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Role of Modern Parameters in Ayurvedic Researches

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ABSTRACT

The recent advances in the field of Ayurveda have motivated many researchers to look at the basic ailments used to explore the *Ayurvedic* field of research. As we know, now-a-days research is the prime need of contemporary *Ayurveda*. *Ayurveda* needs research designed to test and validate its fundamental concepts as well as its management approach. In this context, if *Ayurveda* is to be truly explored and validated in all its aspects, scientific inputs should confirm its principles and philosophy. Multiple researches have been done on *Ayurvedic* text regarding its textual concept, but in today scenario it is difficult to prove any concept without being validate. So, development of parameters to assess *Panchmahabhoota, Tridosha, Agni, Dhatu, Ojas, Srotas, Ama, gunas, Shatkriyakala, Samprapti, Prakriti* etc on a scientific basis is a need of time. For this purpose *Ayurveda* researchers should do their researches in collaboration with modern science. We cover in this short review, mainly some examples of Modern parametres which can be used in recent advancement of *Ayurvedic* researches.

Keywords: Ayurveda, Modern parameters, Researches, Fundamentals.

INTRODUCTION

Ayurveda has been an ancient system of medicine of India which is being used over centuries to live a healthy and worth living life. Though proved useful in many areas of medicine, it has its own shortcomings. It is based more on faith and on observational evidence and little experimental and analytical validation and proof has been provided to it [1]. More precisely saying, we are unable to set a proper match between centuries old concept with the present scientific world. This doesn't mean at all that our *Ayurveda* is lagging behind but it means that somewhere we are not capable enough to set up the scientific scenario as per the demand of this era. *Ayurveda* requires research in various departments. Highlighting one amongst them is the area of diagnostic principles so that the *Ayurvedic* diagnosis can be made more pinpointed leading to more effective treatment strategies [2].

When *Kumarasamy Thangaraj* first considered the possible genetic basis of Ayurveda more than six years ago, it was the first time he was thinking about researching any traditional form of medicine. *Thangaraj* is a *senior scientist* at the *Centre for Cellular and Molecular Biology in Hyderabad* where he has already spent close to two decades answering questions about the genetic ancestry of Indian people. But when he got a call from biomedical research pioneer *MS Valiathan* to look into Ayurveda, he saw that it posed some interesting questions [3]. *Dr. Valiathan* and his *team, and Dr. Ashok Vaidya* and his team have started science initiatives in *Ayurveda* in order to explore *Ayurvedic* fundamentals like *Prakriti* in the parlance of genomics, etc. for the welfare of the humanity, which is a milestone step. Genetic and epigenetic responses are being understood by some scientists in the light of *Prakriti, Oja, Bala and Rasayana* [4].

The turning of an increasingly chemicals-weary population towards natural products has renewed interest in plant-based drugs. Though not completely true, the general perception is that herbal products are safe and free from adverse effects. The holistic approach to health problems is another reason for the revival of interest in indigenous systems of medicine like *Ayurveda*. Notwithstanding this increased interest, a series of questions is being raised about the scientific basis of the system, standardization of the medicines, use of modern parameters to define *Ayurvedic* parameters etc. The need for objectivity, a scientific evaluation, a rational approach and clinical trials are discussed in almost all meetings on traditional medicinal systems [5]. Before the recent upsurge of traditional medicine in a global perspective, *Ayurveda* was persistently criticized for its ambiguity and philosophical tenets incomprehensible to occidental mind. This perception has led to disinterest in *Ayurveda* in the western world, which eventually and unfortunately has led the world to be deprived of many plausible

advantages of traditional healthcare supportive to a total quality life [6]. In India and in the rest of the world we are facing rapid changes in society with globalisation, new emerging and rapidly spreading infectious diseases, changed disease patterns with treatment-resistant tuberculosis, rapid and dramatic climate changes and a changed demography with an ageing population [7]. Medical research is essential to cope with these future challenges. Furthermore, new knowledge in the field of medical science is important to facilitate greater success for the Indian medical industry. We propose to use "best practice" for medical research in India, Collaboration is the key-word, with a focus on strong basic research, strong clinical research, and strong translational research, bringing basic knowledge into clinical practice and vice versa. All three elements need to be facilitated by interdisciplinary approaches and through public- private partnerships.

