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Abstract

Ayurveda has provided healthcare since thousands of years to mankind and it is still a result oriented therapy even today. But in current scenario, scope of Ayurveda has become limited as compare to the vast canvas of modern medical sciences. Also it is being questioned now for its inclusion within the scientific perspective as it differs in language of expression, which is difficult to understand on the basis of current sciences. Present article is an attempt to review and understand the structure and contribution of Ayurveda towards healthcare so as to conclude its integrity as Clinical Science.

Key words : Ayurveda, Indian Healthcare system, Traditional Healthcare system, Clinical Science.

Introduction:

Care of life starts right from the start of life itself. Every organism which born, strives for its existence and survival. So it won't be inappropriate to say that the journey of Healthcare dates back to journey of existence of life itself.

All over the history of Healthcare world-wide, Ayurveda is one of the oldest (and eldest as well) branch of Healthcare.⁽¹⁾ It would be definitely logical to say that it must be bearing true scientific principles as it has survived for thousands of years and is still competently applicable in current era.

But there has been many misunderstandings regarding Ayurveda. Currently Ayurveda has been considered as an Alternative Medicine and there are questions regarding its consideration within the sphere of scientific perspectives. Quest of Knowledge, systematic and logical efforts of years together and resulting expertise, forms the basis of any scientific community. This is reflected in Ayurveda from its conception. Present article is an attempt to understand and analyze the scientific approach of Ayurveda and clear the misconception and objections with logical reasoning and evidence based discussion.

Ayurveda is not just a mythological or traditional health care system but rather a real health science.

The methodology of Indian education system was that of Gurukul system since thousands of years. But after the foreign invasions, this system was eventually declined (e.g. the destruction of universities like Takshashila and Nalanda). Though there was extensive web of schools teaching all over Indian continent, but the background of the schools were mostly religious.⁽²⁾ So naturally the stigma of mythology was attached to Ayurveda due to attachment with Religious teaching or it was considered as traditional healthcare system. But structurally, Ayurveda is having very scientific approach in its development.

As per authentic scripts, knowledge of Ayurveda was transferred from Devine world to Human world in the form of basic principles (Sutras) as it is. But even to receive this knowledge from the Devine world, one of the most intellectual, studied and competent sage was elected to represent and not the one who is politically or economically influential.⁽³⁾

Apart from this mythological beginning, rest of the journey or development of this knowledge of healthcare in the Human world was ever evolving and experimenting all the time. As the challenges of application of these principles (sutras) went on changing in various time-frames, various angles and shades of health aspects were explored and time tested. There were many debates, difference of opinions over various health issues as per studies of different expertise. These were resolved in various conferences, concluding on the acceptable solution, based on most scientific and logical reasoning.⁽⁴⁾ And the non conclusive were rejected. Seven chapters in Charak Samhita are named after conferences held at that time. Vatakalakaliya Adhyaya, Yajja-Purushiya Adhyaya and Atreya Bhadrakapya Adhyaya, are the few to name from Sutra-sthana. Even today also, current scientific community follows the similar foot-steps to accept any scientific theorem. Thus apart from its said mythological origin, the approach of Ayurveda was very structural and scientific right from beginning. It is not like close ended, absolute or ultimate religious texts or tradition with scope of only explanation and not expansion.

It is well known fact that the technique of Rhinoplasty has its roots in Indian Surgical techniques of Shusruta. When the surgery was in its initial developmental phase in western world, a report was published in 1794 over the Rhinoplasties performed by Kumhar Vaidya in Gentleman's magazine Calicut. Joseph Constantine Carpue studied this surgery for many years in India and gained expertise. He then performed individually in 1815 and thus introduced his practise to the western world.⁽⁵⁾ Sushruta Samhita has not only detailed about few prosthetic or minor surgical procedures like abscess and wound management or cauteries but also includes a quite great range of major surgeries including abdominal, ano-rectal, uro-genital, prostate, fractures and dislocations, caesarian section and even cataract surgeries.⁽⁶⁾ Many of the surgical instruments used in today's modern surgery have striking similarity and as if seems to be the modified versions of the surgical instruments mentioned in Sushruta Samhita.⁽⁷⁾ Thus Ayurveda since long has been a live clinical science.

