

Chapter 2

Transforming Ayurveda: Stepping into the Realm of Evidence-Based Practice

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2.1 Introduction

Before we start a discussion about the need of transforming Ayurveda through adoption of evidence-based approaches, a theme of this book, it needs to be clarified that by no means, it challenges the classical principles or practice of Ayurveda but rather supplements it in light of best available evidences to the tune of conventional understanding. Where these evidences are not available due to the paucity of tools or due to the inadequacy of work done, this provokes us to search, create, and amend the existing pieces of clues from clinical practice of Ayurveda and transform them into the nitty-gritty of evidence-based research upon which evidence-based Ayurveda (EBA) as a discipline can successfully be erected.

For selecting a treatment, previously, it was considered sufficient to know about the pathophysiological process of a disease and to understand what a drug might be doing to interrupt such a process [1]. Such pieces of information were often collected independently in pathology and pharmacology labs and were clubbed together to determine a clinical application. More often, these experiments were done through isolated pharmacologically active compounds on in vitro or animal models where a disease was produced artificially.

Only later, it was realized that experiments done on synthesized model cannot simulate the real-life situation of a pathogenesis in a human being and also the behavior of a drug compound studied in such models cannot be replicated in a

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human object where a number of confounding factors operate simultaneously to affect the net outcome of the drug effect.

It is because of this reason; such experimental medicines often fail to produce the holistic effects against a pathogenesis or are often accompanied with a variety of undesired effects which might not be welcomed by all.

Randomized clinical trials intervened at this moment, by offering to study the effects of certain drugs upon human subjects with defined pathogenesis. Randomization offered a reduction of bias related to sample selection which might have influenced the results in case of a stratified sample [2]. Further addition of controlling mechanism to randomized study has given an additional edge to these studies by identifying its superiority, noninferiority, or equivalence to the comparator [3]. Placebo (a compound mimicking the therapeutic compound in appearance, taste, and smell but not having any therapeutic value) which was identified as a strong influencing factor to determine the net outcome of any therapeutic intervention was also added later to these studies to find if the intervention is substantially different than no treatment or placebo.

This gradual awakening about the necessity of unbiased and therefore dependable information as a compulsive paraphernalia to make a decision making regarding the diagnosis, treatment selection, or prognosis projected randomized controlled trials (RCT) as gold standard in the field of clinical research methods. An addition of blinding to the whole trial to avoid any personal influence offered by patient, physician, or the data analyzer has given it the final punch.

For the purpose of clinical application of medicine, RCT has erupted as a tool to validate the information obtained through an explicit clinical examination and its interpretation in order to procure best possible outcome through application of interventions having a sound evidence basis. It is easy to understand that an availability of such evidences has drastically reduced the time and experience required by a physician to make a clinical judgment.

The continued use of RCTs, however, in a range of studies during last 50 years has exhibited certain significant inbuilt weaknesses in this approach warranting rethinking that RCT is no more the gold standard giving way to the emergence of many other alternative ways of testing the truth through observational studies and pragmatic trials.

2.2 Evidence-Based Medicine: What Is This All About?

In efforts to define the EBM, we find people variously explaining and elaborating it. For a common purpose, we can propose EBM as a process of systematically appraising the available evidences in order to help a decision making regarding diagnosis, treatment, or prognosis of a disease aiming to aid to the delivery of optimal care to patients [4].

A movement of evidence-based practice in medicine does not have a long history. It begun in its preliminary form as an small activity at Mc Master University in

Canada with an objective to improve the learning and decision-making skills of their graduates [5]. A better and stable decision-making skill was observed among those medical graduates who received EBM learning in comparison to those who were receiving the convention learning [6]. Beginning as a small activity localized to a specific institute and its people, it gradually was accepted by many as a new discipline since it aimed at optimizing the net outcomes through a continuous and rigorous process of introspection of all the evidences helping in making decision in a particular field. A simple outcome of this process was extending the benefits of research from laboratory to patients and a translation of theory into practice, an objective which could have been the ultimate for every scientist and researcher working in the field of medicine.

