medical College named after the then Nawab of Dhaka) have been named after the name of the city where it is located. The government medical colleges are: Dhaka Medical College; Sir Salimullah Medical College (in Dhaka); Chittagong Medical College; Rajshahi Medical College; Sylhet MAG Osmany Medical College; Mymensingh Medical College; Dinajpur Medical College; Rangpur Medical College; Sher-e-Bangla Medical College, Barisal; Khulna Medical College; Faridpur Medical College; Armed Forces Medical College, Dhaka; Shahid Ziaur Rahman Medical College, Bogra, and Comilla Medical College. Apart from these there are two homeopathic medical colleges, Bangladesh Homeopathic Medical College, Dhaka and Government Homeopathic Degree College, Dhaka. There is also a college on indigenous medicine by the name Government *Unani* and *Ayurvedic* Degree College and an institute of

indigenous medicine named Bangabandhu Institute of Indigenous Medicine, both located in Dhaka.

In the early 1990s, government decided to allow the establishment of private medical colleges in the country. The private sector showed great interest and altogether over a dozen private medical colleges were established rapidly, most of these are located in the capital city Dhaka. Despite the fact that studying at a private medical college is vastly more expensive relative to government medical colleges, there is great demand from prospective entrants for positions in these private medical colleges. This certainly reflects the extent of demand for trained doctors in the country.

Medical University The lone medical university of the country is the Bangabandhu Sheikh Mujib Medical University (BSMMU) established in April 1998 by converting the IPGMR into this full-fledged university. The IPGMR was established during the Pakistan time in 1965 and had served as the sole institute offering post-graduate degrees such as MPhil and PhD in medicine under the administrative control of the University of Dhaka, the premier general university of the country.

The BSMMU offers post-graduate degrees such as MD, MS, MPhil, and PhD. It also offers diplomas in many subjects to produce trained medical technologists. The post-graduate component of the 13 government medical colleges of the country is also operated under the control of BSMMU.

Institution for post-graduate specialisation The institution responsible for specialist practice of doctors in the country is the Bangladesh College of Physicians and Surgeons (BCPS). The BCPS has in its mandate the promotion of specialist practice in various branches of medicine through Fellowship (FCPS) and Membership (MCPS) examinations conducted every year. The college was established in 1962 by the then Pakistan Government with 45 founder fellows and a council of 20 members. In 1982 it received from the government its own premises at Mohakhali where it has now its own building with the necessary infrastructure.

R&D institutions in biomedical sector There are a number of R&D institutions under the Ministry of Health and Family Welfare. These institutions conduct study and research in specific areas. Some of these are: Institute of Public Health; Bangladesh Medical Research Council; Bangladesh National Research Council; Institute of Epidemiology Disease Control and Research; International Centre for Diarrhoeal Disease Research, Bangladesh; National Institute of Cancer Research and Hospital; National Institute of Cardiovascular Disease; National Institute of Ophthalmology and Hospital; National Institute of Population Research; National Institute of Preventive and Social Medicine; and Rehabilitation Institute and Hospital for the Disabled.

In addition, there is an institution called BIRDEM which was established in 1956 under the Ministry of Social Welfare. It is the pioneer research institution for diabetes and metabolic diseases with a nation-wide network of sub-centres to provide service to millions. Its clients mainly comprise its members to whom some essential services are provided at nominal cost, but in recent years it also has acquired facilities to offer more expensive services in modern diagnostics and clinical care through a large hospital called BIRDEM Hospital. [Zia Uddin Ahmed]

Nutrition education and research started as a course on nutrition in the Department of Biochemistry, University of Dhaka, in 1957. Nutrition research got a new direction when a national nutrition survey was conducted in 1962. It revealed widespread malnutrition among the vast majority of the population. More than 80% children under 5 years of age and almost same percentage of pregnant and/or lactating mothers were suffering from chronic protein-energy deficiency. About 70% of the children and the mothers were having iron deficiency anaemia, more than 5% of the children were suffering from night blindness due to vitamin A deficiency, and about 29% of the population was having goitre (5% had visible goitre) due to iodine deficiency. One fruitful outcome of the above survey was that, the University of Dhaka opened the Institute of Nutrition in 1969. Later named as the Institute of Nutrition and Food Science (INFS), the Institute is now staffed by around 100 people, 45 of whom are teachers and researchers.