Not only surgery or medicine, but since its origin, Ayurveda has been classified into eight branches of healthcare - Surgery, ENT, Medicine, Paediatrics, etc. called as Ashtanga Ayurveda.⁽⁸⁾ Not all the branches were able to survive in due course of time because of various reasons, but the approach was definitely very systematic. As on today also we can see various branches of modern healthcare are now flourishing as a specialty of particular subject. Development is integral part of science and for that it has to be always opened.

Similarly Ayurveda is also an open ended science, which urges and appreciate the disciples to contribute and expand the science with own experiences, expertise and knowledge. Charak Samhita says that the list of medicinal formulas given in the text is just representative. For an average practitioner this is sufficient for medical practice and for an intellectual, this will serve just as a guideline. They can and should formulate and contribute more than this as per their knowledge and judgment.⁽⁹⁾

While describing the qualities of a practitioner, Charak Samhita says - A practitioner is suppose to have a continuous quest of knowledge, should be a logical thinker with scientific attitude. Not only that, a practitioner should continuously upgrade himself/herself with continuous clinical practice, should follow all ethics and should follow the experienced scientific faculties.⁽¹⁰⁾ And this is what even the current scientific community in medical profession expects. This gives the relevance of approach of Ayurveda as a science and not just a myth.

Ayurveda has a definite scientific methodology.

To state a scientific discovery or invention or a new theory, one has to follow a standard scientific protocol of presentation all over the world. And the discovery/invention/new theory is accepted after approval of scientific community through a variety of experimental verification, logical

tests, peer reviewed research articles and discussions at various levels via conferences/workshops. The presentation includes Hypothesis, Introduction to problem, Means and Methodology, Result, Discussion and Conclusion. On similar lines, CharakSamhitamentions the necessity of Scientific Symposiums or Conferences for approval / disapproval of new scientific contributions. It has given forty four steps of scientific discussions / assessment for approvals, including those like - Pratidnya, Sthapana, Pratisthapana, Hetu, Upanaya and Nigamanawhich are having very close resemblance with the current scientific presentation protocol.⁽¹¹⁾

Though as per difference in time frame, there may be changes in applicability, but principally there is a definite scope to consider that Ayurveda is based on a sound scientific methodology.

As any scientific texts have many references, cross references and complex theories, it needs a different acumen to read and understand the scientific language. At the end of the text, CharakSamhita has mentioned this need and has given Thirty Six step formula or method to read and understand any scientific text. This is called as Tantra-Yukti. i.eYukti (key)to understand a Tantra (Scientific text).⁽¹²⁾

Being clinical science, Ayurveda has classically mentioned the causes of disease, diagnosis, classifications, prognosis and its medical or surgical management in all respective branches. There is a huge data of medicinal formulations like - herbal, polyherbal, herbo-mineral as well as synthetically prepared mineral compounds mentioned with methods of preparations, purifications, standardization and drug doses also in various reference texts.

Not only medicinal, but Ayurveda has also emphasized the importance of preventive healthcare. For sound mind and sound body, Ayurveda has given guidelines with benefits for diet, daily hygiene, healthcare and ethical behaviour.⁽¹³⁾ It has also recognized the impact of environment or seasonal changes on health and given guidelines for better acclimatization.⁽¹⁴⁾ Even today also we can see thatmajority of the minor ailments are due to seasonal changes. Ayurveda has also addressed the epidemics, its causes and responsible public as well as individual health behavior to overcome it.⁽¹⁵⁾

Along with health behavior, Ayurveda has also mentioned about the Professional behavior. It has described the duties and responsibilities of the Doctor, Nursing staff and Patient, it has given guidance about ethical as well as Good Clinical Practices.⁽¹⁶⁾⁽¹⁷⁾ This issue has been realized and getting more pronounced on the background of Corporatization of Healthcare Industry and day by day strained doctor-patient relationship. There is increasing demand of inclusion of Ethical Practices in medical academics.