Emerging issues in development of Ayurvedic Researches [8]- Research is the prime need of contemporary *Ayurveda*, but Modern research on *Ayurveda* has not been very rewarding for *Ayurveda* itself. Much of it uses *Ayurveda* to extend modern bioscience. In contrast, *Ayurveda* needs research designed to test and validate its fundamental concepts as well as its management protocols. In this context, if *Ayurveda* is to be truly explored and validated in all its aspects, scientific inputs should conform to *Ayurveda*'s principles and philosophy. While its evidence base, established since antiquity, may need further verification, research should now focus on the Science of *Ayurveda*, rather than merely looking for new drugs based on *Ayurveda* herbals; in-depth research is needed on *Ayurveda*. Such research will require teamwork between scientists and *Vaidyas* based on truth and trust. *Ayurveda* research methodology requires the 'whole system testing approach', global participation with protocols evolved through intense interface with modern science, regulatory reforms to eliminate barriers, and to be investigated 'as it is', using approaches adapted from its own basic principles [11]. Research should be a process that converts data into information, information into knowledge and knowledge into wisdom. This is like transforming milk into ghee. It should be more balanced, comprehensive, and equally emphasizing in the literary field, experimental and clinical research. It should be able to impact the fields of academics, pharmacy and practice in a profound way.

Lacunae in *Ayurvedic* Researches found-Present day *Ayurvedic* researches are failing in this aspect as they are unable to disseminate the knowledge gained from the exercises. Neither has the *Ayurvedic* teaching changed in the last 50 years nor have the textbooks been enriched with new researches. The present challenges are globalization of *Ayurveda* and industrialization of the *Ayurvedic* drug sector that needs standardization and quality assurance of in-use drugs, besides developing new drugs and formulations for more recent indications. That classical *Ayurvedic* formulations seem to be losing ground is evident from the drastic cuts in production and sale of classical drugs by most *Ayurvedic* drug companies. On the other hand, there is a strong need to explain fundamental principles of *Ayurveda* in a modern context. Further, we must also address the growing demand for an "evidence-base." Hence research is the prime need of contemporary *Ayurveda*. Not only research but also proper documentation of data and results is a big necessity for update *Ayurveda.* On the other hand, despite modern research in *Ayurveda* not having been very rewarding till now, it cannot be overemphasized that modern scientific inputs are unavoidable in this kind of research, the only rider being that, if *Ayurveda* is to be truly explored, such scientific inputs should conform to the principles and philosophy of *Ayurveda*.

Uses of Modern Parameters- Modern Parameters play an important Role in Reliability/Validity of any type of Researches. By using Modern Parameters reliability and validations has been increased for any types of researches. Validity and reliability concepts can easily be misunderstood as same. But there are differences. Validity is analogues to accuracy. A test/instrument [10] is valid when it measures, what it is intended to measure. The test is reliable when it produces same results under identical conditions. Thus, reliability does not denote validity.

For example, if a person, who weighs 50 kg steps on a weighing scale 4 times and gets readings of 45, 48, 40, and 54 kg the scale, is not reliable and if it consistently reads "45 kg" it is reliable, but not valid. If it reads "50 kg" each time, it is reliable and valid. A test that is not reliable cannot be completely valid. Measures of validity of diagnostic procedures are commonly quantifying the ability of the procedures to distinguish individuals with and without a certain disease. Basic measures for this purpose, such as sensitivity and specificity, likelihood ratios, positive, and negative predictive values are described elsewhere. More elaborate measures of validity for, e.g., psychological testing are presented in it is essential that a diagnosis is reliable and valid.