At the beginning, INFS was mandated with research, with little input on education. There was only a one-year diploma course on applied nutrition and dietetics, first introduced in 1975. It started offering MPhil/PhD degrees from 1983. The diploma course was abolished in 1988, and in its place was introduced the two-year course for MSc. The 4-year BSc (Honours) course was introduced in 1998. INFS is now the biggest nutrition teaching and research institution in Bangladesh. In addition to research on a wide variety of projects, the Institute has been carrying out regular national level nutrition surveys.

Courses on nutrition are also offered at the Department of Biochemistry of Dhaka University and a good number of teachers guide students for MSc, MPhil and PhD degrees in nutrition. An outstanding work accomplished by the department in this regard was the 1993 National Iodine Deficiency Disorders Survey - which showed, for the first time, that about two-thirds of Bangladeshi population suffered from biochemical iodine deficiency, meaning that these many people had their body cells starving from inadequate supply of iodine, whether or not they had goitre. In response to this result, the Government of Bangladesh introduced iodized salt throughout the country through legislature. The IDD survey conducted in 1999 by INFS showed that the goitre situation in the country has improved significantly due to this iodized salt programme.

With the passage of time, other universities started developing facilities for education and research on nutrition. Bangladesh Agricultural University at Mymensingh, the University of Rajshahi, Islami University at Kushtia, and the University of Chittagong are among them. These universities now offer BSc (Hons), MSc, MPhil and PhD degrees in biochemistry and nutrition.

At the government level, several institutions have been established for research and education on applied nutrition. Notable among these are the Institute of Public Health Nutrition (IPHN) in the health sector (under the Ministry of Health and Family Welfare), the Bangladesh Institute of Research and Training on Applied Nutrition (BIRTAN) in the agriculture sector (under the Ministry of Agriculture), and the Institute of Food Science and Technology (IFST) of the Bangladesh Council for Scientific and Industrial Research (BCSIR), and the Institute of Food Radiation Biology (IFRB) of the Atomic Energy Commission (AEC) under the Ministry of Science and Technology. IPHN is engaged in improving the nutritional status of the people, particularly with respect to vitamin A through both vitamin A prophylaxis and home gardening programmes. IPHN conducted the first goitre survey in Bangladesh in 1981 and later played an important role in the prevention of iodine deficiency through lipiodol injection

(salt of iodine dissolved in poppy seed oil) in hyperendemic areas, mainly in the northern regions of the country. IPHN has so far injected over 3 million visible goitre patients.

BIRTAN, founded in 1972 as a private organisation and later commissioned with the Agricultural Ministry, has been imparting the concept of nutrition in agriculture i.e. helping the Ministry of Agriculture give attention to crop diversification with a view to providing the nation with a balanced food basket i.e. a balanced diet having all nutrients in right quantities, rather than the age-old rice-dominated diet. In addition, BIRTAN has also been successful in developing ideas for processing and preservation of fruits and vegetables. On the other side, IFST of BCSIR has invented tens of dozens of recipes and made many patents of their research products in food processing and preservation. IFRB of AEC has also been doing research in food processing and preservation through radiation technology.

The Bangladesh National Nutrition Council (BNNC) started in 1974 under the aegis of the Ministry of Health. It has accomplished a number of achievements. Some of these are the formulation of the Bangladesh National Plan of Action for Nutrition (NPAN), Bangladesh Food and Nutrition Policy, and the Bangladesh Dietary Guideline. In addition, BNNC has for long provided funds for research projects on nutrition and also conducted nutrition education programmes for thousands of school teachers and imams. A good number of NGOs have played an important role in bringing the concept of nutrition education and research. The International Centre for Diarrhoeal Disease Research, Bangladesh, the Bangladesh Rural Advancement Committee (BRAC), World Vision Foundation and Proshika are among the top ones. ICDDR,B has made the discovery of the oral rehydration saline (ORS) which has saved millions of children and adults from death all over the world due to diarrhoea. The Centre has now research programmes on health and nutrition. BRAC is doing research and also has large number of education and training programmes in nutrition at the grass-roots level. World Vision Foundation concentrates on dissemination of knowledge on various aspects of nutrition, particularly vitamin A problem of the country. Proshika also has a number of training and education programmes in nutrition. [Khaleda Islam and Harun KM Yusuf]

Pharmacy education and research The term Pharmacy has been originated from a Greek word, *Pharmakon*, meaning medicine or drug. The first mention of the word pharmacist is found in French record in 1178 AD. Although the profession of pharmacy and concept of pharmacist is a bit older, the first educational institution started in Paris through the establishment of College de Pharmacie in 1777.