Thus Ayurveda has definitely a scientific and methodical approach encompassing almost all aspects influencing or contributing the human health. Though the means may have changed as per available resources and societal requirements at different time frames, but the core concept of human healthcare is much the same as per modern medical sciences.

Ayurveda has a rich textual base with periodic update in every era.

Though there are references in the form of many written scripts of Ayurveda, but on the background of huge and continuous socio-political changes for over years together, many scriptures vanished in black hole of time. What we read as Ayurveda today,are really an edited and re-edited versions of few of them. The process of edition and modification went on continuously from generations together, since thousands of years. So naturally proofs of the experiments or explorations of any particular theory may not be evident at this juncture, but the outcome of the therapeutics definitely directs us to believe in its integrity.

Being surgeon, Acharya Shushruta has emphasized the need of study of internal parts of body. He has mentioned the method of human body dissection with detail anatomical description of number of bones, muscles, ligaments and internal parts of human body.⁽¹⁸⁾

Ayurveda has never been simply a textual knowledge; rather it has been a live clinical knowledge. It is the clinical practice and clinical experiments, which has kept the Knowledge of Ayurveda alive. Ayurveda has never been a blind bookish follower and neither the contributing authorities have expected it. The live clinical experiences of generations in different era has added the database and kept it ever updating. A few name to include -AsthangHridaya by Acharya Vagbhatta is concise compilation of General Medicine and Surgery (6 A.D), MadhavNidan (7A.D.) dedicated to clinical diagnosis, Sharangdhar-Samhita (13 A.D.) dedicated to Pharmaceuticals, various Nighantus like Bhavaprakash (16A.D.) dedicated to compilation of various phyto-botanical information and its medicinal properties (materiamedica), Ras-shastra dedicated to mineral or synthetic medicine formulations and its therapeutic use, etc.

There is never a last word in Science. Beauty of science is in its dynamic nature, which keeps on adding new inputs from time to time. With few periodic exceptions, Ayurveda has kept it-self updated as per societal needs.

The Principles of Ayurveda and current scientific parameters of Health.

Ayurveda defines Health as “Balanced state of body encompassing all physical systems, with sound state of senses, soul and mind.”⁽¹⁹⁾ Even today also WHO has defined health almost on similar lines as – Health is a state of complete physical, mental and social well being and not merely absence of disease or infirmity.⁽²⁰⁾

The modern concept of Homeostasis of Milieu Interior to maintain the health is very much similar with that of Ayurveda.⁽²¹⁾ Ayurveda says that balance of internal systems is important to maintain health and imbalance create disturbances in systems that leads to disease or disorder.⁽²²⁾

The basic concept and parameters of Ayurvedalike - the concept of Tridosha, Panchamahabhuta, Rasa, Guna, Virya, Vipaka, Parabhava, etc. are not yet been completely explainable on the basis of current scientific parameters. So the whole Ayurvedic science becomes questionable, which is based on these unexplainable parameters. But still, it will be unjustified to say Ayurveda to be non-scientific exactly, as it is still result giving therapy. So with retrograde analysis, if we are getting results on the basis of certain theory or hypothesis, then there is definitely a space to consider its parameters within the scientific perspectives. The theory can be labeled as under explored or unexplored with a scope of development, rather than totally rejecting it.

Secondly, according to principle of survival of the fittest, if the science with certain principles is surviving since thousands of years and is still applicable, then the principles must be having some universal truth, (which may be hard to decode or understand on current scientific parameters?).

One more argument goes in favor of Ayurveda is (though can be considered as benefit of doubt) – the scientific theories about certain phenomenon, with strong logical reasoning, assumed as hypothesis and which were not clearly understood for years together, were proved to be correct in due course of time. E.g. Theory of Heliocentrism i.e. Earth moves around the Sun and not the Sun which moves around the Earth. This theory was first stated by scientist Aristrachus in 3rd B.C. and was rejected. But it was revived in 16th century by Nicolus Copernicus and followed by Johannes Kepler in 17th century and now widely accepted theory with modifications and new development.⁽²³⁾