However, in *Ayurveda*, the problem with assessing validity is that there is lack of "gold standard" to compare with. E.g., for pulse diagnosis the diagnosis can only be obtained from a doctor's judgments. However, since different doctors may obtain different diagnoses, we do not know which one is the true diagnosis that all other diagnoses should be compared with. In *Ayurveda,* diagnostic methods (such as pulse diagnosis) often rely on some degree of subjective interpretation by physicians. If the physicians cannot agree on the interpretation, the results will be of little use. Hence, reliability studies are necessary for quality assurance in the conduct of clinical studies and practice [9].

This completely Modern [12], verifiable approach to *Ayurveda* is characterized by careful attention to the preservation of ancient principles which skilled *Ayurvedic* physicians found to be safe and effective. The approach of modern empirical science has engendered many technological wonders in this century, which have been so captivating that appreciation for traditional approaches to medicine has declined. Practitioners have disregarded subjective means of gaining knowledge in favour of objective methods; traditional medical practices and expertise have been lost.

More recently, the **Golden triangle project** has been launched along the lines of the composite drug research scheme, which ended inconclusively during the late sixties, and the ongoing project on **"Science Initiatives in Ayurveda**" and the policy exercise for proposed **Council for International Cooperation in ISM** are still to take off. [8]

Ayurvedic Researches: Its Present Status and Future Aspects- Very beautifully described by **P.Ram Manohar [13]** in his published article," **A Narrative Review of Research in *Ayurveda***" i.e. The Encounter with Modern medicine sparked the debate in Modern times regarding the necessity of Research in *Ayurveda*. For quite some time, staunch traditionalists swore that *Ayurveda* was time-tested and that there was no scope for any new Research. On the other hand, the

progressive-minded emphasized that *Ayurveda* needs to be subjected to the Acid test of Scientific Scrutiny and only what survives can be accepted. The truth seems to lie somewhere in between these two extreme views. Just because *Ayurveda* has a continuity of tradition spanning many centuries, cannot be reason enough for its Authenticity and its acceptance as a whole. An obvious reason is that there have been interruptions in the trans- mission of *Ayurvedic* knowledge as well as ups and downs in its evolution. There is evidence that much of the knowledge preserved by Oral traditions has been lost in the passage of time. Therefore, it is necessary to revisit *Ayurveda* and find proper applications of it for present times [16]

Though India's first Prime Minister **Pandit.Jawahar Lal Nehru** [14] emphasized the need to initiate Research in *Ayurveda* with inputs from Modern Science, and the "Father of the Nation" **Mahatma Gandhi** [15] also pointed out the need to validate the practices of *Ayurveda*, it took a long time for independent India to establish organized and formal mechanisms for systematic Research in **Ayurveda**. Even today, much is still unprocessed in terms of the quality and direction of the Research initiatives in the field of *Ayurveda*. It is interesting to see that Modern Research initiatives are also shifting from drug development to validation of the core concepts of *Ayurveda*. The *Ayurvedic* concept of physical constitution known as *Prakriti* has been subjected to Scientific studies with a view to establish a genomic basis, or identify biochemical markers, that can help to characterize a particular body's constitution. The Surgeon, **Professor M.S. Valiathan** [16], initiated **ASIA (A Science Initiative in Ayurveda**) as a novel approach to the Scientific validation of *Ayurveda*, which shifts attention from drugs to concepts. **ASIA** attempts to validate key concepts that exemplify *Ayurvedic* thinking, including: *Dehaprakriti* (physical constitution), *Rasa-shastra* (the manufacturing and application of metallic compounds in therapy), *Dravyaguna shastra* (*Ayurvedic* pharmacology), *Pancakarma* (five-fold therapy), *Shodhana* (bio-cleansing of the body) and *Rasayana (*anti-ageing therapies). The **ASIA project** has also led to a few publications in high impact journals. The **Department of Science and Technology (DST)** now invites Research proposals for projects to be implemented under a scheme known as ***Ayurvedic* Biology**, which draws its inspiration from the idea that ancient *Ayurvedic* insights can open new avenues of knowledge in modern biology.