Pharmacy education in Bangladesh had its formal beginning in the year 1964 when the degree course in Pharmacy was introduced in a section of the Department of Biochemistry, University of Dhaka. In about two years time after its inception, the Pharmacy section was upgraded to a full-fledged independent department.

At present, the following institutions hold membership in the Pharmacy Council of Bangladesh and are accredited by the council on Pharmaceutical Education in the country. Degrees from these institutions are listed as B Pharm and those having this degree are eligible to get the Pharmacist Grade A registration by the Pharmacy Council of Bangladesh. Department of Pharmacy, Faculty of

Pharmacy, University of Dhaka, Dhaka. Department of Pharmacy, Faculty of Biological Sciences, Jahangirnagar University, Savar, Dhaka. Department of Pharmacy, University of Asia Pacific, Dhanmondi, Dhaka. (Yet to be accredited by the Pharmacy Council of Bangladesh). Department of Pharmacy, Gono Biswabidyaloy, Savar, Dhaka. (Yet to be accredited by the Pharmacy Council of Bangladesh), Department of Pharmacy, University of Rajshahi, Rajshahi, Department of Pharmacy, University of Science and Technology, Chittagong (USTC), Foy's Lake, Chittagong, Pharmacy Discipline, University of Khulna, Khulna. (yet to be accredited by the Pharmacy Council of Bangladesh).

The Pharmacy Council, established in 1976 under the Pharmacy Ordinance of 1976, regulates and controls pharmacy education and practice in the country. Although all the Departments of pharmacy in the country had started with a 3-year (Honours) degree course, the departments in Dhaka and Jahangirnagar Universities have introduced a 4-year (Honours) degree course effective from 1996-1997. Other universities have also started following the same type of courses in the recent years. These departments also offer a 1-year Master of Pharmacy degree course with or without research programmes.

The Pharmacy department of Dhaka University also offers MPhil and PhD degrees by research. The graduates are given registration by the Pharmacy Council of Bangladesh as Grade A pharmacist to practice pharmacy in the country. The graduate pharmacists are employed in the pharmaceuticals manufacturing industries of the country in their production, quality control and marketing departments. Some of them are also employed as hospital pharmacist.

In addition to degree courses, Diploma and Certificate courses in Pharmacy are also offered by Institutes of Health Technology situated in Dhaka and Rajshahi, one Medical Assistant Training School at Bagerhat, and irregularly by the Armed Forces Medical Institute of the Dhaka Cantonment. These institutions have so far produced more than 9,000 Diploma pharmacists who are registered by the Pharmacy Council as Grade B pharmacists. Certificates for practising retail pharmacy or as a dispenser are given by the Pharmacy Council of Bangladesh to people who pass a trade test conducted quarterly by the Council. The Diploma pharmacists normally work in the rural hospitals, health complexes, clinics and diagnostic laboratories, and the Pharmacy Certificate holders are mainly employed in the retail pharmacy shops and dispensaries selling drugs and serving prescriptions to the general public throughout the country. [Abdul Ghani and Md. Omar Faruk Khan]

Pharmacy Ordinance, 1976 promulgated to regulate the practice of pharmacy in the country through a Pharmacy Council. This Ordinance (Ordinance No. XIII of 1976) was made on the 27th February, 1976 to establish a Pharmacy Council to regulate the practice of Pharmacy and to provide for other matters connected therewith and incidental thereto.

Under this Ordinance, the Government, by notification in the official gazette, established a council, known as the Pharmacy Council of Bangladesh. The functions of the council among others include the following: (a) to approve examinations in pharmacy for the purpose of qualifying persons for registration as pharmacists; (b) to approve the courses of study and practical training in pharmacy for the purpose of admission to approved examinations; (c) to recognize degree or diploma in pharmacy for the purpose of registration as pharmacists; (d) to register pharmacists and grant certificates of registration;

(e) to hold examinations for the purpose of registration as pharmacists, and (f) to do such other acts and things as may be empowered or required to do by or under this Ordinance.

