

SCOPE OF INFORMATION TECHNOLOGY IN AYURVEDA PROSPECTIVE

Kumar Mahesh¹, Jitendra Varsakiya²

1.Assistant Professor, Department of Shalya Tantra, CBPACS, Khera Dabar, Najafgarh, New Delhi.

2.Assistant Professor, Department of Kayachikitsa, CBPACS, Khera Dabar, Najafgarh, New Delhi.

Abstract:

Background: Ayurveda is an established ancient science of life. It has its own way of presentation. As the time passes the globalization and modernization is urgently needed to disseminate this traditional system of medicine. In the era of the computer, information technology may play a unique role in this task. **Aims:** To elucidate the scope of information technology in Ayurveda for their better prospect. **Material & Method** – The helping tools to complete the task is available ancient texts, hand search researches, internet and own experiences on the computer and IT(Information technology). **Discussion** – As time passes the global scenario changes towards digitalization in every field. Ayurveda also not escaped from this effect. Hence it is the need of time to use the technology in progression and dissemination of Ayurveda. It helps to make accuracy and uniformity in the subject to establish it on the scientific platform. For this author contribute their small effort as a domain expert and experience on IT.

Index terms : Ayurveda, Electronic health record, Health informatics, Information technology, Research.

I. INTRODUCTION:

The Ayurveda have their unique hierarchy regarding teaching, training and patient care. The ancient school works like a Gurukul. The selected admitted students approach their GURU (teacher) directly and got the knowledge. The process of dissemination of subject is simple like mouth to mouth. At that time this method is sufficient. When the time passes the era of literature came and method of teaching training and patient cares changes gradually. The contemporary modern medical science continuously efforts and evolve their own established uniform methodology. They develop specific scientific tools and techniques to make uniformity everywhere through the assistance of ICD(International classification of diseases)^[1], SNOMED CT (Systematized Nomenclature of Medicine Clinical Terms)^[2], EHR^[3], EMR, PHR, health informatics^[4], bioinformatics^[5], software etc. With the help of these tools, they approximately develop uniformity in sense of data collection, storage, analysis, maintenance, privacy, security with easy inter & interoperability.

Presently the Ayurveda existed in segmented form. Each and every sector i.e. universities, institute, Ayurveda wellness center have their separate rule of conduct. Although the appreciable effort is taken by government authorities like the ministry of AYUSH (Ayurveda Yoga Unani Sidhha & Homeopathy), CCIM((Central council of Indian Medicine), CCRAS(Central council for research in Ayurveda Sciences) at the time to time. Voluminous admirable centers came in existence in the 21st century and doing well in the managed way. They make the contribution in raising and establishing the Ayurveda. Some unique methods of treatment evolved and some are in an emerging phase. But they are still not able to project their work in the much acceptable way which unanimously accepted globally in the scientific platform. The expecting scenario not appearing till now. This can be achieved by applying IT in the system. Sushruta also quoted to learn other science and adopting the knowledge of others (like IT) can enrich our traditional system of medicine^[6].

To mark the Ayurveda on a current scientific platform in way of accurate data generation, easily accessibility, communication, dissemination with perfect diagnosis and management. The Ayurveda needs urgently about such modern things like an intellectual property right, legal aspect, awareness about the importance of generating global data, creating and managing statistical data, bio-piracy, bioinformatics etc.

II. Aims & Objective: To elucidate the scope of information technology in Ayurveda professional for their better prospect.

III. Materials and Methods: The topic indicates a relationship between Ayurveda and information technology. To establish in the current scenario the role of Computer science is highly significant and not be replaceable. So the review of Ayurveda, computer science, IT and networking are mandatory. For this purpose, the self-thorough study of the various field of Ayurveda and basic knowledge of IT assembled. To understand the minute things of the specific domain, the mutual discussion, direct practical implementation with the scope and limitation of both domains carried out. The other things like health informatics, EHR(electronic health record), EMR(Electronic Medical Record), HMIS^[7] (Health Management Informative System), AYUSH informatics, Bioinformatics, Health standards, Telemedicine^[8], Medical Imaging, Decision Support Systems, NABH standards^[9] are prerequisite. The Computer fundamentals, SDLC(software development Lifecycle) ^[10], Database, MS Office, Programming, Mobile technology, Internet, Artificial Intelligence, NLP^[11](Natural language processing), Cloud computing, GIS (Geographic Information system), GPS(Global Positioning System), Wearable gadgets, HPC^[12](high performance computing), Big data management^[13] also needed. The above things can be achieved by integration, collaboration and interactive sessions like lectures, demo, workshops (practical), problem-solution based learning, group discussions, assignments, self-study etc.