Amalgamation of Traditional medicines with Modern Parameters- Making traditional medicine truly mainstream — incorporating its knowledge into modern healthcare and ensuring it meets modern safety and efficacy standards — is no easy task and is far from complete and there is rising concern among conservationists that a growing traditional medicine market threatens biodiversity through overharvesting of medicinal plants or increased use of body parts from endangered animals, such as tigers, rhinos and elephants. Beyond the sustainability of natural resources, marrying traditional and modern medicine faces numerous challenges that stem from key differences in how each is practiced, evaluated and managed [17].

Table 1: Key differences between traditional and Modern medicine

	Traditional medicine	Modern medicine
Knowledge protection	Open access	Closed, patent- protected
Formulation	Ad hoc during consultation with the patient	Pre-determined, and once tested in clinical trials cannot be changed unless re-tested
Regulation	Virtually none, though some countries are trying to introduce rules and standardisation	Extremely tight, to the point that bringing drugs to market now costs billions of dollars
Testing	No formal testing as knowledge of the effectiveness is handed down through generations	Rigorous trials that happen in different phases, first testing for safety, then efficacy
Dosage	Unfixed: the amount of medicine given might be roughly similar, but the active ingredient (which is what dosage really is) can vary hugely	Fixed doses that tend to vary only slightly with age or weight, or disease severity
Consultation	Lengthy, and the patient is asked about a wider range of questions than just their symptoms	Consultations in both primary and secondary care tend to be brief and focused, especially as national health systems come under strain
Training	Both systems of medicine require lengthy training over many years but with traditional medicine, knowledge is often passed one-to-one through families, and practitioners are often born into a family of healers	Often vocational: health professionals go through formal training in schools and universities

New techniques for old treatments [18]

New scientific techniques are also being applied to traditional medicine in the search for Modern drugs. These innovative approaches are developing at breakneck speed.

Table 2: New techniques for old treatments

Technique	Process
Reverse pharmacology	Researchers start with the end product, a clinically useful compound for example, and work backwards to find out what it contains and how it functions. This can offer clues about how particular medicines work, and where they act in the body.
High-throughput screening	This advanced screening relies on high-speed data processing and sensitive detectors to conduct millions of biochemical, genetic or pharmacological tests in a few minutes. The process can quickly identify active compounds that affect particular biological pathways
Ethnopharmacology	The systematic study of how specific ethnic groups use medicinal plants.
Systems biology	This holistic approach aims to understand the way different chemicals and metabolic processes interact within the body. Since traditional medicines often have numerous active ingredients, it could be used to measure the whole body's response to the mixture of compounds.

Some Examples of Modern Parameters used in Ayurvedic Researches

Table 3: Standardization of Bhasma [19]

S No	Parameter	Purpose
1	**EDX-SEM**	**C**hemical nature,size & morphology of particles
2	**TEM,AFM**	Particle size,size distribution
3	**EPMA**	Distribution of individual elements
4	**XRD**	Phase Analysis
5	**XRF,PIXE**	Bulk chemical analysis after making pellets, Detecting metal as element
6	**ESCA**	Electronic nature & oxidation state of metal
7	**Extraction& Chromatography**	To extract out organic matter if any
8	**HPLC,NMR,IR,MALDI**	Characterization of organic matter

EDX-Energy Dispersive X ray analysis
TEM-Transverse Electron Microscopy
AFM-Atomic Force Microscopy
EPMA-Electron Probe Micro Analyzer
NMR-Nuclear Magnetic Resonance
IR-Infrared Spectroscopy
MALDI-Matrix Assisted Laser Desorption/ionization