The Council performs these functions by appointing inspectors and/or sub-committees as and when necessary. Under this Ordinance, no person is allowed to practice as a pharmacist unless he is a registered pharmacist and displays his certificate of registration in a conspicuous place within the premises in which he so practices. No suit, prosecution or other legal proceeding can be taken against any person for anything which is in good faith done or intended to be done under this Ordinance. [Abdul Ghani]

Health economics refers to application of the principles of economics in managing the health sector in the most cost-effective manner. Application of the principles of economics in health care management in Bangladesh has not so far been an area of strong interest to the economists or the health professionals. But this situation is gradually changing. It is estimated that in the year 2040 the population of Bangladesh would be around 240 million. Thus, a huge population will strike the country with formidable health problems in the coming decades. In sharp contrast to this, resources are turning more and more scarce. Knowledge and skill may increase but material resources of which the prime component is land will continue to be lost to non-agricultural uses, but demand for it for human wellbeing will increase in proportion to the number of people inhabiting this small piece of land. At present per capita land in Bangladesh is the lowest of any country in the world. Conversely population density is the highest in the world.

Thus, economic resources that are available to a country at present must be spent in a manner that it produces the best results- that is, benefit the majority with lasting results. Optimisation of spending for maximising the outcome is extremely important in health sector. At one time illness was seen as a period of no work with little or no reflection on its economic cost because in a country with per capita income of less than \$300 it obviously did not receive close scrutiny. But today it is no more seen as simple abstention from work but it is given an economic value and thus entails an economic cost.

There were no formal institutions for study of health economics in Bangladesh until recently. The University of Dhaka addressed this inadequacy by the establishment in 1998 the country's first university department-the Department of Health Economics. Nevertheless, there were some health economic studies being carried out at international organisations, particularly at International Centre for Diarrhoeal Disease Research, Bangladesh.

The economic cost and benefit analysis of health is a subject that is gaining its importance in different organisations in Bangladesh. The target sectors are identified by various organisations in terms of market opportunities. Most international organisations such as WHO, UNDP, the World Bank, Asian Development Bank, UNESCO, UNICEF etc do routinely study major projects in the health sector through incisive health economic analysis in the context of the specific-country situation before implementation. The demand for careful health economic analysis in Bangladesh will certainly increase in the years ahead and facilities need to be created to meet the increased demand. [Zia Uddin Ahmed]

NGOs in health services There are many sectors where the NGOs are now operating actively in Bangladesh. Important among these are poverty alleviation, economic empowerment of the under-privileged and of women, primary education and adult literacy, health education, family planning, etc. Provision of routine health services even in a modest scale is not usually a target activity for the NGOs, neither can it be so for practical reasons of scope of activity of the NGOs and enormity of the task. Instead, therefore, many NGOs prefer to engage in healthcare activities that relate to specific development related projects. Today there are about 20,000 NGOs operating in the country. Most of these are, however, small with focused sphere of activity, but there are a few very large and internationally reputed. These have a broad spectrum of activities including some healthcare programmes.

By far the most prominent NGO working exclusively in the health sector is an international NGO which was created by the Parliament of Bangladesh in 1979 under the name International Centre for Diarrhoeal Disease Research, Bangladesh. Although it had its early focus on diarrhoeal diseases, the centre has broadened its scope in recent years to include health research in general.

Among the national NGOs, it is the smaller ones that work in specific health related projects, usually educational programmes and interventions with drugs and vaccination activities. Areas that are of current interest to the NGOs are Sexually Transmitted Diseases, tuberculosis, leprosy, intestinal parasites and in the family planning sector, on maternal and child health-related problems and fertility intervention with drugs and some vaccines that are being tested for suitability and acceptability.

Provision of routine health services, as opposed to health awareness creation and nutritional education, is an area of relatively less thrust for most NGOs. The former is admittedly the primary responsibility of the government. In Bangladesh the latter is operated entirely on public funds from the government's own internal resources. Needless to say, for resource constraints the healthcare services provided by the government is inadequate. The NGOs have not identified this as an area of their major interest, but rather their participation mainly relates to new products and medical services that may improve the health of the people by creating demand for these products and services. During the early 1990s, the country's health and population sector received very substantial funds from the World Bank and organisations of the UN system and the Asian Development Bank under the Fourth Population and Health Project totalling over half a billion dollars. This project considerably enhanced expenditure in the health sector and many NGOs emerged during this time to participate in the implementation of the project. The Fifth Health and Population Project that followed also infused large funds in the sector turning this area into a vibrant platform for many NGOs activities.

