TRENDS AND DEVELOPMENTS OF AYURVEDA

Hemachandran Nair. G “Study of the application of information technology in the treatment and preparation of medicine in ayurveda with special reference to Kerala” Thesis. Department of Library & Information Science, University of Calicut, 2005
CHAPTER II

TRENDS AND DEVELOPMENTS OF AYURVEDA

Origin of Ayurveda
What is Ayurveda
Basic Philosophy of Health, Disease and Treatment in Ayurveda
Ayurveda as a Sastra
Ayurvedic View of Life
Ayurvedic Viewpoint of Structure and Functions of Body
Diagnosis in Ayurveda
 Modes of Ayurvedic Treatment
Ayurvedic Medicines
Ayurveda in India through the Ages
Growth of Ayurveda in Kerala
Ayurveda at International Level
International Market Share of Ayurvedic Drugs and Products
Universality of Ayurvedic Treatment
Scope of Ayurveda Medicine
Social Relevance of Ayurveda
Ayurveda in the context of Globalisation
Patents and Intellectual Property Rights in Ayurveda
Biopiracy in Ayurveda
Standardisation of Ayurvedic Drugs
Research in Ayurveda
Information Technology
The Information Society
The Knowledge Society
Cyber Society
Medical Informatics
Cyber Medicine
Information Technology in Ayurveda
Computerised Ayurvedic Studies
Current Problems in Ayurveda
TRENDS AND DEVELOPMENTS OF AYURVEDA

Ayurveda, the ancient science of life and health, is a unique heritage of India. In spite of its glorious past as a global medicare system, presently its official practice is limited only to India and certain neighbouring countries. With the changing concepts of health and disease and shifting scenario of health needs of the present times, there has been an amazing arousal of interest which is likely to be accelerated with the growing trends of information technology, economic globalization and industrial activism.

The present study is basically conducted in the field of information science and Ayurveda. It has several theoretical and practical challenges as nobody has attempted to conduct a study like this before, especially in the context of information society, knowledge society, cyber society, medical informatics, cyber medicine etc. Considering the importance of the above concepts for conducting the present study, this topic of "Trends and Developments of Ayurveda" has been included as a chapter, though this is an integral part of review of literature.

1. Origin of Ayurveda

Ayurveda is an intricate system of healing that originated in India thousands of years ago. The historical evidence of Ayurveda can be seen in the ancient books of wisdom known as the Vedas. In the Rig Veda, over 60 preparations were mentioned that could be used to assist an individual in overcoming various ailments. The Rig Veda was written over 6,000 years ago, but really Ayurveda has been around even longer before. Ayurveda is more than just a medical system. As the name itself implies Ayurveda, is the science of life. One of the principal tenets of Ayurveda is that ‘life is eternal’, so its
science should also be eternal. According to the Charaka Samhita, Ayurveda is eternal because of following reasons.

1. It has no beginning.

2. It deals with things, which are inherent in nature.

3. Such natural manifestations are eternal.

Based on several facts and proofs, scholars of Ayurveda and ancient literature have said that Ayurveda originated before or around 6000 B.C. because prior to this, Ayurveda was preached and practised orally. Historians have considered this to be the time of origin of Ayurveda, speaking on the basis of written proofs only (Dash and Junius, 1983).

2. What is Ayurveda?

Ayurveda is made up of two Sanskrit words: Ayu which means life and Veda which means the knowledge. To know about life is Ayurveda. However, to comprehend the vast scope of Ayurveda fully, it is necessary to understand the meaning of "Ayu" or life. "Ayurveda" in totality means 'Science of life'. It incorporates all aspects of life whether physical, psychological, spiritual or social. What is beneficial and what is harmful to life, what is happy life and what is sorrowful life; all these four questions and life span allied issues are elaborately and emphatically discussed in Ayurveda. According to the ancient Ayurvedic scholar Charaka, "ayu" is comprised of four essential parts. These are mind, body, senses and the soul (Gupta, 1919).

3. Basic Philosophy of Health, Disease and Treatment in Ayurveda

As per Ayurveda, 'Health' is a state of equilibrium of normal functions of doshas, dhatus, malas and agni with delighted body, mind and soul. It means that when Doshas, Dhatus, Malas and Agni are constantly in a state of functional equilibrium, then the health is maintained. Otherwise distortion of
the equilibrium results into diseases. Erratic lifestyle is believed to be one of the basic reasons behind the failure of the mechanism of maintaining equilibrium (Dash, 1980). Treatment either with or without drugs and application of specific rules of diet, activity and mental status as described, disease wise, brings back the state of equilibrium i.e. health.

4. Ayurveda as a Sastra

The word philosophy is used in the sense of the Sanskrit word darsana. The term sastra is translated as science. Darsana can be understood as appraisals of the fundamental laws of nature. There can be different darsanas, because of the different premises from which and through which the enquiry proceeds. Sastra is the study of how the fundamental principles of nature are put into practice with regard to some particular aspect of life. What, why, when and how to apply are explained in the sastra. Ayurveda is ayussastra: the science of life. Life is what living beings feel, think, say and do all the time. These external conditions and circumstances affect the physical and mental manifestations. If all these external factors are in proper order, the internal biological processes are also in proper order resulting in health, experienced as all-round well-being, or ease. Otherwise it is disease, disorder, with its various aspects. They are explained in the texts of Charaka, Susruta and Vagbhata. These are the fundamental sources of valid knowledge of Ayurveda or aptavakya. Only through the correct interpretation of the texts, can these ideas be understood properly. Here darsanas assist in correctly assessing the importance of the texts. One may think that in the evolution of various darsanas, Ayurvedic speculations may have made some contributions; because, in the process of solving certain problems in Ayurveda, the ideas of the darsana naturally come up. Perhaps Ayurveda provided the contexts to prove the validity of the darsanas (Thirumulpad, 1999).
5. Ayurvedic View of Life

Ayurveda perceives man as an integral part of nature. They both have fundamental commonalities. Every anguish and distress of man is caused by his ignorance of the body and the mind. It is this anguish, which manifests as a disease. Appropriate and perfect knowledge retrieves man from his anguishes. Ayurveda attempts to understand and explain the human life in its entirety. It may not be completely true to characterise Ayurveda just as a science dealing with the human body and its life. Because, it is more than a healthcare system, it happens to be a philosophy of life (Varier and Regunath, 2001).

6. Ayurvedic Viewpoint of Structure and Functions of Body

Universe as well as human body is made up of five basic elements collectively called ‘Panch Mahabhootas’. These are Aakash (Ether), Vayu (Air), Agni(Fire), Aapa (Water) and Prithvi (Earth). The sixth mandatory component of life is Atma (life spirit) without which life ceases. The human body is made up of Doshas (Bio-humours), Dhatus (Body matrix) and Malas (excretable products). Vata, Pitta and kapha known as the Tridoshas are physiological entities of the body, which are responsible for carrying out all the functions of the body. Dhatus are the structural entities of the body. These are Rasa (Plasma), Rakta (Blood cells), Mamsa (Muscular tissue), Meda (Fatty tissue), Asthi (Bony tissue), Majja (Bone marrow) and Shukra (Hormonal and other secretions of genital). Agni (Metabolic fire) is in thirteen different forms and carries out the whole metabolism of the body. The waste products of the body, which are excretable, are produced in the body as by-products of metabolism. These are known as malas, which include Pureesh (faeces), Sweda (sweat) and Mutra (urine). All biotransformations within the body occur through Srotases (body channels), which are the sites for the action of agni (Sharma, 1995).
7. Diagnosis in Ayurveda

Diagnostic procedures in Ayurveda are two pronged; one is aimed to establish the state and type of pathology and second to decide the mode of treatment to be applied. The former implies examination of the patient and the different investigations to diagnose the disease entity. Inspection, palpation, percussion and interrogation are the main modes of physical examination. The second type of examination is to assess the strength and physical status of the individual so that accordingly the type of management required could be planned. For this examination of Prakriti (Body constitution), Saar (Tissue quality), Samhnan (physique), Satva (Mental strength), Satamya (specific adaptability), Aaharshakti (diet intake capacity), Vyayaam shakti (exercise capacity) and Vaya (age) is done. On the basis of this examination the individual is decided to be having Pravar Bal (excellent strength), Madhyam Bal (moderate strength) or Heen Bal (low strength) (Kurup, 1983).