DISCUSSION

Updating *Ayurveda*, by integrating with modern technologies, without changing the basic principles, is a challenging task that needs great insight in the field of *Ayurveda* and intellect nourished with Modern tonic. **Dr. Gopal Basishta, Senior Rheumatologist, USA, with the unique approach of Symbio Health,** is working on the idea of rewriting *Charaka Samhita* by incorporating modern technologies in it. The much needed project will be started soon. Such efforts are the need of the present hour. Otherwise Ayurveda will not remain *Ayurveda;* soon it will be covered up by the curtains of Modern Herbalist Research. Many new diseases are identified, invented, narrated, explained, and introduced in Modern Science. Scientists are able to Research upon the causation and formation of diseases up to the DNA level. But when it comes to *Ayurveda*, we need to consider the fundamental principles to form the *Samprapti* (pathophysiology) and then formulate the treatment protocol including *Shodhana (*purification procedures) or *Shamana* (medicinal management). Merely giving a herbal drug, which is justified on the basis of Modern Research, would not be sufficient in that case. At first, the amplification of the fundamental principles of *Ayurveda* by integrating Modern investigation tools to formulate the pathogenesis from an *Ayurvedic* aspect is needed. For example, **Electro Myelography** and nerve conduction studies can be useful to ascertain the diagnosis of a disease that is related to ***Mamsa Dhatu* (**muscular tissue), which may be ***Mamsagata Vata, Mamsavritta Vata,*** etc., In *Ayurveda* and muscular dystrophy in modern medicine. Similarly, these tests can be useful to assess the efficacy of *Ayurvedic* procedures such as *Shashtika Shali Sweda* and *Pinda Sweda* (types of fomentation using red rice cooked in milk). This will provide the objective data. But merely prescribing some drugs based on Modern Researches without diagnosing the *Awastha* (status) of *Dosha*, level of *Dhatu*, and *Aama* status as per *Ayurveda* would be of partial benefit. Therefore, it is of utmost importance to standardize the fundamental diagnostic principles, integrating it with the Modern investigative Tools and utilizing it for attaining a diagnostic and treatment perspective. This may help the young generation, fast and high in intelligence, solve the challenges in understanding newer diseases using *Ayurveda.* Modern medicine has been extraordinarily developed with the amalgamation of technology in the field of diagnostic, prognostic, and curative procedures. Newer technologies are being introduced each day for finer and precise understanding of human being and diseases. **Molecular genetics, radio-diagnostics, and invasive cardiology** are few examples that show the power of human brain to probe physiology and investigate pathology. The world is so nearer now that everything can be made possible within minutes at a remote location by the use of information technology. The integration of technologies (e.g., **telemedicine and webinars**) has made this difference in the field of medicine too [18].

CONCLUSION

In this way from above discussion, we can understand that at what extent we need to use modern parameters for Ayurvedic Researches. Researches and *Ayurveda* go hand in hand. Today this is a common talk that there is a need of Research based study in Ayurveda as because the text being written 2000 BC is somewhat needs its validation in today circumstances. Seeking the mechanism of action *Ayurvedic* concepts is not about questioning its authenticity but it would help us to flourish our rich *Ayurvedic* heritage. Ayurveda is a science of Life but somewhere that science is lacking. My only approach of this article is to lighten up that science of Ayurveda. So, it may get much more scientific and logical to understand. Only by this means, Ayurvedic science can make its acceptance amongst mainstream Health sciences.

Modern parameters are otherwise also important because these parameters have a logical background and principle over which they work. Moreover, in 21st century these modern scaling techniques are easily accepted by modern society and nobody questions about their authenticity and when something like Ayurvedic principles are proved by using modern parameters, are easily accepted by general population.

Therefore, if Ayurveda has to make it to a mainstream life science. Modern parameters based researches are the mainstay for its acceptance and is demand of time.

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