Since the very large number of NGOs that operate in the country at the present time have their units active in all parts of the country, the NGOs have served an important ancillary function. They have been of value in supplementing government efforts in healthcare areas such as childhood immunisation, and nutritional education and intervention at the community level. During the National Immunisation Day, which is being observed since 1995 for administration of oral polio vaccine to infants and children under the age of five as part of Polio eradication programme, millions of polio vaccines are given, where NGOs with hundreds of thousands of volunteers from the community participate. Also, the NGOs help create awareness towards the Extended

Programme of Immunisation in which children are immunised against six preventable childhood diseases. [Zia Uddin Ahmed]

a non-government health sector of the pre-British period. The *Vaidyas*, the only health workers during the Hindu period, practiced *Ayurvedic* methods of treatment. *Unani (Hekimi)* methods were added to *Ayurvedic* system during the Muslim period. However, folk treatment was also prevalent along with these two methods. The East India Company who brought western treatment established the Indian Medical Service (IMS) in 1764 to look after European health in British India. Medical Colleges were established in the three Presidency towns between 1835 and 1845 to train subordinate medical staff. Till 1860, Indian Medical Service practice largely remained confined within the orbit of curative medicine. A sanitary perspective was however introduced for the first time in 1835 by James Ronald Martin, presidency surgeon of Bengal.

With the assumption of control by the Crown from the East India Company in 1857, the army in India came to constitute the largest single concentration of British troops outside the United Kingdom, one-third of all British forces. High rates of illness and death from epidemic diseases threatened the security of this force and prompted health measures across the subcontinent. By mid-19th century Britain was entering the era of sanitary reorganisation. Of the total number of British deaths in the army in the first half of the nineteenth century, only 6 per cent were due to military conflict. The rest were caused by four major diseases-fevers, causing 40 per cent of all deaths and three-quarters of all hospital admissions; dysentery and diarrhoea; liver diseases; and cholera, the greatest killer, particularly when the troops were on the march. The diseases which killed British soldiers were endemic to the country.

Florence Nightingale's campaign for a sanitary commission for bringing medical reforms among the European troops in India was rewarded in May 1859 when a Royal Commission was appointed to investigate the sanitary state of the army in India. The Military Cantonments Act of 1864 provided for a system of overall sanitary policing under the charge of military medical officers. New army barracks were constructed for providing more ventilation. The Cantonments Act also made provision for the medical inspection and regulation of brothels to mitigate the danger of venereal diseases among British soldiers.

The establishment of charitable dispensaries from the 1830s has been regarded as one of the earliest attempts to extend western medical care to the Indians. They became centres for vaccination against smallpox and for spreading western ideas about hygiene and sanitation. From 1870 the colonial administration distanced itself from the financial responsibility of running these dispensaries and they were left to raise their own resources. In Bengal, the total number of dispensaries rose from 61 in 1867 to over 500 in 1900. The Government of Bengal, from time to time, drew up schemes for employing the native, male *kaviraj* to popularize western medicine (alongside the use of indigenous drugs) at the village level. There were about ten to fifteen *tikadars* (inoculators) who practised in 1830. Their number rose to 30 in 1844 and to 68 by 1850. In 1907, the Director General of the IMS agreed to the proposals of giving Commissioners of different districts all over India a free hand to permit municipal and local boards to choose and employ *vaid*s and *hakeems*.

The Compulsory Vaccination Act of 1880 empowered provincial Governments to introduce compulsory vaccination for children over 6 months old. Apart from this kind of feeble medical intervention on the part of the imperial Government

the actual responsibility for public health was left to the initiative of the local administrative units like municipalities in the larger towns (set up between 1871 and 1874) and District Boards were being set up in the rural and semi-urban areas since 1881. They were required to raise their own resources and provide for drainage, water supply, general sanitation, maintenance of hospitals and dispensaries, etc in addition to other developmental activities. Municipalities generally employed untrained Sanitary Inspectors and the District Local Boards employed ill-paid and poorly educated vaccinators. Between 1888 and 1893, a Sanitary Board was set up in each province, composed of administrative and public works officers apart from the Sanitary Commissioner and the Inspector General of Civil Hospitals. The main function of these Boards was to give technical advice to the local bodies on sanitary works, which would be backed by financial contributions of the provincial Government.