8. Modes of Ayurvedic Treatment

There exists eight divisions of Ayurvedic therapeutics, namely Kayachikitsa (Internal medicine), Shalya (Surgery), Shalkya (Otorhinolaryngology and Ophthalmology), Kaumr Bhritya (Paediatrics, Gynaecology and Obstetrics) Agad tantra (Toxicology), Rasayana (Gerentorology), Vajikaran (Aphrodisiacs) and Bhoot Vidya (Psychiatry) (India, 2000).

The principles of treatment are Shodhan (purificatory), Shaman (palliative and conservative), Nidan parivarjan (avoidance of causative and precipitating factors of disease) and Pathya Vyavastha (do’s and don’ts regarding diets lifestyle). Shodhan therapy includes Vamana (medically induced emesis), Virechana (medically induced laxation), Vasti (medicated enema), shirovirechana (administration of medicines through nose) and Raktmokshan (Blood letting). These therapeutic procedures are collectively
known as Panch karma. Before executing Panch karma treatment Snehan (olation) and Swedan (getting perspiration) are to be employed first.

9. Ayurvedic Medicines

Whatever is natural, whether belonging to plants, animals, or minerals, is considered the source of raw material for Ayurvedic medicines. However 600 medicinal plant products, 52 minerals and 50 animal products are commonly used.

Ayurvedic medicines are marketed in various forms. The main ones are tablets, pills, powders, fermentation products (Asva-arishta), decoctions, medicated fats (Ghrita and Tel). For topical use drops, creams, lotions, liniments and ointments are available. Dried plant extracts in capsule form are also in use presently (Sharma, 1987).

10. Ayurveda in India through the Ages

Ayurveda is not a stagnant science. It was developing throughout its history, even though there were periods of rapid progress and comparative stagnation. Throughout the history, its propagation was mainly through academic tradition even though familial tradition also coexisted. Ayurveda has interacted with various medical systems from time to time and this interaction has also facilitated its growth.

Harappa, Indus Valley Civilization, which arose around 3000 B.C. and lasted for perhaps 1500 years, gave way to the Vedic civilisation. The Aryans brought with them Vedas, their ancient book of wisdom and sacrificial ritual. The Vedas took on their current form at some point during the second millennium B.C. (Svoboda, 1992). Ayurveda is the Upveda or accessory Veda, to the Atharva-Veda. The Atharva – Veda differs in subject matter from the other three Vedas (the Rig-Veda, Yajur-Veda and Sama-Veda), being basically a manual of magic. Both Atharva-Veda and Rig-Veda contain a lot of
reference about drugs, anatomical terms, names of diseases, surgical procedures and therapeutics measures. From the youngest of the Vedas, the Atharva Veda developed Ayurveda. At the turn of the first millennium B.C. the treatise now known as the Charaka Samhita, the first and still most important of all Ayurveda texts appeared (Agnivesh, 2002).

Ayurveda gained its identity as a separate science in the post Vedic period. During this period the major Ayurvedic treatise known as Samhita was written (Samhita is a compendium). During the Samhita period scientific conceptualisation of popular knowledge and formation of scientific medicine was coined. Samhita period was followed by Sangraha period. Sangraha is a compilation. This period produced a good number of classics and commentaries of former work. Sangraha period also produced various Ayurvedic dictionaries and Pharmacopoeias. Indian culture entered its golden age during this period and learning flourished. By the sixth century B.C. a University was established at Takshashila in Rawalpindi. One of the Takshashila products was Jivaka, the royal physician of King Bimbisara of Magadha, who was appointed by the King to personally supervise the health of Gautama Buddha and his followers (Agnivesh, 2002).

Ayurveda medicine was already extensively developed by the time of Buddha. The Buddha, who taught compassion for all beings, supported both the study and practice of the medicine. In the third century B.C. Asoka, the emperor of most of North India became a convert to Buddhism. Motivated by compassion for all sentient beings, Asoka built charitable hospitals for both humans and animals throughout his realm (Svoboda, 1992). In the fourth century A.D. three more famous Ayurvedic texts appeared. Astanga Sangraha probably in the sixth century and Astanga Hrydaya about a century later are both ascribed to Vaghbhata. In the eighth century Madhava Nidana, a treatise on diagnostics appeared. The Buddhists, who supported all forms of learning,
set up the most famous university Nalanda, to teach Buddhism as well as Ayurvedic medicine along with other subjects.

The Golden age ended when Mughals invaded Northern India between the tenth and twelfth centuries. At that time Buddhism had developed in entire Northern India and monks went to neighbouring countries like Nepal, Sri Lanka and Tibet where Ayurveda had first penetrated along with Buddhism. The arrival of Mughals brought their own medicine, the Unani Tibbia, to India. While India’s Muslim rulers tendered to support Unani, Ayurveda also flourished. During the sixteenth century Akbar, the greatest Mughal emperor and a remarkable enlightened ruler, personally ordered the compilation of all Indian medical knowledge under the direction of his finance minister Raja Todar Mal (Svoboda, 1992).

During the colonial period Lord McCauley ordered that English Medicine should be exclusively encouraged in all areas governed by the East India Company, and the Eastern Systems were actively discouraged. During the 19th century Indian political climate was boiling with the National movement. The interest in Indian art and science was reawakened and Ayurveda began a gradual renaissance. Today it is one of the six medical systems in India that are officially recognised by the government. The others are Allopathy, Homeopathy, Naturopathy, Unani, Siddha, Yoga Therapy and Amchi system of medicine (Svoboda, 1992).

The Independence of India had its impact on Ayurveda too. Ayurveda was hailed as Indian Medicine and government encouraged its growth. A large number of Ayurveda colleges, hospitals and dispensaries were established. Modern anatomy and physiology and surgery were incorporated in the books written during in this period (Agnivesh, 2002).

India’s independence had marked the emergence of new legislation and new government policies. A large number of commissions were appointed to
assess the status of Ayurvedic practice and education. The central government has also constituted Central Council for Research in Ayurveda and Siddha. The council has about a hundred units conducting Ayurvedic research. Ayurveda departments were set up under the central and state governments. Governments started Ayurveda University and colleges, and allotted financial grants to Ayurveda colleges in private sector also. Manufacture and sale of Ayurvedic drugs also brought under law. About eighty percent of Indian population utilise Ayurveda for their medical care. In independent India Ayurveda practice gradually shifted from one institution to a more complex multi-faculty institutions.

11. Growth of Ayurveda in Kerala

Kerala has always been a promising land for different social community groups. Kerala is generally hailed as the region of healthy people and health care practice. This is not only due to their social habits and living practices but also due to traditional systems of treatment developed and followed by the people over centuries (Kurup and Vijaykumar, 1999). Kerala has different traditions of Ayurveda schools, efficient practitioners, reputed drug manufacturers and people who have faith in this ancient system. Keralites have greatly contributed to the evolution of proper health care and medical system in their homeland by incorporating several indigenous practices. Kerala has contributed much to the growth of Ayurveda.

Ayurveda has deep rooted and wide spread influence on Kerala. This pan Indian system entered this region through two major streams viz. Buddhistic and Brahmanical. The genesis of Ayurveda can be traced to the Veda, which emerged in the Sapta Sindhu region; its perfect existence can be seen even now in Kerala. It was in the period of Samhita that the medicines and its methods prescribed were put into letters. There arose a number of Samhitas like Carakasamhita and Susrutasamhita. Another great text in the
field was written by Vagbhata viz. Astangahrdayam in seventh century A.D. at Alappuzha. Even though Charaka and Susrutha are revered and their texts are popular in Kerala, it is Vagbhata's Astangahrdayam, which serves as the foundation of Ayurvedic treatment in Kerala (Varier, 1993).