2.2.1 Applying Evidence Base to Ayurvedic Clinical Practice

Why do we need an evidence base to Ayurvedic practice? Do we really require an evidence search for a health-care practice which is in vogue since ages? This often made argument from core Ayurveda fraternity needs to be analyzed in terms of extended benefits of putting an evidence basis to the practice of Ayurveda, primarily for a prospectively better and dependable health care and secondarily for the prospective growth of Ayurveda as a contemporary science. An evidence basis is required to be adopted at every level of health-care practice from diagnostics to the therapeutic decision making. Ayurveda requires a thorough work to bring out an evidence basis to its diagnostics primarily to support its fundamentals and to create a sound scientific and logical basis upon which a decision of therapeutic intervention can be made [7–9].

In addition, it also requires evidences to support its interventions in various clinical conditions to the extent that it may justify their application in a given condition. Evidence basis, in its essence, is proposed to be beneficial for the benchmarking of any medical practice. This is meant for maximization of predictable benefits to any clinical intervention besides minimization of any untoward effect through looking into and utilizing the documented evidences to reach at a clinical decision. In contemporary Ayurvedic clinical practice, subjective inferences often loom larger than the objective evidences. Therefore, an evidence-based approach seems to be the most appropriate one in bringing uniformity initially to the practice style and standards and subsequently to the responses obtained. An illustration of *prakriti* analysis in contemporary Ayurvedic practice holds a good example in case. Despite of its sound fundamental basis and clinical importance, it is often diagnosed with huge intra- and interrater variability. Absence of an unambiguous, reproducible, and uniform tool to analyze *prakriti* in Ayurvedic clinical practice not only limits its application as a help to Ayurvedic diagnostics and therapeutics but also questions the decisions taken on behalf of its analyses which remains challengeable [10–13].

Ayurveda fundamentally appreciates the evidence-based decision making. It appreciates the evidences generated through clinical observations (*pratyksha*),

speculation (*anumana*), experimentation (*yukti*), and documentation (*apta*). Classical texts of Ayurveda stand in favor of a comprehensive utilization of these evidences in decision making in Ayurvedic practice.

Ayurveda has been in practice for thousands of years now and has gathered a huge sum of personal experiences regarding its benefits in many clinical conditions. Unfortunately, for a larger part of its historical succession, Ayurveda did not adopt a method of documentation or record keeping, and therefore these personal experiences by and large could not be utilized for their mass applications by growing Ayurvedic physicians in the post-independence period. Moreover, bringing documentary evidence to support a clinical decision is the utmost thing which makes the concerned physician accountable for their acts.

We can see evidence-based practice as largely applicable to Ayurveda within its purview and by essentially utilizing its own tools of evidence generation. Application of the stringent methods of evidence generation may not appear essential to Ayurvedic practice initially, but this is of utmost importance that their own tools of disease diagnosis and progress indicators should be utilized efficiently.

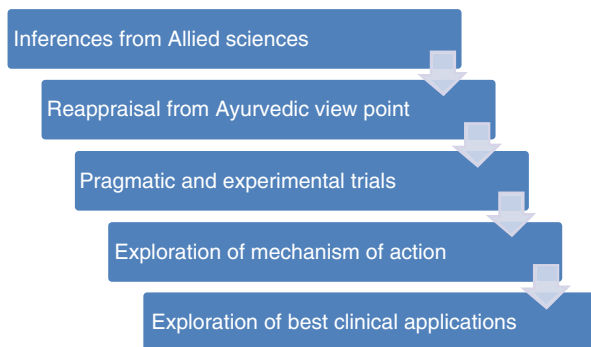
2.2.2 Applying Evidence Base to Ayurvedic Clinical Practice: What Are the Tools?

To apply the evidence base as a help to decision making in practice of Ayurveda, we need to search, assemble, and systematically reappraise the evidences available. Seeing the paucity of researches and thereby evidences generated in Ayurveda, the issue of adopting EBA is significantly different than that of EBM. For EBA, we not only need to appraise the researches done in field of Ayurveda but also need to reappraise various researches done in contemporary science with a different objective but which may hold a close resemblance to the principles and practice of Ayurveda. This is a simple adoption of what is already available and accessible in science for making a better understanding and applicability of our own science. Simultaneous to this, we need to systematically reappraise whatever meager researches are available to Ayurveda through various sources, and finally, we need to generate more evidences and their documentation in order to have a better applicability of Ayurveda into clinical practice.