The district hospitals are generally overcrowded with capacity unequal to demand. But facilities at the lower level are characterised by underutilisation and this is mainly due to lack of people's confidence. The new five-year health and population sector programme (HPSP) based on the Health and Population Sector Strategy (HPSS) already under implementation since July 1998 calls for providing an essential service package (ESP) or a community based healthcare scheme to the entire population at four different levels of delivery. The levels are: community out-reach, health and family welfare centres/rural dispensaries, upazila health complexes as first referral system and district hospital as second referral system. The public-private partnership in health (PPPH) programme is one of the components of the HPSP which aims to improve the access to the poor of good quality essential services especially to women and children by engaging the private sector. ESP includes child health, reproductive health, adolescent health, family planning, infectious diseases and curative services. These are the priority primary healthcare services for Bangladesh. The purpose of this is to develop a delivery system for primary care services for people of rural Bangladesh who have less access to healthcare services.

The non-government sector has successful stories in implementation of health and population programmes in accessing the poor to good quality essential services, especially the women and children. Bangladesh Rural Advancement Committee's (BRAC) community based health and population programme that utilises community health workers and makes use of community partnership is one such successful example of extending all elements of ESP through community partnership. Over the decades BRAC has been successfully implementing healthcare services at household level as well as from periphery static service delivery sites through strong involvement of community. Some of the successful stories of BRAC's healthcare services include Extended Programme of Immunisation, DOT tuberculosis programme, family planning, and post and pre-natal services.

Grameen health centres are operated by physicians and their sub-centres by paramedics. The centres' care is focused on patients with acute illness and referral arrangements with three non-profit private hospitals in and around Dhaka City. A pre-payment health scheme has been developed which accounts for one third of the cost of the centres' operations. Locally generated income accounts for 66 percent of the total costs. The annual per capital recurrent cost is only about US\$ 0.37.

Gonoshathaya Kendra operates community healthcare services through four sub-centres. Paramedics mainly staff these but a physician pays visit to the

centres twice a week. These centres are closely related to the Gonoshasthaya Kendra Hospital, which manages referral cases sent from these centres. The paramedics of the sub-centres also make home visits and provide basic health care services and health education.

Dhaka Community Hospital operates rural primary healthcare clinics and maintains a 50-bed facility in the capital for referral. The clinic programme is completely self-reliant. In the rural clinics each member contribute Taka 10 monthly to the programme and in return receives periodic home visits from health workers as well as free consultation from a physician at the clinic.

The International Centre for Diarrhoeal Disease Research, Bangladesh has extensive experience with operation research and with the implementation of innovative approaches. The Matlab MCH-FP (Mother and Child Health- Family Planning) project is the longest and most thoroughly documented experience in Bangladesh with the provision of most of the elements of ESP at the community level. icddr's commendable experience in developing reproductive health programmes including the promotion of safe motherhood and detection of treatment of reproductive tract infections for the past two decades are some of the achievements.

Currently the traditional healers (about 80%) are the major healthcare providers in the country. They are the first source of care for rural people with acute as well as chronic illness. These traditional healers need improved knowledge of medical science.

Resource allocation of medical and surgical requisite (MSR) to healthcare across different levels remains neglected, which needs to be taken care of to salvage the collapsing tertiary and secondary healthcare system in the country. All hospitals attached to medical colleges receive an annual allocation to Tk 25,000 (about US \$ 500) per bed per year, which bears no relation to the reality. The district level hospitals receive Tk 18,000 per bed per year while the upazila health complexes receive Tk 10,500 per bed per year. The urban dispensaries get Tk 70,000 for each hospital. The union health and family welfare centres get Tk 40,000 each year. The central medical store gets a lump allocation of 20% of total fund for buying medical equipment, apparatus and other capital goods. The country over the past few years has seen development of modern hospitals capable of providing quality medical services. To name some of them, the National Heart Foundation, Sikdar Medical College and Hospital, Central Hospital, Japan-Bangladesh Friendship Hospital, Bajitpur Medical College and Hospital, and Dhaka Community Hospital.

The hospitals in the government sector are going to be placed under the Hospital Improvement Initiative Programme (HIIP). This would involve behaviour change of hospital staff and administration officials, improvement of structures and addition of new facilities for better service delivery.