When the Bhramins came to Kerala, they never tried to replace the existing system fully or to impose their system in total. There are Namboothiri Brahmin families called Astavaidyan viz. Pulamanthol, Alathiyur, Kuttancherry, Trissur Thaikad, Eledath Thaikad, and Cirattamon etc. The tradition of Astavaidyas is noteworthy. They are so called because of their proficiency in all the eighth angas. Kerala, which imbibed the pan-Indian Ayurveda, contributed its own share to this branch of knowledge (Varier, 1993).

Kerala has produced a number of works on Ayurveda in Malayalam. Aithiyamala, a collection of popular legends on Malayalam contains many stories on the rare medical skill of various Astavaidyas. Kalari, the martial art of Kerala is a complimentary part of ancient medicine. The masters of Kalari have many drug formulations of their own. There are many medicated oils and peyas also (Murali, 2002).

During the seventeenth century the Dutch Governor of Cochin Hendrik Adrian Van Reed collected and codified the details of Ayurvedic and folk medicinal properties and published Hortus Indicus Marabaricus, the famous ancient materia medica in Latin language. This voluminous study deals in detail with the medical plants of Kerala and identification of plants through 794 illustrations (Sankaran, 2002).

The colonial challenges faced by the Indian society led to the movement during the nineteenth century, which later worked as a catalyst in the propagation of oriental studies. Uppottu Kannan (1825-1885) was a famous Ayurveda Physician from North Kerala. Tayyil Kumaran Krishan (1856 - 1917) had prepared an Ayurvedic Oushadhi Nighantu (Ayurvedic Medical Dictionary)
in Malayalam after fifteen years of hard work in 1906. Which has got good acceptance from Ayurvedists. Vaikkathu Pachu Muthatu (1813-1882) was a versatile genius in Ayurveda treatment and has written two books Hrdyapriya and Sukhasaadham based on Astangahrdyam, which serves as handbook for clinical practice. Colayil Kunji Mami Vaidayn (1865-1933), born in the family of traditional physicians, became a famous physician in a short period (Murali, 2002).

Two most outstanding social reformers in Kerala were Chattambi Swamikal (1854-1924) and Sri Narayana Guru (1856-1928). Chattambi Swamikal was an expert in Sidhavaidyam, which emphasised treatment by minerals. Sri Narayana Guru was born in the family of traditional physicians and had deep knowledge of traditional medicines (Kurup and Vijaykumar, 1999).

The first and foremost attempt to establish an institution for Ayurvedic studies was started by Kaviyoor Parameswaran Moosad in 1886 at Thiruvananthapuram. In Malabar region a well-known organisation under the name Arya Vaidya Samajam came into existence in 1902. This registered organisation had been patronised by great personalities like Vallathol, the poet, Punnasserri Neelakanta Sharma, the scholar and educationalist and Valiya Raja of Nilambur royal family. Later this organisation was taken up by Vaidyaratnam P.S Varier (1869-1944) who started a centre for Ayurvedic studies at Calicut in 1917(Kurup and Vijayakumar 1999). This study centre is transplanted to Kottakkal, where he started Kottakkal Arya Vaidya Sala in Malappuram in 1902 to make available ready-made Ayurvedic medicines. This institution is now a full-fledged modern Ayurveda college with postgraduate courses and attracts patients from all over the world; the centre has mechanised the production of medicine by using steam and electricity.
After independence the government of Kerala followed a policy patronising traditional medical systems. The government started Ayurveda colleges, and hospitals in a number of villages of Kerala (India, 2000). To ensure the smooth supply of medicine, the government of Kerala started an Ayurvedic drug production centre viz. Oushadhi at Trichur in central Kerala.

11.1. Ayurveda Medical Care Facilities in Kerala

According the annual report of the Indian System of Medicine and Homeopathy in India in the year 2000, there are 116 Ayurveda hospitals and 716 dispensaries in Kerala. The total bed strength in Kerala is 2644. There are 14,000 registered Ayurvedic practitioners and 900 drug production firms in Kerala.

Table 1
Ayurvedic Medical Care Facilities in Kerala

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals</td>
<td>116</td>
</tr>
<tr>
<td>Dispensaries</td>
<td>716</td>
</tr>
<tr>
<td>Bed Strength</td>
<td>2644</td>
</tr>
<tr>
<td>Practitioners</td>
<td>14000</td>
</tr>
<tr>
<td>Manufacturers</td>
<td>900</td>
</tr>
</tbody>
</table>

11.2. Traditional Practitioners of Kerala

Traditional medicine is the traditional practice of medicine passed from one generation to another. Traditional practitioners are non-institutionally qualified practitioners, who have only a general practical knowledge which is handed down from generation to generation. Traditional practitioners are called “Vaidyans”. Vaidya community, is a community whose traditional
occupation is the practice of traditional medicine or Ayurveda. Traditional practitioners are not oriented by academically qualified Ayurvedic practitioners. They gained this knowledge either by their family traditions or by working as assistants or apprentices to the traditional Vaidya for a period of 10 to 15 years or more. They gained a practising experience without academic base and only with a little knowledge regarding the human anatomy, physiology and modern laboratory investigation techniques. At present Kerala has about 6169 non-institutionally qualified Ayurvedic practitioners. They are 44 percent among the total practitioners in the state (Reeja, 2000).

11.3. Market share of Ayurvedic Drugs in Kerala

In Kerala the total value of production of Ayurvedic products has been remaining stagnant around at Rupees. 350 crores for the last few years. Out of this 75 percent was in the organised sector i.e. in the form of trusts, private or public limited companies. The balance is produced and used by the local Ayurvedic physicians in their clinics as a household industry with a licence from the state drug controller (Narayan, 1999). In the organised sector also the production has not done in well-engineered plants. Most of the mechanised plants are only improvisation of old manual procedures for a higher batch size. The result is high cost of production and difficulty in quality control.

In Kerala there are 55 percent people resort to Ayurvedic medicine for treatment. The total annual domestic market of India on Ayurvedic drugs and products are about Rupees. 5,000 crores. The annual domestic market of Ayurvedic drugs in Kerala is Rupees 250 crores. India’s export of Ayurvedic medicine was worth Rupees 1125 crores in 2001-2002 with Kerala’s export share of Rupees 100 crores (Sharma, 2003).
12. **Ayurveda at International Level**

Unlike in India, the majority of the foreign government agencies have shown less concern in introducing Ayurveda in their country. The Alma Ata declaration of WHO in 1980, which recognized Ayurveda as an alternate holistic system of medicine has created major awareness in the West. This has expanded the scope of Ayurveda’s official entry into Europe and America.

12.1. **Ayurveda in America**

Interest of Ayurveda in the United States began in the 1970’s, largely as the result of the efforts by the Maharishi Mahesh Yogi Organisation of Transcendental Meditation. In the 1980’s Dr. Deepak Chopra wrote introductory book on Ayurveda for the general public and many Westerners became familiar with India’s ancient healing science. In addition to this pioneers like Dr. David Frawely of American Institute for Vedic Studies, New Mexico and Robert Svoboda, a Westerner who completed India’s BAMS programme of Ayurvedic Institute in New Mexico, have been influential in helping Ayurveda grow in the 1980’s (Halperns, 2000). As interest and awareness have grown, training programs of various degrees have emerged. In 1995 the California College of Ayurveda opened its doors. It was the first government-approved institution offering a recognised vocational program in America. At present there are a large number of Ayurveda study programs run by the Florida Vedic College, the International Ayurvedic Institute in Massachusetts and the Ayurvedic Holistic Center in New York. In 2000 two independent representative organisations like California Association of Ayurvedic Medicine and National Association of Ayurvedic medicine were formed. Both organisations have their mission to formalise Ayurvedic educational standards, attaining licensing and setting standards of practice. Opportunities are growing for Ayurvedic physicians from India to practise in
the United States. India’s export of Ayurveda drugs to US in the year 2001-2002 was $40.41 millions (Mishra, 2003).

