



Scope and Importance of Research in Ayurveda: Bridging Ancient Wisdom with Modern Science

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ABSTRACT

Ayurveda is an old Indian way of living. It is about taking care of your health in a way that is just right for you. Ayurveda says that to be healthy you need to balance your body, mind and spirit. It talks three things called doshas. Vata, Pitta and Kapha. If these doshas are not balanced you can get sick. Ayurveda has been around for a time and it has helped people with many problems like diabetes, arthritis and stress. Ayurveda also helps people with system problems.. Even with all its good effects Ayurveda is not widely accepted around the world. This is because there is not scientific proof to support the ideas and principles of Ayurveda. People want to know more about how Ayurveda works and what happens when you use it to treat diseases. They want to see results, from trials and studies. Research in Ayurveda has a lot of potential in areas. We can do research and fundamental research to understand classical concepts like Prakriti, which is about a persons individual constitution. We can also use pharmacology to find new drugs from traditional Ayurveda formulations. Additionally we need to standardize Ayurveda pharmaceuticals and do trials to test them. It is also an idea to combine Ayurveda with modern biomedicine for a more integrative approach. Nowadays people are looking at Ayurveda in ways. They are trying to validate it with evidence through methodologies. Research on Prakriti is being linked to genomics.



Scientists are also analyzing bioactive compounds. The United Nations has Sustainable Development Goals and Ayurveda can help with Good Health and Well-being which's goal number 3. Research, in Ayurveda can help us achieve this goal. The thing about this kind of research is that it helps us get proof that Ayurveda really works. This is important because it makes people trust Ayurveda more it makes sure that Ayurveda is safe and works well it helps Ayurveda become a part of healthcare around the world and it shows that Ayurveda can be used with other kinds of medicine. When people from fields work together use methods that respect where the knowledge comes from and organizations like the Central Council for Research in Ayurvedic Sciences do their part research can really help us see how great Ayurveda can be for medicine that is tailored to each person prevents health problems and is good, for the planet. This will not help keep the old ways of knowing things safe but it will also help people deal with health problems that we have today. It will do this by using things that're safe come from nature and consider the whole person, which is what holistic solutions from natural things are all about, like natural and holistic solutions.

INTRODUCTION

Ayurveda is an old way of medicine that comes from India. It is based on the idea of taking care of your life, which is what the words Ayus and Veda mean. Ayurveda has been around for over 5,000 years. The main books of Ayurveda like the Charaka Samhita, Sushruta Samhita and Ashtanga Hridaya tell us how to stay healthy. They show us that Ayurveda is, about stopping people from getting sick treating each person differently and helping them feel their best. Ayurveda is a way of medicine that looks at the person, not just their sickness. This system is based on the idea that everything is connected and that there are three things that make our bodies work. These are called doshas. Vata is about movement Pitta is about change. Kapha is about energy. Together these three doshas are known as Tridosha. The special mix of Vata, Pitta and Kapha in each person is called Prakriti. This mix of Vata, Pitta and Kapha determines what kind of body a person has what kind of diseases they might get and how



they will respond to treatment. This is the basis for making sure the medicine is right for each person, which's something that people thought, about long before they knew about genes [1].

Ayurveda is really popular in South Asia and people around the world are getting more interested in it.. Ayurveda is not a big part of regular healthcare everywhere. The main reason for this is that Ayurveda is about looking at the person and it is based on what people have experienced. On the hand modern medicine is, about breaking things down and using numbers to understand them. Some people do not think Ayurveda is valid because it has not been tested in the way that modern medicine has. They say that the basic ideas of Ayurveda and the medicines used in it have not been proven to work with scientific tests [2]. Ayurveda and its treatments need to be tested in a scientific way for people to trust them. We really need to do a lot of research on Ayurveda. This research should not try to make Ayurveda like medicine. Instead it should try to understand Ayurveda in its way and see how it can work with regular medicine. We need to make sure Ayurveda is safe and works well.

This article talks about how important it's to do research on Ayurveda. Research on Ayurveda is essential, for combining ideas with new science. This will help us use Ayurveda to solve health problems. Ayurveda research is critical because it can help us learn from the past and make people healthier today.