Recently the Interdisciplinary studies are showing some promising attempts to understand the basic concepts of Ayurveda. In a major break-through, Prakriti Parikshan, the phenotypical classification of individual based on Tridosha theory, has been able to link with the Genotypical base, asserting the ‘Individualized Medicine’ approach of Ayurveda.⁽²⁴⁾

Similarly, attempts of understanding the peculiarity of Ayurvedic drugs are also going on. Nano-medicine is gaining importance now to minimize the drug dose. Studies of Ayurvedic Medicine - Bhasma (metallic oxide compounds) has revealed its nano-particulate nature.⁽²⁵⁾

Ayurveda has evolved by thoughtful clinical observations and experimentations of years together. Targeted interdisciplinary attempts would definitely help to understand its core concepts which seems to mystical today for modern science.

Mainstream Healthcare Science VS Alternative Healthcare Science.

Till 12th century, Ayurveda was having a progressive development. After foreign invasions and during Islamic rule, it slowed down a little bit. With few exceptional periods, the socio political situations were not stable enough due to continuous wars and battles in Indian continent.⁽²⁶⁾ So the conditions were not highly favorable for development of Science, Arts etc. But amid all such chaotic situations, the schooling system was still maintained throughout the cities, towns and villages through Gurukuls, Pathshalas, Madarassas. Subjects like mathematics, arts, economics and business, warfare techniques and medicine was also being taught as specialty subjects⁽²⁾. During the Islamic rule, Unani system of medicine was also developed and promoted with preference along with Ayurvedic system of medicine.⁽²⁷⁾ Though during this era, Ayurveda did not experienced any new and great development, but still upto pre British era, Ayurveda was mainstream Medical Science that was being practiced successfully and effectively in India.

The education system in Indian continent was well spread than the western world till 18th century.⁽²⁾ But, there was difference in background and approach towards knowledge. While the Indian education system was still having religious background, during the same period, western world was experiencing the modern age of great change that started from Renaissance era. There was dynamic revolution of scientific attitude and perspectives. Every fact and phenomenon were being challenged and tested on the basis of more realistic and measurable parameters. Notions that were proved were being accepted and implemented by the society, irrespective of religious approval. Education was almost completely freed from the religious clutches and myths. Also, the whole change was supported by the then existing rulers in western world.⁽²⁸⁾

Britishers came India with this background and attitude. So with advent of British rule, the whole Indian system of medical education was gradually wiped out, without assessing its worthiness.⁽²⁹⁾ Ayurveda, as a healthcare system, was completely sidelined and then never been able to gain the mainstream status again. So naturally, with all this unfavorable background, there was a great set back to the development of Ayurveda as health science. Though however it was very much connected to lifestyle, food-style, culture, customs and environment of Indian continent, but due to lack of support by rulers, it remained confined to traditional individual practice and in the form of home remedies only. Any science, however strong its principles maybe, it needs continuous up-gradation and experimentation for its development on a larger scale with support from the government. So due to lapse in development and lack of government support for almost century or two, Ayurveda lagged behind in comparison with the modern medical science and has been considered as alternative medical science today.

Ayurveda is not a science of lost world, but a science with lapsed era.

Applicability of Ayurveda in current scenario.

There is a very popular phrase saying – Need is mother of all invention. Development occurs in an attempt to provide a solution for an existing or anticipated need in any field including Healthcare.

Development in field of surgery with the help of anesthesiology and invention of antibiotics has changed the perspective of medical science altogether.⁽³⁰⁾ Advanced technologies have helped in development of radiological and pathological diagnostics bringing accuracy in diagnosis of patient. Life saving gadgets like ventilators and defibrillators and has taken it to a different height. Development of different drug delivery routes which are making the medicine to work in any state of the patient is definitely creditable. All such developments have lead to expansion of secondary, tertiary and critical care in modern medical sciences.