12.2. Ayurveda in Canada

Ayurveda reached in Canada in 1972 by the efforts of Maharshi Mahesh Yogi Organisation of Transcendental Meditation. It has grown on par with the United States. There are a number of Ayurvedic practitioners in Canada. The Canadian Association of Ayurvedic Medicine, Ontario provides training in Ayurveda for physicians and general public and the Maharshi Ayurveda Centre, Ontario also provides health care education according to Ayurveda principle.

12.3. Ayurveda in Europe

Many European countries have increasingly turned towards Ayurveda and natural health foods supplements in the last decade of 20th century. People in Europe are turning towards Ayurveda because there are several grey areas in Allopathy medicine, which are merely suppressing the problem. The herbal medicine market in 2002 was $36.80 millions in the European Union countries.

12.3.1. United Kingdom

In the majority of the European countries, the private sectors have taken great deal of interests in promotion of Ayurveda hoping accreditation with the respective government bodies. The British Ayurvedic Medical Council which incorporates the British Association of Accredited Ayurvedic Physicians (BAAAP) is the only member of the Working Group which is actively encouraging the growth of Ayurveda in Britain. Once the self-regulation comes into force there are opportunities for Ayurveda to be offered in the mainstream publicly funded health care system (Warrier, 2003). There are more than one hundred qualified Ayurvedic physicians in the UK who are registered with the Ayurvedic Medical Association, UK.
12.3.2. Russia

The knowledge of Ayurveda reached at the medical community of Russia in 1966; the “first International Conference on fundamental principles of Ayurveda: Diagnosis and Treatment” had been convened in Moscow with the participation of Kottakkal Arya Vaidya Sala’s leading specialists. The proceedings of the conference made quite an impact in Russia’s academic circles (Rzhanitsyna, 2000). Russia now has keen interests in institutional collaborations for Ayurveda education and therapeutics resources. With the co-operation in the field of Ayurveda in July 1999 for the first time it has become the subject matter of an agreement signed between the governments of Russia and India. It was the first document that India has signed with another country in regards to traditional medicine. It was a historical landmark in introduction of Ayurveda in Russia’s healthcare system. Now Russia is all set to establish all round co-operation with Indian specialists in the field of Ayurveda and train their doctors in Ayurvedic system to promote its growth in Russia (Patel, 2000).

12.3.3. Italy

Ayurveda reached in Italy in the early nineteen nineties. The institute of Italiano di Ayurveda at Firenze established in 1994 provides training, education and clinical practice of Ayurveda. The International Association of Ayurveda and Naturopathy in Italy organises various programs on Ayurveda including short-term courses. India’s Ayurveda products export to Italy was worth rupees 7.5 million in the year 2001-2002.

12.3.4. Switzerland

Ayurveda Research Company, Walzenhausen, Switzerland provides Keralia Panchakarma treatment and health care education. There are more than 50 Ayurveda clinics in Zurich. India’s export of Ayurvedic, medicines for
therapeutic prophylactic uses to Switzerland is worth rupees 5.6 million during
the year 2001-2002 (Gupta, 2003).

12.3.5. Germany

In Germany Ayurveda based health food supplement formulations are
sold for millions of dollars every year. There is tremendous market for
Ayurveda products in Germany. It has increasingly turned towards natural
health foods and food supplements and that is why Ayurveda is increasingly
becoming the most favoured health food. Many Doctors in Germany are
interested to learn Ayurveda. Germany accounts for 5 billion worth of herbal
extracts sold as prescription drugs and covered by national health insurance.
India's export to Ayurveda products to Germany was worth 8.04 million
dollars in 2001-2002. But it was 3.12 million dollars in 2000-2001 showing a
tremendous 157.7 per cent growth rate (Sharma, 2003). The major Ayurvedic
Centre in Germany is Indo-German Centre for Health and Education and Seva
Academy for Ayurveda in Munich (Mathew, 2002). In Germany different types
of Ayurveda course are being conducted by various institutes, which are
affiliated to Indian Institute of Ayurveda, Pune (Ranade, 2003).

12.3.6. Netherlands

In Netherlands the major Ayurvedic centre is European Institute for
Scientific Research in Ayurveda which conducts research in Ayurveda
medicine and its clinical effects to various diseases like Parkinson disease,
Leukaemia, Cancer and AIDS.

12.4. Australia

Australia is a multicultural country where the streams of many different
traditions meet. Medicinal traditions are no exception. In 1979 the first
International Congress of Traditional Asian Medicine was held at the
Australian National University in Canberra. Ayurveda was practically
unknown in Australia before this event. In 1982 the Australian School of Ayurveda was founded, which is the first registered School of Ayurveda in Australia. In 1981 the Australerba laboratories, a distinguished licensed company manufacturing herbal products for Australia was founded. The Australina School of Ayurveda conducts short information courses of Ayurveda. In 1988, the first Ayurvedic Associations in Australia, the Australasian Association of Ayurveda was founded to bring greater awareness of Ayurveda to the public, to set, and to maintain good standard of Ayurvedic practice. In 1994 the Australian School of Ayurveda together with other Naturopaths established the Australasian Academy of Natural Medicine in Ayurveda (Krishna Kumar and Junius, 2000).

12.5. Ayurveda in Asian Countries

In the third century B.C. Asoka, the emperor of most of the North India became a convert to Buddhism. For the propagation of Buddhism he sent missionaries to many neighboring countries. These emissaries carried Indian science with them, which probably how Ayurveda reached in Sri Lanka, Nepal, Thailand, Myanmar and other Asian countries (Svoboda, 1992).

12.5.1. Nepal

Nepal has a special place in the history of Ayurveda. It is thought by many that the original knowledge of Ayurveda was obtained in the Himalayan foothills of Nepal. There are thousands of ancient Ayurvedic manuscripts located here. In addition, the biodiversity of Nepal makes it a fertile region for many Ayurvedic herbs. Nepal is rich in Ayurvedic tradition. Besides the living tradition its National Archives has many Ayurvedic manuscripts, which are only available here and are yet to be published. Many western scholars and agencies are coming to Nepal to record first hand heritage of Ayurveda, and Ayurvedists of Nepal are having more western patients (Baral, 1996).
The Department of Ayurveda, the apex body for Ayurveda in the country, directly under the Ministry of Health, is responsible for formulation, implementation and overall supervision of Ayurveda hospitals. The Naradevi Ayurveda hospital, a national college of Ayurvedic medicine in Kathmandu, affiliated to Tribhuvan University, conducts Ayurvedic graduate courses of 5 years duration and Ayurvedic certificate course of three years duration. There are Ayurveda regional hospitals, district Ayurvedic hospitals and primary dispensaries in Nepal (Sushila, 1997). More than 150 Indian Ayurvedic drug companies are currently supplying Ayurvedic medicines to Nepal. India’s export of Ayurvedic products to Nepal was worth rupees. 20.3 crores in the year 2001-2002 (Alms Ali, 1999).

12.5.2. Sri Lanka

Ayurveda reached Sri Lanka along with Buddhist missionaries in the third century B.C. The Ayurveda now existing in Sri Lanka is almost identical with that in India. The basic ideas of Ayurvedic theory are closely associated with the cultural traditions of both Buddhist, and Hindus in Sri Lanka (Dissanyake, 2003). There are government Ayurvedic hospitals located in almost all districts. Ayurveda is currently practised in Sri Lanka with great success. Several Ayurvedic hospitals, both state run and private, have been opened up in different parts of the island. Ayurvedic physicians are practising in almost all parts of the country. The formation of a National Health Policy for the Ayurveda reflects as a highly developmental activity at present (Abeysekera, 2000).