2.2.2.1 Searching the Evidences from Contemporary Science

In effort to bring an evidence base awareness to the basic science of Ayurveda and its clinical application, the first thing which can and which should be done is the thorough exploration of contemporary science to reappraise various pieces of information from research done primarily with a different objective but which may find a substantial relevance and applicability to Ayurveda.

Fig. 2.1 Generating evidences through researches in allied sciences



We all agree that the phenomenal growth of biomedicine in past few decades was not primarily because of the work done in the field of medicine but because of the work done in the field of allied sciences and through their application to the field of medicine.

Looking into available information from science, with a view to find their relevance and applicability in Ayurveda, could prove to be a simple yet powerful exercise to make a foundation to more specific and innovative exercises which are required to be planned in future. This exploration and reappraisal of contemporary science could be done in a random or a systematic manner. This could also be done with a view to find information with a clinical relevance as well as those with fundamental or pharmaceutical importance (Fig. 2.1).

2.2.2.2 Reappraising the Information Helping in Diagnostic Decision Making

We recently have come across the concept of biomarkers which are proposed to be the specific biological substances arriving early in the process of a pathogenesis and whose identification can bring an early identification of a disease process. The pioneering work done by David Wong brought a paradigm shift in the field of salivary diagnostics [14]. Salivary diagnostics was further proposed to be a *point-of-care* (POC) diagnostics, where a limited amount of resource was to be used to handle a larger patient load for diagnosing diseases reciprocally [15]. A noninvasive, well-tolerated oral sample of saliva is used here to identify biomarkers, diagnostic to various diseases during the patient's periodic or initial dental visits.

Making an extension to the salivary diagnostics, Indian Council of Medical Research (ICMR), as an effort to provide a handy, inexpensive, and screening tool to diagnose and monitor diabetes, is proposing its screening test through saliva. This test would be a less expensive and noninvasive tool to enable a mass screening and monitoring of huge diabetic population in India [16]. Interestingly, Ayurveda identifies *asya madhurya* (sweet taste in mouth) as a prodromal symptom to *prameha*, an entity having a good resemblance to what we understand as diabetes [17].

Now, this reappraisal of salivary diagnostics from the point of view of Ayurveda gives us a strong reason to test all Ayurvedic prodromal sign and symptoms described in various conditions for their feasibility of quick identification clinically and also for any possibility of developing tools for an early diagnosis of the disease during their prodromal phases. Adding further to the quest, just to approve sweetness of mouth as a prodromal symptom, this would also be of interest to know if an increase in sugar appears early in saliva in comparison to blood. It is therefore, taking a clue from Ayurveda, any such evidence provided to diagnostics would not only be able to provide a substantial evidence base to the clinical description of Ayurveda but at the same time would also be able to change the face of contemporary medical practice.

Prakriti, as a fundamental construct of Ayurveda, forms the genetic and epigenetic basis to the human morphological and biological specifications. As per the genetic specifications determined at the time of conception and further under the influence of immediate environment, an individual is made distinct in terms of its appearance, behavior, and physiology. We have come across many studies which have approved a genetic basis to *prakriti* constructs.

As independent researches, we also have come across few recent studies and publications of Oxford University, Medical Research Council of Britain, Concordia University, British Journal of Psychology, and Bath University who are linking certain morphological features of human body to some specific psychological attributes. Among them, most interesting ones are those who link the shape and size of fingers to some special psychological abilities [18]. Reappraising these independent works in reference to Ayurveda, we can easily point that morphological attribute of an individual are primarily the reflection of a differential distribution of *dosha* in every individual determined in early phases of intrauterine life. Psychological attributes are also essentially the reflections of these *dosha* distributions only. It is therefore obvious to find a link between morphological and psychological features in individuals in reference to their *dosha* preponderance. Understanding such associations between morphology and psychology can make remarkable changes in the field of preventive and curative medicine. Moreover, this can also possibly offer a great help to counselors who suggest a career opinion in reference to the aptitudes of an individual.