According to the *State of the World's Children 2001* published recently by UNICEF out of 181 reported countries, Bangladesh stands 53rd from the bottom up in terms of child mortality rates. Regionally Bangladesh is reported to be doing better than other countries such as India and Pakistan, which come out 49th and 39th respectively. Parameters such as immunization coverage access to 'safe' drinking water, sanitation, rate of school enrollment especially of girls and completion of primary education are slowly but definitely showing an upward and positive trend. If the validity of these statistics hold, these are

something that Bangladesh has achieved in the last three decades. [Md Anwarul Islam]

Ref. : Khan, Naila, Health in Bangladesh in the new millenium; Haq, Naimul, Innovative approaches to healthcare and family planning services; Peters, Gordon, Healthcare in Bangladesh: the missing link; Prince, MR, *Healthcare in Bangladesh: beyond 2000*, The Daily Star, 30. 1. 2001.

ANNEX-4: List of Key Educational Institutions .

Name of key Public Universities in Bangladesh

1. Dhaka University, Dhaka
2. Rajshahi University, Rajshahi
3. Chittagong University, Chittagong.
4. Bangladesh University of Engineering & Technology (BUET), Dhaka.
5. Bangladesh Agriculture University (BAU), Mymensingh.
6. Jahangirnagar University, Savar, Dhaka.
7. Islamic University, Khulna.
8. Shajalal University, Sylhet
9. Khulna University
10. Bangladesh Open University, Gazipur
11. National University, Gazipur
12. Bango Bandhu Sk. Mujibur Rahaman Agriculture University, Gazipur
13. Bango Bandhu Sk Mujibur Rahaman Medical University, Dhaka.
14. Sher-E-Bangla Agriculture University, Dhaka.
15. Haji Denish Science & Technology University
16. Patuakhali Science & Technology University, Patuakhali
17. Moulana Bhasini Science & Technology University, Tangail.
18. Chittagong Engineering & Technology University, Chittagong
19. Rajshahi Engineering & Technology University, Rajshahi
20. Khulna Engineering & Technology University, Khulna
21. Dhaka Engineering & Technology University, Dhaka.

Name of Private universities in Bangladesh

1. North South University, Dhaka.
2. East West University, Dhaka.
3. South East University, Dhaka.
4. Asian University, Dhaka.
5. American International University Bangladesh, Dhaka.
6. Northern University, Dhaka.
7. Asia Pacific University, Dhaka.
8. South East University, Dhaka.
9. Atish Dipankar University
10. Royal University, Dhaka.
11. Stamford University, Dhaka.
12. Uttara University, Dhaka.
13. Peoples University, Dhaka.
14. Queens University, Dhaka.
15. University of Development Alternative (UDA), Dhaka.
16. Victoria University, Dhaka.
17. Comilla University, Comilla with a Dhaka campus.
18. Darul Ihsan University, Dhaka.
19. Independent University of Bangladesh (IUB), Dhaka.
20. Presidency University, Dhaka.
21. United University, Dhaka.
22. World University of Bangladesh
23. Dhaka International University, Dhaka.
24. Ahsanullah University of Science & Technology
25. BRAC University, Dhaka.

26. Premium University, Dhaka.
27. Gono University, Savar, Dhaka (Medical University)
28. Viqarunnessa University
29. Central Women's University, Dhaka
30. International University of Business, Agriculture & Technology (IUBAT)
31. Manarat International University, Dhaka.
32. Islamic University, Chittagong.

Source: University Grant Commission in Bangladesh Statistical Pocket Book-2004, BBS

List of Unani and Ayurvedic Educational Institutions

Unani Educational Institutions

1. Tibbia Habibia College, Dhaka
2. Government Tibbia College, Sylhet
3. Chittagong Unani Tibbia College, Chittagong
4. Chandpur Unani Tibbia College, Chandpur
5. Islmia Unani Tibbia College, Bhola
6. Unani Tibbia College, Feni
7. Khulna Unani Medical College, Khulna
8. Momenshahi Unani Medical College, Mymensingh
9. Hamdard Unani Medical College, Bogra
10. Akbar Ali Khan Technical and Commercial College (Unani Branch), Gaouripur, Comilla.

Ayurvedic Educational Institutions

1. Momenshahi Ayurvedic College, Mymensingh
2. Noor Majid Ayurvedic College, Dhaka.
3. Mojaher Ayurvedic College, Chittagong
4. Kundeshwari Ayurvedic College, Gohira, Chittagong
5. Srihatta Sanksrit College (Ayurved Branch), Sylhet
6. Prafulla Singha Ayurvedic College, Magura
7. Amrita Lal De Ayurvedic and Unani College, Barisal.

Source: Ahsan Ullah, 2002.