12.5.3. Bangladesh

The Practice of Ayurveda in Bangladesh was as old as in India, because formerly it was part of India. There are five Ayurvedic colleges in Bangladesh conducting 4-year diploma course. There are a large numbers of Ayurvedic hospitals in Bangladesh. Several Ayurvedic manufacturing units from India are
exporting Ayurvedic medicines to Bangladesh. India’s export of Ayurvedic drugs to Bangladesh was for 61 million rupees in 2001-2002 (Sharma, 2003).

12.5.4. Myanmar

An Ayurvedic College was started in Myanmar in 1976, which was renamed as college of Burmese Traditional Medicine. However, Ayurveda is the main subject of this course. It is a 3-year diploma course with one year compulsory internship. The Government of Myanmar has decided to upgrade this into a degree course.

12.5.5. Thailand

One Ayurvedic College is functioning in the suburbs of Bangkok. This was started in the private sector with a 4-year course. Graduates of these colleges are appointed in primary health centres of Thailand.

12.5.6. Japan

The Institute of Traditional Oriental Medicine, Tokyo conduct short term Ayurvedic Course for health professionals.

The other Asian countries where Ayurveda is prevalent are Hong Kong, Malaysia, Singapore, Indonesia, Pakistan, Taiwan etc. At present India exports Ayurveda drugs to more than 35 Asian countries (Sharma, 2003).

13. International Market Share of Ayurvedic Drugs and Products

There is a quantum jump of Indian Ayurvedic medicines, plants and products in international market during the couple of years, which shows a tremendous growth rate.
13.1. India’s Major Exporting Destinations of Ayurvedic Drugs

Table 2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>America</td>
<td>24.69</td>
<td>40.41</td>
<td>63.67</td>
</tr>
<tr>
<td>Europe</td>
<td>21.85</td>
<td>36.80</td>
<td>68.42</td>
</tr>
<tr>
<td>Africa</td>
<td>5.25</td>
<td>6.41</td>
<td>22.10</td>
</tr>
<tr>
<td>Rest of the World</td>
<td>77.72</td>
<td>126.94</td>
<td>63.33</td>
</tr>
</tbody>
</table>

The exporting of Ayurvedic drugs and its formulations are increasing every year. From Table 2, it can be seen that the annual export of the Ayurvedic products in the two years increased more than 50 percent in Europe and America. The export of Ayurvedic products to America in the years 2000-2001 and 2001-2002 was worth $24.69 millions and $40.41 millions respectively, which shows the growth rate of 63.67 percent. The export to Europe in the same period was worth $21.85 and $36.80 millions respectively with a growth rate of 68.42 percent. The export to Africa in the years 2000-2001 and 2001-2002 was worth $5.25 and $6.41 respectively with a growth rate of 22.10 percent. The export of Ayurvedic products to the rest of the world in the years 2000-2001 to 2001-2002 was $77.72 millions and $126.94 millions respectively. The growth rate shows 63.33 percent increase in the exporting. Therefore the demand for Ayurvedic drugs and its export will increase in the coming years tremendously (Sharma, 2003). The growth of Ayurvedic drugs export is graphically represented in figure 1.
Fig. 1. Growth Rate of Export of Ayurvedic Drugs

Regions

Rest of the World  America  Europe  Africa

US $ Million

2000-01  2001-02
13.2. Domestic Market in India

There are more than 9000 manufacturing units of Ayurvedic Medicines in India. About 50 are large scale, 200 medium scale and remaining are of small scale. Total annual domestic market of Ayurveda drugs and products in India was about Rupees 5,000 crores in the year 2001-2002 (Sharma, 2003).

14. Universality of Ayurvedic Treatment

Ayurvedic treatment is defined as the cure or relief from disease, the removal of its cause. It is the beneficial usage of medicine, diet and practices prescribed separately or together. According to Ayurveda, everything in this universe can be used as medicine and there is not a single plant or any other material that is considered useless from medicinal point of view. The physicians can however, use many drugs for the treatment of various diseases. Ayurveda has its unique method of identifying a disease and describing its diagnosis as well as treatment. The utility of Ayurvedic treatment is not confined to a particular period, region and culture. A medicinal plant described in Ayurveda may grow in a particular area, a particular type of diet prescribed in Ayurveda may be commonly used in a particular region and a type of ritual prescribed in Ayurvedic texts may be prevalent during a particular period of history. But the principles of Ayurveda, especially those laid down to describe drug composition and drug action are universal in nature. It has its unique concepts of physiology and pathology, which are equally applicable to all people in this world irrespective of their geographical, cultural, religious and traditional differences.

Ayurveda is now a dominating system of medicine in India. It is one among the accepted systems of medicine and is becoming more and more popular, due to some of its unique features, viz. emphasising the preventive aspects, treating man as a whole in a psychosomatic approach. Taking into
account the basic constitution of an individual, while diagnosing and treating
him having fewer side effects and acting in accordance with the customs and
traditions of the people. This uniqueness is essentially based on the fact that
Ayurveda is not only medicine but also a guide to a healthy and happy way of
living covering aspects of religion, philosophy, and hygiene as well as the
treatment of ill health. The chief objective of the Ayurveda is the maintenance
of the metabolic equilibrium of man and the restoration of the same if it is
disturbed by undesirable factors (Sharma, 1995).

Ayurveda is deeply rooted in Indian philosophy. The founders of
Ayurveda have an integrated view of man and life in the universe. It is mainly
the Sankhya School of philosophy from which Ayurveda has drawn its
understanding of the evolution of the universe and the man. The prime goal of
Ayurveda is the maintenance of health and not the cure of disease. Today’s
understanding of Ayurveda as a system of medicine is due to modern
civilisation with very external changes and influences. Besides aiming a
healthy life, Ayurveda is also aiming a life useful for others and the human
society at large (Bhaskar, 1971).

Modern medical science is currently in the throes of a revolution, which
is likely to have a dramatic impact on both the theories of medicine and the
way it is practised. The mechanistic model which served biomedicine well for
many years is gradually collapsing (Warner, 1997). Another participant in this
exciting climate of change and ferment is Ayurveda, India’s ancient medical
system. While Ayurveda has already contributed much to modern medicine
that is reserpine, gugulipid, plastic surgery etc, its real contributions are yet to
be made to maintain a healthy state (Nadkarni, 1978).

15. **Scope of Ayurvedic Medicine**

Ayurveda has a wide scope as far as the prevention of disease,
promotion of health and its preservation are concerned. Lifestyle rules
mentioned in Ayurveda texts if applied rigorously would give definite results. Lifestyle related diseases; drug abuse, degenerative diseases, autoimmune diseases and certain metabolic and allergic disorders are well manageable with Ayurvedic techniques and medicaments. Being holistic and disease eradicative with principles of individualised treatment, conducive to socio-economic conditions of India and with availability of abundance of formulations for any particular disease, use of food items as medicine and lifestyle rules, Ayurveda enjoys a better place as far as prevention and cure of the disease is concerned in comparison to western medical system. Kerala’s economic development is to be centred on Ayurveda, information technology and tourism in the coming days (Chitrarajan, 2002).

16. Social Relevance of Ayurveda

An affordable system of health care is the dream of human society. Modern system of medicine has made rapid strides often with magical solutions for problems of health. But it has also made the medical and health services highly expensive and unaffordable to the common man. It is in this context that Indian heritage medical system is becoming a boon to provide a cost-effective alternative. It has a significant sociological bearing especially for those who cannot afford expensive health services on account of various socio-economic factors. Thus Ayurveda is destined to become a socially relevant system of medicine.