A reappraisal of exogenous researches, however, may not prove to be helpful always. The example in case is the findings obtained through the identification of genetic correlates of longevity and selected age-related phenotypes. In a genome-wide association, Framingham study identified a relationship between walking speed and longevity [19]. In the study, it was found that those who walk faster have a better probability to live longer than those who walk slow. This inference, however, is in contrast to the perception of Ayurveda. People with *vata* predominance are proposed to have a faster walking speed, but at the same time, these people are presumed to have less happy and shorter life in comparison to *kapha* people who are marked with a slow walking speed yet a happy and long life.

An intricate relationship between gut and joint pathologies has long been proposed in Ayurveda. *Ama*, an outcome of incomplete digestion, has been proposed as

the principal incriminator to many joint pathologies marked by pain and stiffness [18]. We have come across many such researches who are proposing a gut pathology in terms of increased permeability, mucosal denudation, and increased influx of complex macromolecular antigen to the gut periphery and also to the systemic circulation [20]. As a result, an immune aberrance is proposed to occur which may finally give rise to systemic presentations like arthritis [21–23]. This observation gives us a unique opportunity to understand *ama* in light of qualitative and quantitative observation of in-fluxed antigen and their corresponding antibodies. Needless to emphasize, this can also give us a unique opportunity of objectively quantifying *ama* for its application in making the judgments about clinical and therapeutic evaluation in reference to an *ama*-related disease.

2.2.2.3 Reappraising the Information Relating to Ayurvedic Pharmaceuticals and Therapeutics

Ayurvedic pharmaceuticals is composed of certain unique propositions of drug delivery system which largely are based upon Ayurvedic methods of drug preparations. An arbitrary classification of Ayurvedic pharmaceutical preparations as those of *guru* (strong) and *laghu* (mild) is in recognition to their rapidity of delivering the active molecules and thereby bringing them into action.

Nanomedicine argues for small nano-sized drug particles to enable them for some target-oriented functions where size of the particle matters. This is especially true for target-oriented intracellular activities where drug particles are required to be engulfed intracellularly to initiate a cellular response. Many independent researchers have established the role of particle size in initiation of a drug response [24]. Ayurvedic preparations containing metal are processed through a controlled incineration method (*puta*) where heat is offered to disintegrate metal into smaller particles. *Puta* as a traditional measure to the intensity and duration of heat offered in the process relates inversely to the particle size, i.e., the larger the *puta* number and size, the smaller would be the particle size [25]. Any correlational study to compare a drug response in a defined clinical condition through use of drugs which are prepared variously through utilization of different *puta*, and thereby offering different particle size, can establish the fact of particle size and its clinical effect as is perceived in Ayurveda. A pharmacodynamic and kinetic study may further follow to confirm the mechanism behind these assumptions. This simple study can have a substantial effect upon bringing an evidence-based logic to the selection of drugs in clinical practice of Ayurveda.

Bronchial asthma has been among few most frequently occurring illnesses which affect the quality of life of the sufferer significantly. Ayurveda approaches toward it variously but with less significant responses. Identification of bitter taste receptors of airway smooth muscles (ASM) [26], however, may change the Ayurvedic management protocol in bronchial asthma. Bitter taste receptors (TAS 2 Rs) on the tongue were presumed to be evolved as protective mechanism to protect individual from accidental intake of plant substances containing bitter taste. Identification of

these receptors on ASM was also thought to be an extension of the earlier phenomena. In view of this, this was hypothesized that an inhalation containing bitter tastants would lead to an ASM contraction. Paradoxically, experimentation done to test this hypothesis proved it on the contrary. A bitter tastant inhalation caused a significant relaxation of the ASM. It further has decreased the airway obstruction in a mouse model of asthma. These observations can give a strong impetus to Ayurvedic *dhumapana* (fume inhalation) method of drug delivery recommended to asthmatics. *Dhumapana* is traditionally recommended to all asthmatics who undergo a purificatory *vamana* (emesis) therapy. A dried hollow stick made of paste of certain herbs is dipped at one end in ghee (clarified butter) and is then ignited to produce fumes. This fume is inhaled from the rear end of the stick. This is noteworthy that most herbs recommended for *dhumapana* in asthmatics are bitter in taste. After receiving a scientific understanding to why bitter are recommended to asthmatics, we can now propose for its improved delivery system where the quantity and quality of fume produced and inhaled can be monitored to produce dependable responses every time. Alternatively, a steam inhalation where steam is impregnated with bitter tastants can also be tried. In either way, this would be providing a sound evidence base to Ayurvedic recommendations for bronchial asthma therapy.