FUNDAMENTAL PRINCIPLES AND THE NEED:

Ayurveda is really about being healthy. It thinks that health is when your body and mind and what is around you are all in balance. When you are not healthy that means something is out of balance. This happens when the things that make you up like your body and mind are not working together. The things that you do every day what you eat and how you live can make you sick if they do not fit with what you're like as a person. Ayurveda talks about some ideas like Agni, which is like a fire that helps you digest food, Ama, which is the bad stuff that can build up in your body and Srotas which are, like tiny roads that help your body work properly. These ideas help us understand how our bodies work and what happens when we get sick. The main thing to look at when it comes to research is the research. This is where we take a look, at the old ideas and try to understand them in a new way using the science we have today. For instance:

The Prakriti Phenotyping is an area of research. It is about taking the Prakriti assessment, which is based on what people think and feel and turning it into things that we can measure. People are starting to find links between Prakriti types and things like markers, body measurements and even the genetic code. This suggests that the different Prakriti types may be connected to our genes. Studies are looking at



Prakriti types. How they relate to these things like the markers in our body and our genetic signatures to see if there is a genetic reason, for the different Prakriti types [4, 5].

Dosha Biomarkers are really important. Research is being done to find out what is going on with Vata, Pitta and Kapha states at a metabolic level. This research on Dosha Biomarkers could also look at the neuroendocrine system. If we can figure out what is happening with Vata, Pitta and Kapha states it could completely change how we diagnose things and give us a way to understand how our bodies work as a system. Dosha Biomarkers, like these could be very useful.

Pharmacological Principles are based on some concepts. These concepts include Rasa, which's the taste of something, Virya, which is the potency of something, Vipaka, which is what happens after we digest something and Prabhava, which is the unique potency of something. We need to understand these concepts of Pharmacological Principles like Rasa, Virya, Vipaka and Prabhava. This can be done by studying Pharmacological Principles through phytochemistry and pharmacodynamics to learn more, about Pharmacological Principles and how they work.

This basic research is really important. It gives us a base to work from so we can do clinical and pharmaceutical research with confidence. This helps move Ayurveda from something people just believe in to something that is actually proven by evidence. Ayurveda is becoming more about facts and less, about trusting it works.

DOMAINS OF AYURVEDIC RESEARCH: AN EXPANSIVE SCOPE:

The study of Ayurveda covers a lot of areas. It includes things like history and philosophy which're more about people and culture. At the time Ayurveda also involves advanced science and technology like the kind of work that is done in laboratories with special equipment. The research in Ayurveda is really broad. Looks at many things from the humanities to high-tech laboratory science, in Ayurveda.

- 1. Literary and Historico-Medical Research:** We really need to study and translate old texts. This is important because it stops us from losing the information makes things clearer when they are not easy to understand and makes sure that the information is passed on correctly. We have to make copies of this information and create lists of medicinal plants and the ways they are used that we know are correct these are the first things we have to do [7].
- 2. Drug Research and Reverse Pharmacology:** Ayurveda has a lot of medicines made from plants, minerals and animals. This is a resource for finding new drugs. The usual way of making medicines,



which is from the laboratory to the clinic does not always work out. Ayurveda has an approach that has been around for a long time. This approach is called Reverse Pharmacology. It starts with things that are already being used to help people. Then it is studied in the laboratory. Ayurveda's approach is a way to discover new medicines because it uses things that are already known to work. Ayurveda and its medicines are very useful, for drug discovery.

Stage 1: Documented clinical observations of safety and efficacy of a traditional formulation.

Stage 2: Exploratory studies in relevant laboratory and animal models to understand mechanisms.

Stage 3: Experimental clinical research to validate hypotheses.

This way of doing things has given us ideas for conditions like rheumatoid arthritis for example *Boswellia serrata* and diabetes for example *Gymnema sylvestre* and also cognitive disorders, for example *Bacopa monnieri* [9].

- 3. Pharmaceutical Standardization (Pharmaceutics):** A big problem for medicines like Bhasmas, Asavas, Arishtas and Churnas is that the ingredients and the way they are made can be very different. We need to do research on Ayurvedic medicines specifically on Bhasmas, Asavas, Arishtas and Churnas to make them more widely accepted. Research, on medicines, including Bhasmas, Asavas, Arishtas and Churnas should look at: Developing standard operative procedures (SOPs) for cultivation, harvesting, and processing. Implementing Good Agricultural and Collection Practices (GACP). Using advanced analytical tools (HPTLC, HPLC, GC-MS, NMR) for chemical fingerprinting and batch-to-batch consistency [10]. Establishing rigorous quality control for heavy metals and other contaminants, ensuring safety without compromising the integrity of traditional processes like Shodhana (purification) [11].
- 4. Clinical Research:** Doing clinical trials for Ayurvedic treatments is really tough because Ayurvedic treatments look at the whole person and what they need. Researchers need to think of ways to study Ayurvedic treatments that go beyond the usual method of comparing a treatment, to a dummy treatment and not telling people which one they are getting. We need to develop ways to study Ayurvedic treatments that are based on how Ayurveda actually works: Pragmatic Trials: Evaluating whole-system Ayurvedic treatment (including diet, lifestyle, and herbs) in real-world settings. Prakriti-Stratified Trials are a way to make clinical trials more personal. This is done by grouping the people who take part in the trials based on their body type, which is also known as their constitution. The reason for doing this is that people with body types may react differently to the same treatment.