Spirituality had always been the backbone of Indian Sciences. Ayurveda had always recommended a code of conduct for a healthy mind and healthy body. This has started making an impact on the society and people have started practicing yoga, meditation, self-regulation, and moderation etc. Ayurveda is influencing the tourism industry as well. People have started appreciating the soothing effects of oil bath massaging etc. Nutraceuticals and cosmetics are becoming Ayurveda based. Acceptance of Ayurveda will eventually bring
around the society to accept our basic values in life. Change is a very slow process. But apart from the economic advantage, Ayurveda will definitely have a sobering effect on humanity (Thara, 2002).

The limitation of modern medical science in controlling various diseases like AIDS, Cancer, Leukemia and Alzheimer’s are forcing modern scientists to look for various alternative systems of medicines for controlling such challenging disorders. Adoption of Ayurveda seems to be one of the best possible solutions to such problems because of its cost effective and safe medicines. Global acceptance of simple and safe Ayurvedic health delivery system can be made affordable to the poorest of the poor in the developing and underdeveloped countries. Ayurveda does not limit to its coverage on human beings alone. It deals with the treatment of plants and animals also.

17. Ayurveda in the context of Globalisation

The central phenomenon, which will hallmark the turn of the century, will be the globalisation of Ayurveda. It is understood that Ayurveda is a science and art of healing and hence it has to have a global character. In recent years there has been a growing interest in Ayurveda both in its holistic principles and its safe treatment modalities (Ramachandran, 2002).

Information Technology is a powerful tool in the hands of the developed and information rich countries in the globalisation process. The term globalization has been used in a multiplicity of senses. In its most general sense, globalization refers to cross - national flows of goods, investment, production and technology. The Alma Ata declaration of WHO in 1980 has created major awareness about Ayurveda in the Western World. The demand for Ayurveda in foreign countries is multifaceted which actually determines its present status in respective countries. This impact is rapidly changing the picture of Ayurveda in India as well as abroad (Patel, 2000).
Ayurveda and its allied system focus on universal applicability. India being one of the world’s 12 mega bio-diverse countries which account for 8 per cent of the recorded species of the world with 45,000 plant species. India is rich in information and genetic materials as well. India is sitting on gold mine of well-recorded and well-practised knowledge of herbal medicine. So now the Indian Ayurvedic industry wants to do original and developmental research with the help of information technology for new and user-friendly products. Otherwise, the technologically superior transnational corporations will play havoc in the field. It will be detrimental to the traditional Ayurvedic industry. (Narayan, 2003).

18. Patents and Intellectual Property Rights in Ayurveda

Many people in India feel that Ayurveda should not be allowed to globalize because of the chances of its exploitation by the multinationals at the cost of Indian economy and national interest. With the advent of new patent regime and intellectual property rights, the apprehensions in this regard have further increased. However it seems that because of the prevailing legal and economic provisions at international level, the phenomenon of globalization cannot be prevented and moreover India is the preacher of the philosophy of “Vasudhaiva Kudumbakam”, which means ‘the whole world is a family’ for centuries (Singh, 2000).

The idea of open World Trade led to the emergence of General Agreement on Tariffs and Trade (GATT), and the Trade Related Intellectual Property Rights (TRIPs). The greatest concern is the issue of linking the intellectual property with trade in new patent régime creating a situation where the trade will overwhelm the intellectual property. This is against the interest of India. In the context of Ayurveda and similar other assets of traditional national heritage, it is rather unfortunate that like Indian Patent Act 1970, the World
Trade Organization too does not make provision of protection of the ancient traditional national heritage of India.

19. Biopiracy in Ayurveda

Biopiracy means taking biological resources from one country or region to another and using it in the latter’s industry, agriculture or other commercial process. The loss of indigenous knowledge related to medicinal uses of biodiversity is bio-piracy - the piracy and patenting of traditional knowledge. In the earlier decades of last century taking away bio resources from one country to another was not considered illegal and therefore the concept of biopiracy was non-existent (Fowler, 1996). With the growth of knowledge in the field of biological conservation, especially in terms of in situ and ex situ conservation, biopiracy received international recognition. Countries now have started recognising their sovereign rights over the biological material within their boundaries (Agarwal, 1996). Recent developments in the international arena seem to reinforce the process of protecting biological resources of one country from being exploited by another. Biopiracy is now not permissible. An international treaty called the Convention of Biological Diversity (CBD) has converted biological resources from a “common heritage of mankind” to a “national property” and signatory countries are expected to frame laws to this effect (Asif, 1998).

Biodiversity of medicinal plants is the basis of Ayurvedic healing. The appropriation and patenting of Ayurvedic knowledge is another threat to the free flourishing of Ayurveda in the future. The patenting of nimba (Azadirachta indica), haridra (curcuma longa), aswagandha (Withania somifera), maricha (piper nigrarn), ardraka (zingiber officinale), karavellam (momordica charantia) . . . . is not just an assault on the collective, cumulative innovations over millennia embodied in Ayurveda.
In the past, the threat Ayurveda faced was from marginalisation through neglect; today’s threat comes from marginalisation through its commercial success and popularity. The sudden popularity of Ayurveda poses threat to its integrity as a knowledge system and system of healing. Patents on traditional Ayurvedic knowledge are doubly wrong- first, traditional knowledge is by its very nature not novel, it is not an invention. It should hence lie beyond the purview of patentability. Secondly, exclusively rights and monopolies go against the spirit of Ayurveda which treats healing as a gift, not a commodity (Vandana Shiva, 2003).

20. Standardisation of Ayurvedic Drugs

At present the lack of standardisation and quality control in Ayurvedic medicine is a major hurdle for marketing it internationally as a global medicine. Ayurveda is one of the most important and efficient systems of medicine from the ancient age to the modern era. To improve its activity, standardisation and quality control are most essential for global market. Standardisation of such drug is mostly complex as well as time-consuming. Tremendous industrialisation has led to commercialisation. Today most of the classical drugs are replaced by patent drugs, which make their way in the international market.

Standardisation of raw drugs is an absolute necessity, because to get standardised product, use of standardised raw materials is essential. Hence standardisation must begin from the stage of acquiring and processing of raw drugs. Preparation of drugs in Ayurveda requires internationally acceptable standards. So it is necessary to consider the internationally recommended guidelines related to the process validation or process standardisation. The international norms, mostly all the recommendations and guidelines available now, are more related to the modern pharmaceutical process. The standardisation means the assurance of quality of drugs and formulations with
regard to its composition, efficacy and genuineness in terms of measurable parameters (Prajapathi, 2002).

Standardisation and quality control should be taken care of to promote export of Ayurvedic medicine to make Ayurveda popular and acceptable to the people at large (Varrier, 2002). With growing globalisation and international demand for improvements of quality of herbal drugs parameters for standardisation has to be generated for all products (Saxena, 2002). Standardisation of Ayurvedic drugs is an indispensable part of Indian System of medicine, as it is inevitable for world-wide acceptance. Traditional medicine though firmly established in clinical side but there are no scientific methods to ascertain the standard, purity and exact nature of finished products. The industry has to bid adieu to the traditional ways and should adopt modern analytical methods. As herbal polypharmaceuticals are a mixture of numerous chemical molecules, the term standardisation has to give way to the better-enhanced quality control with the application of information technology.