But still Primary healthcare encompass the larger part of healthcare. Seasonal diseases, lifestyle related disorders, autoimmune disorders are some of the major parts of primary healthcare. These are all related to change in lifestyle. Lifestyle related disorders are steadily rising now and has become one of the major concerns in healthcare. Change in lifestyle and its impact on health have been very well recognized by Ayurveda. That's why it has given a high emphasis on Lifestyle Modification as well as Preventive Healthcare.⁽³¹⁾ Along with medical management, this domain can really be a stronghold of Ayurveda. Even many of the diseases of secondary or tertiary care are also effectively managed by Ayurveda through Panchakarma and medical management. Unfortunately, what is lagging in Ayurveda, is documentation and evidence building (apart from its authentic texts), thus leading to ambiguity about its applicability.

Ayurveda is a holistic healthcare science which guides about healthy mental and physical lifestyle, preventive care, along with medicinal management. If combined with current technologies, it definitely has potential to justify the changing health needs of today's world.

Ayurvedic medicine and efficiency of Ayurveda.

Ayurveda is just not about herbal medicine. It is a Health science with strong medical therapeutics based on its Own Unique Parameters. So testing the clinical viability / reliability of herbs or herbal formulations from Ayurveda on Modern scientific parameters is not testing Ayurveda. It is about testing an Allopathy drug with Phytochemical origin with a reference link from Ayurveda. Ayurveda has its own parameters of patient assessment and the drug therapy is based on those parameters and assessment. Understanding the underlying chain of patho-physiological events that leads to the expression of the disease / disorder is the key of medical management. Appropriate intervention at certain stages leads to the treatment and its outcome. The way of modern medicine is disease or disorder specific, the way of Ayurveda is more person specific. So the choice of drug according to Ayurveda may vary from person to person for the same disease / disorder. Hence if the choice of grouping patient is not done as per Ayurvedic parameters, drug which may seem to be effective in one group may not show equally effective outcome in another group, thus questioning its usefulness. So the efficacy of particular Ayurvedic medicine has to be judged on the Ayurvedic parametric assessment to get its real outcome, then only it can be labeled as efficient or inefficient. If it is not understood properly, then the reference link may not give expected results and invariably Ayurveda will be labeled as ineffective therapy (when actually the Phyto-chemical Allopathy drug under testing is found to be less effective / ineffective because of its inappropriate lead).

Medicine is just one of the tools of the therapeutics. It is not the medicine which is only responsible for the outcome of the treatment. For judgment of efficacy of any therapeutics, the logic behind the therapy is more important and not simply the medicine. Today we can see the market is flooded with Ayurvedic products. e.g cosmetics, pain balm, energy drinks, tea, wellness products, nutritional and health supplements, etc. endorsing the usefulness of Ayurveda.⁽³²⁾ It is not market hype created by the corporate sector, it is deep rooted faith and belief of people in safety, efficacy and authenticity of Ayurveda. Unfortunately this trust has been en-cashed by the market for mostly Over The Counter (OTC) products only and genuine Ayurvedic therapy is sidelined.

Ayurveda is not simply about herbal medicine. It is a healthcare system that is finely woven in cultural texture of Indian continent with wide range of simple home remedies for minor ailments to serious medical therapeutics. The need of hour is to reduce its casual look and focus its expansion in the area of genuine Therapeutic Medical Management.

Discussion:

Ayurveda has very strong and long standing base and contribution in healthcare. With a definite methodology, and rich textual, it has an appreciable database. Its approach towards healthcare is definitely systematic, analytical and scientific. It has been live Clinical Science since long. Except for last two centuries it has also continuously updated for the changing needs of the society. But with advent of modern medical sciences, Ayurveda was sidelined during and after British era and it got disconnected from the mainstream.

Modern science has definitely brought a huge change in all spheres of life. There is kind of explosion of inventions, discoveries and information in all the aspects of materialistic knowledge in last two centuries and modern medical science in particular, is immensely benefited. Because of technological developments, new diagnostic tests, minimum invasive surgical techniques and life saving critical care, advanced medical management was possible. Development of Pharmacology as a separate entity has literally boosted modern medical science to a new high. Newer and newer scientific developments in every aspect are contributing to medical science to become less painful and more user friendly.