This is what Prakriti-Stratified Trials are, about. They help us understand why people respond differently to the treatment [12].

Whole Systems Research is a way of studying things that looks at how all the parts work. It is, about trying out treatments that are made up of different things rather than just testing one herb at a time. Whole Systems Research is really useful because it takes into account that people are all different and what works for one person may not work for another. This type of research focuses on Whole Systems Research. How all the components interact with each other to create a unique effect.

There are some health problems that we do not know a lot about. These are the areas where we need to do more research. Chronic diseases are one of these areas. This is when someone is sick for a time. We also need to learn more about diseases that are caused by things, like metabolic syndrome. This is when someone has a lot of health problems at once like being overweight and having high blood pressure. Autoimmune disorders are another area where we need to do research. This is when the body attacks itself. We also need to learn more about diseases that affect the brain, like diseases. Mental health is another area where we need to do research. This is when someone is not healthy in their mind. Finally we need to learn more, about how to take care of people, which is called geriatric care.

5. Integrative Medicine Research: The important area of work is probably where Ayurveda and modern biomedicine come together in research. This is not about putting these two types of treatment in the same place. It is about combining them so that the good things about Ayurveda can make up for the things that modern biomedicine is not so good, at and the other way around. Ayurveda and modern biomedicine can work well together in research.

- Oncology: Managing chemotherapy-induced nausea, fatigue, and improving quality of life.
- Lifestyle Disorders: Combining Ayurvedic Dinacharya (daily regimen) and Ritucharya (seasonal regimen) with conventional management of diabetes and hypertension.
- Surgery: Utilizing Ayurvedic wound-healing herbs and pre-operative restorative protocols (Snehana, Swedana) [14].

We need to do research that sets out clear rules does not hurt people and checks if the results are really helping the patients. The research here has to make sure it is doing things that're good for the patients. The patients are the important thing so the research here must be about what is best, for the patients.



EMERGING TRENDS AND METHODOLOGICAL INNOVATIONS:

Nowadays Ayurvedic research is using the science to make new discoveries. The people doing Ayurvedic research are looking at what modern science has to offer. They are using this science to learn more, about Ayurvedic research. Ayurvedic research is really benefiting from the science.

Omics Technologies: We use genomics and metabolomics and proteomics to understand the basis of Prakriti. We also use genomics and metabolomics and proteomics to see how Ayurvedic treatments affect the body as a whole.

Network Pharmacology is a way of studying how lots of things in medicine work together. It goes beyond the idea of one drug working on one thing. Instead it looks at how many different compounds in formulations interact with many biological targets. This is actually really similar to how Ayurveda works, which is, by using many things to treat the body in lots of different ways [15].

Artificial Intelligence and Big Data are really useful together. Artificial Intelligence can look at a lot of Prakriti assessment data. It can even try to figure out what the results of a treatment will be. Artificial Intelligence is also helpful in making treatment plans that are tailored to each person. It does this by looking at an amount of information from clinics. Artificial Intelligence and Big Data make it possible to give people the treatment plan, for their specific needs.

We need to find ways to study Ayurveda that respect what Ayurveda is about. At the time these ways have to meet the standards of science. This is an area of research that is getting more attention. Developing methods that work for Ayurveda and, for science is a challenge. We have to make sure that Ayurveda methods are respected when we use them to do research. This is a thing to do because Ayurveda is a special kind of medicine.

THE CRITICAL IMPORTANCE OF AYURVEDIC RESEARCH:

This big research project is not just about learning something. It is really important for people who need care all around the world. The healthcare system globally will benefit from this research. The research on healthcare is very important, for people.

- 1. Generating Robust Evidence for Credibility and Integration:** Good evidence is very important, for healthcare. We need to do research on the safety of Ayurveda, which is also known as pharmacovigilance and we need to make sure it works well which we can do with well-designed trials. We also need to understand how Ayurveda works, which is science. This kind of research is



necessary for Ayurveda to be accepted by the global medical community, people who make policies and insurance companies [2].