20.1. Good Manufacturing Practice (GMP)

GMP refers to the Good Manufacturing Practice Regulations promulgated by the U.S. Food and Drug Administration under the authority of the Federal Food, Drug and Cosmetic Act. The “GMP is used internationally to describe a set of principles and procedures which when followed by manufacturers of therapeutic goods, helps to ensure that the products manufactured will have the required quality (www.health.gov.au, 2002). Good Manufacturing Practice is a system for ensuring that the products are consistently produced and controlled according to quality standards (www.who.int, 2002). GMP is important because of poor quality medicines are not only a health hazard, but also a waste of money for both governments and individual consumers. Most countries will only accept import and sale of medicines that have been manufactured by internationally recognised GMP.
According to the statistics available from the Office of Deputy Drug Controller (Ay.), Trivandrum, GMP in Kerala was first introduced in the year 2000. In the same year three firms obtained GMP and four firms obtained GMP in 2001. In the year 2002 there was a steep increase in the possession of GMP certificate with 69 firms. In the year 2003 there were 74 firms which obtained GMP. In the year 2004, 66 Ayurvedic firms obtained GMP. The growth of GMP shows that within the short span of four years, 216 firms (24 percent) upgraded their manufacturing units into the GMP standards. The growth of GMP is graphically represented in figure 2.
Fig. 2. Growth of GMP in Kerala

Year

1999 2000 2001 2002 2003 2004

Number of Manufacturers

0 10 20 30 40 50 60 70 80
21. Research in Ayurveda

It is commonly believed, not only by the public but also by the Ayurvedic physicians that, there was no research in ancient India, when Charaka and Sushrutha wrote their treaties. All the writing was based on personal experience and intuition of sages. The general notion is that Ayurvedic seers have discovered the valuable knowledge through divine intuition and insight that the ordinary mortal scientists of today cannot attain. Any science, including Ayurveda has been formulated through generations of observations, evaluations and experience. It includes scientific observations, experimentation and logical inferences (Anil Kumar, 2002). The Ancient sages of Ayurveda have written everything after careful research. The whole Vimanasthana of Charaka dealing with the methodology of research, has given so many new concepts, which, if accepted, will give a new dimension to our present knowledge of research and the possibility of modernisation of Ayurveda (Shukla, 2003).

Ayurveda has got a vast scope of research in the fields like fundamental research, clinical research, drug research and literary research. But there is a stronger need to develop suitable methodology both clinical as well as laboratory-oriented, based on modern technology and Ayurvedic fundamentals and approaches to enable Ayurvedic research in true sense to grow and to evaluate Ayurvedic remedies on global level. Several objective parameters based on Ayurvedic concepts and modern technology need to be developed which may have universal acceptance to revive, update and promote Ayurvedic Research in true sense (Varshney, 2003).

Research in Ayurveda at the national and global levels continue to focus heavily on herbal / herbo mineral remedies for various diseases with pharmacological, phytochemical, botanical / pharmacocognostic and clinical studies (Satyavati, 2003). On the other hand several modern medical scientists
initiated scientific research on Ayurvedic drugs especially single drugs. Most of such studies were carried out at laboratory level and not much clinical research was carried out to prove the clinical efficacy of such drugs with the application of modern technology (Sharma, 2003). Ayurvedic research generally attempts at the second objective. Traditionally established facts are challenged and scrutinized here in the light of new knowledge. This is essential for keeping the science in tune with the times.

Ayurvedic research should essentially be directed in such a way that this research helps in development of Ayurveda as a global system, its results benefit the common man, real practitioners and manufacturers of Ayurveda and there is a growth of credibility and confidence in the system. The problems of research should be formulated in terms of Ayurvedic principles and modern technology and approaches; of course the programme will have to be launched with due scientific temper utilizing available scientific tools and techniques specially designed for the purpose. It will be necessary to analyse all laboratory findings, radiological investigations like MRI, Ultrasound scan, Angiography etc. in terms of morbid factors described in Ayurveda (Anil Kumar, 2002).

22. Information Technology

The impact of information explosion reveals that the needed information at any moment appears to be diverse and diffuse. It should be processed, analysed, synthesised and tailored for easy assimilation and consumption. Thus the capacity to handle and disseminate information to pertinent users is an important activity. It is noteworthy that the possession of the capacity to handle information and knowledge becomes the means of access to and source of power and the potential for material wealth, as a society tends towards technological and industrial growth. (Karisiddhappa and Padhi, 1989).
Information Technology represents an assembling of technologies. These technologies are the computer ability to store and process information, and the communication technology, which represents transmitting information to location where it may be needed (Gopinath, 1995). Information technology is in fact an emergence of three strands of technologies, computer, microelectronics and communication.

Information Technology in its wider sense can be defined as any technology related to recording, presentation and communication of information or knowledge emerged from time immemorial. On the other hand new information technology connotes the massive applications of electronic or digital technologies for the recording, presentation and communication of information and knowledge (Fjallbrant, 1990). Due to modern development in IT, information is now instantly available all over the globe and may be stored and retrieved as long as electricity is available. Time and space no longer restrict the exchange of information (Lunendijk, 1994).

Information Technology has affected the research process profoundly. Creating opportunities for scientific exploration through new instrument and analytical capabilities; permitting research collaborations to extend cheaply and efficiently across the globe and improving the capacity for displaying results as visual images. New technologies, as well as integration of existing technologies into national and global systems, offer further opportunities to enhance the productivity of research. (Clement, 1990).

23. The Information Society

Modern society can be rightly be designated as information society in which information has become the strategic resource for all major societal activities (Soman, 2001). The concept of information society emerged in the 1970s. With the development of digital technologies since the 1960’s there has been a steady convergence between information technology and communication
technologies. This has led to the emergence of new Information and Communication Technologies (ICTs). The last decades of 20th century saw the growth of the Information Society, where ICTs play a major role in the development of almost all spheres of life. In an information society, the quality of life as well as prospects for social change and economic development depends increasingly upon information and its exploitation (Martin, 1995). The information society can be defined as “the society currently being put into place, where low-cost information and data storage and transmission technologies are in general use. This generalisation of information and data use is being accompanied by organisational, commercial, social and legal innovations that will profoundly change life both in the world of work and in society generally (HLEG, 1997). In information society everyone is empowered with the ability to communicate and access information, freely and without barrier. It is a society where all sectors public, private, education, individual citizens and communities can interact with seamless ease.

The new revolution in IT is creating an Information Society wherein information forms the basis for economic and cultural production and consumption. Information generation and processing are at the roots of the new productivity and the sources of wealth and power are the informational capacity of each society (Chopra, 2001). Information is a valuable resource and an intellectual property. It transforms natural resources to useful products (Nair, 2000). In the Information age, the information and knowledge are vital resources in gaining and retaining competitive advantage and in the creation of wealth. Essentially information society will transform the way we live. ICTs offer the opportunity to revolutionize the quality of life and economic well-being. These new technologies affect how people work and conduct business, engage in leisure and entertainment activities, learn, participate in the political processes, access public services and so on (Pohjola, 2001)
24. The Knowledge Society

Knowledge society is not only about digitised information or about electronic networks. The transformation of knowledge society can only be understood if it is viewed in a broader context, as a social process where bits, networks, and knowledge have a social context. In knowledge society, everything is not information, technology or knowledge (Castells, 1997). Technology itself exists in a context of meaningful social practice, and technological change cannot be understood without understanding the process of social change. Although technology has always been fundamentally a social change, when information and communication technology penetrates everyday life, these technologies become protean platforms for social change. Based on the results of the current work, it, indeed, seems that a new type of society is emerging. The ongoing transformation is a profound one. It will change the lifestyle, organisations, politics, and values (Mangla, 2003).

The emergence of the knowledge society, built on the pervasive influence of modern information and communication technologies, is bringing about a fundamental reshaping of the global economy. Its significance goes well beyond the hyping of the Internet or the dramatic declines in the dot.com sector. What is underway is transformation of the economy and society (Tuomi, 2001). Knowledge has always been a factor of production, and a driver of economic and social development. The digitisation of information and the associated pervasiveness of the Internet are facilitating a new intensity in the application of knowledge to economic activity, to the extent that it has become the predominant factor in the creation of wealth.

25. Cyber Society

The cyber society is called networked society and the one which is willing to explore the opportunities for deviance that are opened up by computer networks. The future shape of the society, depends upon the smooth
running of computer networks (www.unn.ac.uk, 2001). It describes the origins of the term in the libertarian dream of an independent, self-contained, self-rulled and unregulable society of equals in cyberspace (Muller, 2000).

It is knowledge and wisdom based highly networked society. Wisdom and knowledge can be very effectively and efficiently utilised. It is independent, at the same time interconnected. It cannot ignore the global changes. Wisdom and knowledge of a society can effectively be utilised through cyber society. Knowledge and wisdom are most used in this society. This is expanding globally day by day. Society’s wisdom and knowledge are efficiently utilised in cyber society (Jones, 1995).