2.3 Generating Evidences: What Are the Needs of Ayurvedic Research?

Ayurveda is often being criticized by scientific fraternity for its ambiguity and paucity of evidences required to bring a strong scientific footing to its belief. On the contrary, hard-core Ayurvedic physicians are often found emphasizing the inadequacy of scientific tools in evaluating the intricate subjective details of human biology as are perceived in Ayurveda.

What do we primarily require to initiate a research? For a scientifically tuned mind, the answer is easy to find. It is the research question around which we plan our whole research. This is therefore important to understand that the methods are only secondary and are the means to reach at the desired objective. A method should therefore follow the primary research question and not the contrary as is happening to many of current researches in Ayurveda.

When we try to honestly define the research questions in Ayurveda, we would be surprised to see that there are millions of questions unanswered and which can be approached by simple research methods available around us. For few more complicated issues, we may possibly require more sophisticated research models which may be developed de novo or through required modifications into the existing models.

What we need in Ayurveda is to develop a spirit of scientific inquiry for the search of truth. Whatever methods are found adequate, unbiased, and helpful in taking us to the ultimate objective would be the most appropriate method of research in Ayurveda.

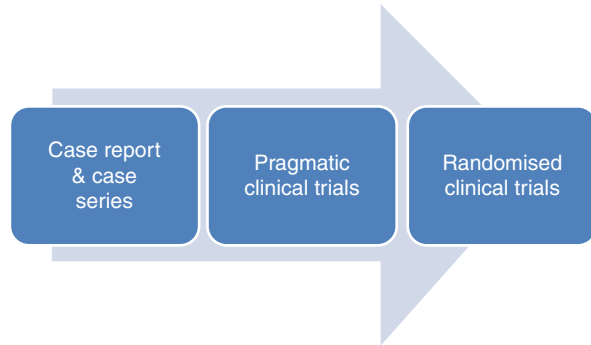
The guiding dictum should be to identify such appropriate tools and methods of research in Ayurveda which may be capable to respect equally the desired rigor of science as well as the original holistic nature of Ayurveda. We discuss here a few research methodologies which seem most appropriate for bringing evidence base to contemporary Ayurveda.

2.3.1 Reporting Single Cases and Case Series

Ayurvedic clinical practice is overwhelmingly marked by huge sum of anecdotal claims which are not substantiated through thorough scientific screening of a cause and effect relationship between the changed status of patient and the intervention given. This is however largely realized that until we develop a culture to generate stronger evidences, it is worthy to begin with nurturing a culture to report more and more cases where some noticeable changes have occurred. This adoption of case-reporting culture would possibly help initially to develop an aptitude of scientific scrutiny to each and every point we presume important in case management, and secondly, this will provide us a huge raw data upon which a magnitude of future research can be erected. Many biomedical breakthroughs have had a modest beginning in the form of an isolated case report without a presumption that what could be the future impact of this report. We have observed many case reports from Ayurveda in recent past claiming for substantial changes among clinical status where the intervention was made. These conditions are as diverse as mono-ocular vision loss [27], cerebellar ataxia [28], insomnia [29], PAOD [30], migraine [31], rhinosinusitis [32], osteoarthritis, [33] and many more. Number of case reports published in literature in reference to Ayurveda, however, are limited. Creating an awareness among primary care physicians besides those who are maintaining a specialty practice might have a lasting impact in producing more case reports as a definitive help to the ultimate evidence generation.