- 2. Ensuring Safety and Quality Assurance:** We need to have systems in place to make sure the things we take to get better are safe. This means we have to check for things like heavy metals and make sure the herbs do not interfere with the drugs. The Food and Drug Administration and other organizations have to work to build trust with the people and keep the patients safe. Research on pharmacovigilance systems and standardization is really important to address concerns, about adulteration and herb-drug interactions. This is how we can make sure people trust the medicine they take and that patients are safe when they take their medicine [11].
- 3. Facilitating Global Integration and Policy Making:** Evidence is essential for regulatory approvals (e.g., by the FDA as a "botanical drug," or within the EU's Traditional Herbal Medicinal Products Directive), inclusion in national health policies, and integration into primary healthcare systems, especially in low-resource settings.
- 4. Contributing to Personalized, Predictive, Preventive, and Participatory (P4) Medicine:** Ayurveda is naturally a personal thing. Studies that show how Prakriti can be used to group people can help put Ayurveda in a leading position in the worlds move towards medicine that is tailored to each person. This can provide ways to prevent disease that're easy on the budget and start from an early age. Ayurveda is the key to this approach and research, on Ayurveda and Prakriti can make a big difference.
- 5. Drug Discovery and Sustainable Development:** Reverse pharmacology is a way to make new medicines from things that are found in nature. It is more efficient. It also considers the culture. We can also learn from Ayurveda and its use of plants to make medicine. This is good for the earth because it helps to protect the environment and the plants and animals that live here. This is important for the United Nations goal of making sure people are healthy and happy which is called Good Health and Well-being. It also helps with some other goals. Reverse pharmacology and Ayurveda and its plant-based solutions are very useful, for this.
- 6. Preserving Cultural Heritage and Providing Economic Opportunities:** Scientific validation is really important because it helps to protect knowledge from being used in the wrong way. This is good for knowledge. It also helps to create a system that's good for the environment and that is based on research. This system includes things like growing plants making products and medical practice. The results of this system are very good for people and for the economy. Scientific validation is very useful, for knowledge. It helps knowledge to be used in a good way.



CHALLENGES AND THE WAY FORWARD:

The path to learning about Ayurveda is not easy. Ayurveda has a lot of challenges. There is not money to do the research. We also need people who know about Ayurveda and modern science. The way we do research is also a problem.. There are rules that make it hard to do things.. There are some good things happening. The Central Council for Research in Ayurvedic Sciences in India is doing some work. They have projects that they are working on.. Ayurveda is getting more attention from other countries. This is a sign, for Ayurveda. The way forward requires a lot of things. We need to think about what the future holds for the way.

The way will need us to work together on the way forward. This is the way we can make sure the way forward is good. The way forward is what we should focus on.

- 1) Increased Public and Private Funding dedicated to trans-disciplinary Ayurvedic research.
- 2) Curriculum Reform to create a new generation of clinician-scientists fluent in both paradigms.
- 3) Development of Accepted Research Guidelines for Ayurvedic clinical trials and pharmacology.
- 4) Fostering International Collaborations between research institutions, hospitals, and universities.
- 5) Active Engagement with regulatory bodies to create pathways for the acceptance of traditional medicine evidence.

CONCLUSION

Ayurveda is not something that's old and outdated. It is a living science that is still growing. It is very important for our lives today. The focus of Ayurveda is on stopping people from getting sick keeping our body healthy living in balance with nature and giving each person the care they need. These things can help us deal with the problems we are facing like more and more people getting sick with long term diseases the high cost of healthcare and the fact that some medical treatments do not work very well. But to really make Ayurveda work we need to do a lot of thorough research. We need to study Ayurveda in a way that's respectful and thoughtful and that brings together many different people and ideas. Ayurveda has the potential to make a difference in our lives and, with the right research we can make that happen.

The research in Ayurveda is really big. It goes from small things like molecules to really big things like the universe. People do research in libraries and laboratories. They also do research on farms and in clinics. Ayurveda is important because it is not about looking at old ways of doing things. It is about creating a way of thinking about health that includes the whole world. When we combine the



wisdom of Ayurveda with the new tools of modern science we can make a healthcare system that is kinder and works better. This system will be good for the earth. It will remember that everything, in life is connected to everything else. Ayurveda research can help us make a healthcare system that really cares about people and the world. The journey to bring together these two areas of knowledge has started. It is very important that this journey is successful. The future of medicine depends on the success of this journey to bring these two big areas of knowledge, medicine.

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