IV. Discussion:

In the current scenario of health sector services the transparency, exploitation-free environment, evidence-based easily accessible data and no medical negligence is pre-requisite. Modern science solves many medico-legal issues easily by following the services of IT. This technology changes the medical scenario and most of the challenges and irregularities simply rule out. In AYUSH sector most of above problem still existed. A lot of data (big data) generated daily in AYUSH sector and available in irregular and scattered way which are useless until it converted into a fruitful information. The exploration of this data of traditional medicine is possible with the help of IT. The following sectors can be benefitted by using technology as mentioned below-

The scope of IT in hospital – It is useful in healthcare informatics applications like:

(a) **HIS (hospital information system) & HMIS (Health management information system):** This is beneficial for the large hospital, connected hospital & chain hospitals. The different aspect of a hospital like material services, payment details, cost accuracy, budgeting, patient billing accountability & future action plan all fall in HIS & HMIS.

(b) **EHR ^[14] (Electronic health record) & EMR (Electronic medical record)** – The EMR is a component of EHR. This system is helpful for

- **Patient-** Pre-appointment, service accessibility, easy availability, and integration of individual health records.
- **Hospital** -Protection of the health record, easy accessibility of evidence-based data, escalating staff productivity, reducing the cost of labour & rising patient satisfaction. Ultimately it improves the hospital services.

- **Nation** – Provide maximum services to society, reduce un-necessary health sector budgeting, can focus and solve the burning issues of society.
- c) **PHR** ^[15] (**personal health record**) – The individual health record maintained and easily accessible anytime anywhere.

The scope of IT in Academic

- (a) Tools for teaching & training – Using IT tools like the computer, projector, digital board, and audio-visual aids definitely raise the quality of education.
- (b) Teaching methodology – The IT enhance the methodology of teaching by using Microsoft power point presentation, Microsoft word, Microsoft excel, video conferencing, the arrangement of webinar etc. This platform can be used to disseminate the expert's knowledge, skills & opinion at remote areas.
- (c) MOOCs^[16] (Massive online open courses) – There are many MOOCs courses delivering by LinkedIn^[17], Coursera^[18], Swayam^{[19],[20]}, NIOS^[21] (National Institute of Open Schooling) etc. These courses adding the skill and knowledge of learner.
- (d) E-library such as LIBSYS, e-Granthalaya ^{[22],[23]} etc are convenient in the academy.
- (e) Academia ^[24] software for academic collaboration, employee detail, batch-wise distribution of student etc.

The scope of IT in research: IT is actually the backbone of research. Data collection, data segregation, big data management, data analysis, easy data accessibility, data backup, image analysis (processing), data transfer, data retrieval and exploration of data can be definitely possible by using IT. Different software (various kinds of the program used to operate a computer), applications and search tools such as Mendeley^[25], SPSS^[26] (Statistical package for social science), science direct, Pub Med, IEEE(Institute of Electrical and Electronic Engineers)^[27], Cochrane, Google etc. act as a tool to assemble information. The collected data can be converted into rewarding information which provides evidence-based knowledge means the final outcome of research. The computer and their tools like Microsoft excel (for data analysis), Microsoft Word (for data collection), Microsoft power point (for the presentation of data), Microsoft access (database management) etc are useful to enhance the research platform.

The scope of IT in administrative point of view: The E-office, E-governance, online transaction, record keeping etc. can be well managed by using IT.

Miscellaneous scope – The following services deliver because of information technology as:

- a) Epi-info software, Ayusoft, iCare@home, e-Tongue, MosQUIt. Mdots, etc.
- b) Digital India, SMART India
- c) Health for all – Technology for all
- d) Capacity Building of AYUSH experts
- e) Integration of Information Technology with Health Domain
- f) Overview of various aspects of Health Informatics, Current Status, Case studies
- g) An interaction between Experts-End Users and Technology developers
- h) Facilitates Interdisciplinary research
- i) Development of ICT based solutions in AYUSH Informatics
- j) New career opportunities

Achievements, Limitation & Challenges:

The Ayurveda fraternity developed database such as *Triskanda Kosha*, *Trisutra*, NAMASTE Portal ^[28], AYUSH PORTAL^[29] etc. that are totally accepted. Also, some projects like Standard treatment guideline

(STG), standard treatment protocol (STP), Ayurgenomic^[30], *Prakruti Praikshana*^[31] etc. has been carried out. These are supportive to develop uniformity in Ayurveda science. The unfamiliarity with technology, less knowledge, lesser technical experts and fragile dedication mark its limitation. The challenges while assembling IT in the traditional system of medicine can be resolved by evolving knowledge with the help of training, symposium, conferences etc. Also to develop soft skill, learning ability, clinical expertise, enthusiasm among teachers, students and assisting staff. Making awareness about the importance of IT and ensure their application at all workstation.

V. Conclusions:

The author takes an attempt to explore the prerequisite of IT in Ayurveda. It found that various innovative techniques and ideas related to information technology are in practice by some stalwarts of Ayurveda and they continually disseminate it, but most of the fraternity are still unaware of the same. The area of Ayurveda like academic, clinical and research field where we can use IT, so that system got benefitted. Hence for evidence base documentation, data safety, security, easy accessibility, worldwide propagation and many more are possible by using IT.

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