Information generated through several similar cases may constitute a case series. It has been considered as a strong pre-evidence which can conclude in more dependable evidences if the signals generated through the case series are trapped and evaluated further. Seeing the overwhelming claims of complementary and alternative medicine (CAM) in various terminal and incurable illness, National Institute of Health (NIH) has taken a novel initiative. Through its program of best case series launched at National Cancer Institute (NCI), it aimed at filtering the CAM interventions where the claims of clinical improvements are substantiated through radiological and biochemical evidences. It further emphasizes the importance of a good documentation both in pre- and post-treatment phases as an essential prelude to evidence generation. NCI proposes a detailed and thorough experimentation with the interventions where an improvement is substantiated through proper documentation [34]. Despite of their considerable importance as a curtain raiser to future evidences, single cases and subsequent series find a little attention in Ayurvedic fraternity which is evident through their poor availability at

Fig. 2.2 Generating evidences through case reporting



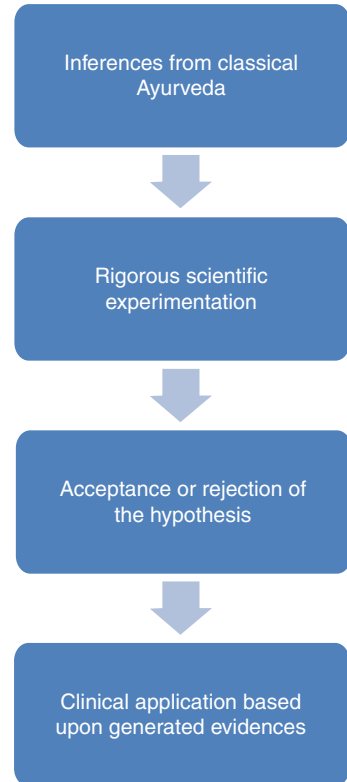
the searchable databases [35]. We need to find ways for an optimal utilization of this so far underutilized tool to generate clinical evidences per se (Fig. 2.2). An encouragement to clinical research in practice settings is required to be done in this purview.

2.3.2 Evidences from Classical Ayurveda

Figure 2.3 explicitly explains how the classical knowledge of Ayurveda can be changed into dependable contemporary evidences just by exposing it to some objectively defined research models. Every single statement made in Ayurvedic classics may thereby, as per their clinical and therapeutic importance, be brought into scientific scrutiny, and as a result, what we get is a pure, dependable, and applicable knowledge which may help the optimization of Ayurvedic interventions in any given condition.

Various new research experiments may also be proposed referring to evidence generation in Ayurveda. Examples in case are the augmentation in level of glutathione and Cyt P450 enzyme levels in reference to *panchakarma* procedures of Ayurveda. Various enzyme systems that are responsible for inactivation and elimination of toxins and xenobiotics get activated in response to intake of herbal compounds. This enzyme activation can be a potential mechanism behind detoxification which is said to be obtained through *panchakarma* [36]. Lele has proposed four plausible mechanisms to understand action of Ayurvedic drugs. A pleiotropic nature of Ayurvedic drugs is largely attributed to sharing of their molecular targets by many cell systems and cell membrane components [37, 38].

Bioavailability of Ayurvedic herbal drugs has not been given the importance in research so far which it deserves to be. Inverted intestine loop model is used to study the bioavailability of *Terminalia arjuna* extracts and is proved as a valid model to study the bioavailability of various Ayurvedic herbs [39]. Many more such models and experiments can be proposed to validate various Ayurvedic postulates for their better applicability into clinical practice.

Fig. 2.3 Evidence generation from classical Ayurveda

2.3.3 *Evidences from Contemporary Ayurvedic Research*

Ayurvedic researches conducted in past few decades have not really been rewarding [40]. Poor research methodology and their equally poor presentation have led to a substantial unacceptability of Ayurvedic research papers through many peer reviewed and indexed journals. This is how we find a huge bulk of Ayurvedic researches that remain unpublished [41]. Many Ayurvedic publications are also referred unavailable because of inaccessibility to their editions through digital media. This is how the researches done so far in Ayurveda could neither be made available for their wider analysis nor could be utilized for any future work. A paucity of research literature in Ayurveda, therefore, has helped skepticism to grow about its principles and interventions. The conditions, however, currently are found improving by seeing a boom of journals both indexed and peer reviewed solely dedicated to the cause of Ayurveda. This has given an opportunity to less privileged researchers to have published their researches and thereby exposing them to a larger screening through a peer readership [42].