On this background, Ayurveda as on today has definitely a limited share in therapeutics of overall medical field in India itself.⁽³³⁾ But looking at its contribution for thousands of years, it definitely seems to have a potential to contribute more. It is need of hour to collaborate and co-ordinate with modern science for further development. This will be helpful to bridge the two different approaches which are concerned with the same subject of human healthcare. Acharya Sushruta has also said that to implement a particular branch of science, one should collaborate and take inputs from other related branches as well.⁽³⁴⁾

Irrespective of approach, the ultimate aim of healthcare is to improve the quality of health and increase the sustainability of human being.

So as per health needs of current time frame, Ayurveda has to develop new protocols as per the quickly changing lifestyles. Apart from its huge database, there is need of organized real time documentation, as evidence based practice is becoming need of hour. Experimentation is a key of development. For its expansion, Ayurveda needs experimentation in all the sectors. Particularly in the Pharmaindustry, to improve its applicability. Drug developments and new delivery systems with Ayurvedic Ideology will make Ayurveda more user friendly and broadly acceptable. Though the OTC or FMCG market of Ayurvedic products is increasing in millions and billions, but huge conscious efforts are required to increase its 'Therapeutic Use' so as to cater the healthcare needs of increasing population. With sound conceptual background and Clinical wisdom of thousands of years, Ayurveda as a healthcare science, definitely has potential to meet the current challenges.

Principles of modern science are experimentally proven reproducible facts. Clinical experimentation is a key of Ayurveda that has helped to survive the system from thousands of years. So ideally the theory on which the results are based must also to be considered as true. Though Ayurveda is Clinically proven but Theoretically Unproven on modern experimental parameters. Hence the question that - is it a Science or mysterious hypothesis? becomes more complex. But reviewing the history and development of Ayurveda, though currently it may seem to have unsolved theoretical base as per modern scientific parameters, we can definitely say it as an applicable Clinical Science.

Conclusion:

Ayurveda not only as Healthcare Science, but also as a lifestyle has been finely woven in Indian cultural texture since thousands of years. But developmental lag due to unfavorable conditions in last two centuries has limited the scope and expansion of Ayurveda. Also difference in language of expression makes it difficult to connect with language of current science. In spite of such drawbacks, looking at its basic structure, approach and contribution towards the healthcare, Ayurveda can definitely be considered as a Live Applicable Clinical Science.

References :

01. Traditional Knowledge-based Medicine: A review of History, Principles, and Relevance in the Present Context of P4 Systems Medicine, Lemonnier et.al, PROGREVMED 2017; 2:e0011, Published online 11 December 2017, Doi: 10.1097/pp9.000000000000011, https://journals.iww.com/progpremed/Fulltext/2017/12000/Traditional_Knowledge_based_Medicine__A_Review_of.1.aspx
02. Dinesh Chand. IJAR 2015;1(2):110-113, www.allresearchjournal.com
03. The CarakSamhita (AgniveshaSamhita revised by Caraka and Drdhabala), Sutra-sthana, chapter 1/19-23, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.
04. The CarakSamhita (AgniveshaSamhita revised by Caraka and Drdhabala), Sutra-sthana, chapter 12,25,26, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.
05. https://en.m.wikipedia.org/wiki/Plastic_surgery
06. https://en.m.wikipedia.org/wiki/Sushruta_Samhita
07. SushrutaSamhita of Maharshi Sushruta, Sutra-sthana 7/ 1,5,6,10-15, commentator - KavirajaDr. AmbikadattaShashtri, Chaukhamba Sanskrit Sansthan Varanasi, 11th edition 1997.
08. SushrutaSamhita of Maharshi Sushruta, Sutra-sthana, chapter 1/7, commentator - KavirajaDr. AmbikadattaShashtri, Chaukhamba Sanskrit Sansthan Varanasi, 11th edition 1997.
09. The CarakSamhita (AgniveshaSamhita revised by Caraka and Drdhabala), Sutra-sthana, chapter 4/20, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.
10. The CarakSamhita (AgniveshaSamhita revised by Caraka and Drdhabala), Sutra-sthana, chapter 9/21-25, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.
11. The CarakSamhita (AgniveshaSamhita revised by Caraka and Drdhabala), Vimana-sthana, chapter 8/14-35, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.
12. The CarakSamhita (AgniveshaSamhita revised by Caraka and Drdhabala), Siddhi-sthana, chapter 12/40-49, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.
13. The CarakSamhita (AgniveshaSamhita revised by Caraka and Drdhabala), Sutra-sthana, chapter 5, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.
14. The CarakSamhita (AgniveshaSamhita revised by Caraka and Drdhabala), Sutra-sthana, chapter 6, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.
15. The CarakSamhita (AgniveshaSamhita revised by Caraka and Drdhabala), Vimana-sthana, chapter 3, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.
16. The CarakSamhita of Agnivesha revised by Caraka and Drdhabala, Sutra-sthana, chapter 9, commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti Academy Publication, 21st Edition 1995.