26. Medical Informatics

Medical informatics is the application of computers in medical care. It is defined as the study, invention, and implementation of structures and algorithms to improve communication, understanding and management of medical information. The end objective of the medical informatics is the coalescing of data, knowledge, and the tools necessary to apply that data and knowledge in the decision-making process, at the time and place that a decision needs to be made. The focus on the structures and algorithms necessary to manipulate the information separates medical Informatics from other medical disciplines where information content is the focus (Bemmel and Musen, 1999)

27. Cyber Medicine

Cyber Medicine is the discipline of applying the Internet to medicine. As an offspring of the information revolution, Cyber Medicine is rapidly transforming medicine into a virtual marriage of fields as disparate as the medical sciences, business and commerce, electronics, psychology, philosophy and health economics. Cyber medicine is the Internet-driven practice of
medicine where patients communicate with physicians through electronic mail (Ellen, 2001). Physicians who practise cyber medicine are called cyberdoctors. Cyber medicine allows patients to receive on-line advice from cyberdoctors, who hold themselves out as medical professionals. Cyberdoctors diagnose patients' symptoms, prescribe medication over the Internet, and advise on how to treat varying ailments. Patients simply have to locate a medical website, such as www.cyberdocs.com, type in their medical history, a description of their ailments, a credit card number, and an e-mail address. Upon receipt of this information a cyberdoctor reviews it and administers a diagnosis and treatment advice. The cyberdoctor can call in a prescription to a local pharmacy and the patient may retrieve the medicine or have it sent by mail. 

Cyber Medicine is not a sub-set of something else -- it is the embodiment of 21st century medicine (Diepgan and Essenbach, 1998).

28. Information Technology in Ayurveda

Ayurveda, the ancient science of healing was an outcome of the past age social scientific thinking. The lack of writing technology made man to propagate Ayurveda, like other Indian systems from one person to another for which the language and method of presentation were designed known as Aphorisms (Sutras). After industrial revolution, the rate of growth in science and technology was very fast, resulting in the inventions of computers, which are having the capacity to memorise and analyse millions of data in a nanosecond. But in practice unfortunately, even 50 per cent of the available data does not appear to be utilised by the present day practitioners, perhaps with very few exceptions. Hence it is natural for an individual of the present age who is exposed to Ayurveda, and also to computer technology, to think in the lines of application of information technology in Ayurveda so that it could be utilised for present practical applications of diagnosis and treatment (Shajahan, 1998).
28.1. Computerised Ayurvedic Studies

The computerised Ayurveda studies have identified several important factors that affect the current and future role of computers and Information Technology in Ayurveda treatment. These factors include advances in information science, biotechnology and computer hardware and software, changes in the background of Ayurveda professionals, changes in the medicolegal climate and changing strategies for healthcare.


Body Tune, the interactive Computerised Ayurvedic Medicare software concepts contribute to Ayurveda in three basic interrelated ways. It detects and communicates data about the physical conditions. It interprets that data, and actively assists in assessment and accurate diagnosis. It helps to organise the diagnostic method in a classical way envisaged by Indian Sages of Ayurveda. CAM was clinically tested by Gujarat Ayurveda University in 1993 developed by Dr. M.A. Shajahan. Its efficiency has been tested in patients and found correct. This software was particularly meant for determination of Tridosha (Vata, Pitta, Kapha) aspects only, not for any specific disease. This was the first attempt ever made in bringing computers in the field of Ayurveda. Its second and third versions came in 1988 and 1990 respectively (Shajahan, 1993).


Prakes is an expert system for estimation of Prakrti (body constitution) developed by CIRA (Centre for Informatics Research Advancement, Kerala). It was aimed at building a system to estimate the Prakrti of a person.


This is an expert system designed and developed by Chaitanya Consultancy, Pune. It gives users Prakrti, health advice regarding diet, instructions about daily activities, likely illness and measures for its prevention.
28.1.4. Pilex (1990)

This software is intended to diagnose the piles, its prognosis, complications and treatments. It was developed in Basic language in Gujarat Ayurved University, Jamnagar.


Centre for Development of Advanced Computing, Pune has developed this diagnostics expert system based on Ayurvedic System of Medicine to diagnose a wide variety of disease. This system is developed to aid physicians in cases when the necessary information for a precise diagnosis is unavailable.

The system is capable of on – line learning as well as updating, thereby providing a scope for upgrading the system. In this system, the physician would conduct an interactive dialogue about the patient by proving information and responding to the questions generated by the system. The output of the system is a list of possible diagnosis with a certainty greater than a predefined level. The system acts as an advisor, and the physicians have the final responsibility about diagnosis of the disease as well as administration of the medicine and treatment.

28.1.6. Rasex (1992)

This package was developed by Government Ayurvda College, Trivandrum, CIRA, and ER & DC, Trivandrum. In this package an attempt has been made to correlate the pharmacological properties with that of therapeutic properties with the help of computer. A database was created after collecting, organising and storing all the pharmacological and therapeutic properties of single rasa drug using dBase III plus. A list of drugs, which conforms to the physician’s specifications is collected and displayed (Shajahan, 1993).
29. Current Problems in Ayurveda

Ayurveda is truly acknowledged by the intelligentsia and the common folk alike as the most popular sciences. The scientific design of the Ayurvedic system of diagnosing and treating the patients, rather than the disease of the patient, one would feel that the system was being developed with the intention to wholly suit itself to any condition and in particular to application of new technologies. In the field of medical care and health services of the third world countries, the traditional system of medicine plays a vital role along with the modern medicine. While modern medicine is developing at a great speed, there is a tendency to ignore or even relinquish the traditional system of medicine in these countries. At the same time traditional system is on the verge of extinction or even disintegration mainly due to the scrupulous plundering of traditional wisdom and knowledge related to the traditional system of medicine by modern medicine (Mathew, 1998). So there is an urgent need for conducting a very detailed and systematic study of social application of the information technology in this system of medicine so as to modernise them to withstand the challenges of the time. In other words medical informatics in the context of the traditional system of medicine is a vast untapped area of study, which could be developed by a proper integration of information technology and traditional system of medicine without deviating from its fundamental principles.

For the modernisation of Ayurvedic system and to change it from the traditional framework to modern lines, there is an urgent need to change the mindset and the thinking horizon of both practitioners and manufacturers. Then the practitioners and manufacturers realise the necessity of modernisation and adoption of new technologies in Ayurveda and its global chance in this century as the most useful alternate system of medicine. So in order to convert Ayurveda to global level from the traditional way, it is necessary to adopt the latest technological tools and scientific framework similar to modern medicine.
In the context of globalisation one has to take into account the fact that Ayurveda is not only a treatment, but it is a full system of medicine also. As such the greatest difficulty in its globalisation is the lack of competent manpower with required communication skills, which may help in propagating the knowledge of Ayurveda as a science and a system. The lack of good multilanguage literature on Ayurveda suitable for globalisation of knowledge is another problem in this mission. Other major problems are the lack of awareness about the phenomenon of globalisation of knowledge and its application, their legal and commercial dimensions, inadequate patent laws to protect the traditional national heritage, legal obstacles in the use of Ayurvedic drugs and formulations outside India. The slow and inadequate research and development activities and lack of economic and infrastructural inputs in the field of Ayurveda, lack of standardisation and quality control of Ayurvedic drugs and half-hearted industrialisation and lack of attention to conservation and cultivation of medicinal plants also pose problems. Now it is the era of wisdom and knowledge-based industry. Ayurveda is a century-old wisdom. If the changes are to be adopted fundamentally, and then Ayurvedic medicine can flourish at global level.
REFERENCES


www.indianmedicine.nic.in/html/ismh/annual/annual.htm, (2001)

(19 November 2003)