Converting published and unpublished literature into an evidence requires a conventional approach. It is composed of an assemblage and systematic sorting of

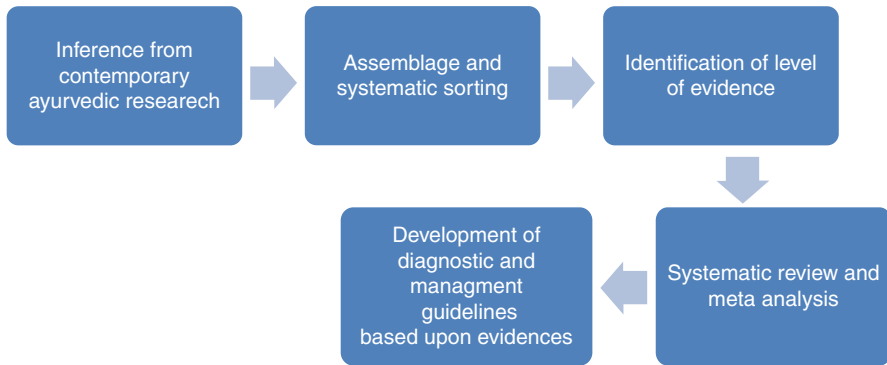


Fig. 2.4 Evidence generation from contemporary Ayurvedic research

literature followed by assigning a level of evidence to them as per their research protocols. These assembled researches then can be exposed to systematic review and meta-analysis to generate strength to evidences either favoring or disfavoring certain idea or intervention. A development of diagnostic and management protocols and guidelines may follow these basic exercises (Fig. 2.4).

2.4 Problems of Applying Effective Evidence Base to Ayurvedic Clinical Practice

Application of evidence basis to Ayurvedic practice is adhered with plenty of inherent problems. Comparing to the modern medical practice, where evidence-based practice is concerned about effective and handy utilization of continuously emerging pool of evidences subsequent to mass influx of clinical and experimental researches, Ayurvedic clinical practice suffers with a paucity of documented evidences. Besides this paucity, the meager existing evidences in Ayurveda are also not readily retrievable for lack of a single and accessible database accessible to its clinicians.

Lack of objective screening and standardization of various Ayurvedic tools utilized in diagnostic and therapeutic decision making is another limitation which makes bringing transparency in Ayurvedic clinical practice rather difficult.

The problems in bringing evidence basis to Ayurvedic practice can be enumerated as under:

1. Suboptimal perception of the importance of bringing evidence basis to Ayurvedic clinical practice among peers. This is leading to a lack of thought status among most of our Ayurvedic peers. A recently conducted survey in Maharashtra, UP, and Bihar identified the acceptance of ignorance about newly emerging safety and practice issue among over 80% respondents who were institutionally qualified Ayurvedic physicians.

2. Un-updated literature pertaining to the clinical specialties. Current Ayurvedic clinical practice largely relies upon classical texts like *Charaka*, *Sushruta*, and *Vagbhata*. Unfortunately, many of the classical formulations described in these texts are unavailable or obsolete. The production and use of classical Ayurvedic formulations have shrunken greatly in recent years, and the new proprietary formulations which have now flooded the market seriously lack theoretical logic as well as scientific evidence besides big dosage-form crisis. Minimal approaches have been made to update these classical texts to the contemporary requirements or to develop an acceptable treatment protocol for clinical conditions approaching in Ayurvedic clinics.
3. Poor diagnostic framework. Ayurveda has its own set of understanding a disease, and its treatment pattern is in accordance to its own understanding. Various key fundamentals like *prakriti*, *tridosha*, and *srotus* are involved in making a pathogenic and subsequent diagnostic and management approach of Ayurveda. Unfortunately, most of these fundamentals have not been brought into the critical scientific screening for their utilization in clinical practice in a more objective and reproducible manner. In lack of objectivity, these fundamentals and hence their utilization in practice are subject to individual judgments and variations leading to incomprehensibility in practice.
4. Inadequate sharing of experiences and inadequate documentation are another pitfall which limits the application of evidence-based practice in Ayurveda. Ayurvedic physicians, in general, are not aware and not adequately trained in documentation of the clinical records. In lack of these records, a substantial intervention in a clinical condition may remain unnoticed for its thorough exploration to be utilized further.
5. Inaccessibility to recent advances in Ayurveda or modern medicine. Ayurvedic physicians are poorly acquainted with accessibility to resources to make them updated about the recent advances occurring in the field. Researches done at various institutes of Ayurveda in India are only manually accessible and hence cannot be utilized by the people practicing away from those places.
6. Unavailability of meta-analysis studies about Ayurvedic interventions in various clinical conditions.