17. The CarakSamhita(AgniveshaSamhita revised by Caraka and Drdhabala), Vimana-sthana, chapter 8/13,commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti AcademyPublication, 21st Edition 1995.
18. SushrutaSamhita, Sharir-sthana, chapter 5/58-61, commentator - KavirajaDr. AmbikadattaShashtri, ChaukhambaSanskritSansthan Varanasi, 11th edition 1997.
19. SushrutaSamhita, Sutra-sthana, chapter 15/48, commentator - KavirajaDr. AmbikadattaShashtri, ChaukhambaSanskritSansthan Varanasi, 11th edition 1997.
20. www.who.int/suggestions/faq/en/
21. Textbook of Medical Physiology, chapter 1, Guyton and Hall, 11th edition, SAUNDERS An imprint of Elsevier, Published by Elsevier, a division of Reed Elsevier India Pvt.Ltd. Indian Reprint ISBN : 978-81-8147-920-4
22. SaarthVagbhat -AshtangHrudaya by Vagbhat with Marathi Translation, Surtra-sthana, chapter 1/20, Dr. Ganesh KrushnaGarde, Anmol Publication, 683, BudhwarPeth, Pune, Edition 1994.
23. <https://en.m.wikipedia.org/wiki/Heliocentrism>
24. Genome-wide analysis correlates Ayurveda Prakriti, P.Govindarajet.al.,Scientific reports 5, Article number 15786, 29 October 2015,<https://www.nature.com/articles/srep15786>
25. Study on physical properties of Ayurvedic nanocrystallineTamraBhasma by employing modern scientific tools, Singh Rakeshkr, Journal of Ayurveda and Integrative Medicine (2017), <https://dx.doi.org/10.1016/j.jaim.2017.06.012>
26. Medieval India: Society, Culture and Religion, Dr. N.Padmanabhan, University of Calicut, school of distance education, V-semester-core course, B.A. History (2011 Admission onwards)
27. History of Medicine with special reference to India, Prof. H. Roy MD, www.histopathology-india.net/history_of_medicin.htm
28. <https://en.m.wikipedia.org/wiki/Renaissance>
29. Physicians of Colonial India (1757-1900), Anu Saini, Journal of Family Medicine and Primary Care. 2016 Jul-Sep;5(3)528-532, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5290754/>
30. Medical Milestones, The Editor, BMJ January 2007; 334 (suppl):s1-22
31. The CarakSamhita(AgniveshaSamhita revised by Caraka and Drdhabala), Sutra-sthana, chapter 30/37,commentator Pt. KashinathShastri and Dr. GorakhnathaChaturvedi, Chaukhamba Bharti AcademyPublication, 21st Edition 1995.
32. Herbal Medicinal Products Market: Global Industry Analysis (2012-2016) and opportunity Assessment (2017-2027). <https://www.futuremarketinsights.com/reports/herbal-medicinal-products-market>
33. Utilization of alternative system of medicine as healthcare service in India: Evidence on AYUSH care from NSS 2014, ShaliniRudra et al, PLOS ONE <https://doi.org/10.1371/journal.pone.0176916>, May 4, 2017
34. SushrutaSamhita of MaharshiSushruta, Sutra-sthana, chapter 4/7, commentator- KavirajaDr. AmbikadattaShashtri, ChaukhambaSanskritSansthan Varanasi, 11th edition 1997.