2.4.1 Solutions: Creating an Effective Evidence Resource and Ensuring Its Utilization

Keeping in view of an immediate need of bringing evidence base to Ayurvedic clinical practice to ensure transparency and uniformity in practice initially and to the overall clinical benefits subsequently, we may need the following as the way out to reach at a modest beginning of an evidence-based practice in Ayurveda. Having a careful look at the existing problems is supposed to help framing an effective and need-based strategy for the ultimate cause:

- Creating a strong, accessible, and free electronic database pertaining to the researches done in Ayurveda. This database, however, needs to be vigilant before putting any information for its source, reliability, and authenticity.
- Promotion of documentation in Ayurvedic clinical practice. Documentation has been the key factor ensuring a transparency in practice and its adherence to protocols. Ayurvedic physicians are required to be made aware of importance of documentation and should be promoted for scientific writing.
- Case report documentation should be promoted at all the clinical forums, and journals should develop a liberal and flexible approach to consider writings from new professionals.
- Promotion of in-house clinical and scientific journal publication from Ayurvedic institutes involved in research.
- Introduction of Ayurvedic tools of diagnostics and therapeutic decision making into strict scientific scrutiny, to bring out their uniform, applicable, and standard forms which can unambiguously be applied into clinical practice.

2.5 Conclusions

Singh [7] in his guest editorial to a recent issue of IJAR explains how the classical frame of evidence from Ayurveda can be utilized to a contemporary tune. While talking of searching and applying evidence base to Ayurveda, we need to understand that in conventional sense, the term “*evidence*” is primarily coined to help clinical decision making in light of best among overwhelmingly available inferences within modern medicine [1]. Conventional modus operandi of applying evidence base to medical practice, therefore, is limited to screening of best evidences helping a decision making. Thereby, defining the best evidence and finding them pragmatically in a clinical setting are the only real challenges.

Referring to Ayurveda, however, the issue of applying evidence base needs to be redefined in reference to its unique propositions. There is a ubiquitous agreement upon the traditional evidences of Ayurveda of which experience, long-term use, and textual classical references form a large sum. This substantial primary evidence base of Ayurveda is not static; rather, it is vitally “dynamic” because the practitioners use the principles contained in the *shastra* and tradition in their day-to-day practice dynamically. Still, this primary evidence needs secondarily to be supported by new science evidence. A primary evidence base of Ayurveda, therefore, is required to be brought in a format which can become retrievable to help decision making in a clinical dilemma. A thorough documentation, therefore, comes as the foundation of evidence-based practice, and it warrants an unflinching and untiring documentation of every evidence from Ayurveda, conventional or unconventional [8]. Besides, this is also important to address the issue of human biology as is observed from Ayurvedic or conventional perspective. If we are deferring from conventional theories and their experimental designs, we need to innovate our own methods to understand a biological process and also the ways through which this

understanding can help a decision making [39]. Needless to emphasize, these methods are essentially required to be flawless, dependable, reproducible, and acceptable. Designing these methods require a rigorous brainstorming initially about what is available and what is required, and subsequently the ground research by designing suitable models which can solve the dilemma of understanding the Ayurvedic biology [10–12].

The issue of evidence base in Ayurveda, therefore, requires to be dealt at various levels like documentation of existing evidences, designing diagnostic and clinical parameters which can act as evidence to help a decision making, and generating more evidences in reference to the safety and efficacy pertinent to Ayurvedic practice. This is the time when we need to understand that bringing evidence base to the practice of Ayurveda is mandatory if it is thought to be raised as a medical system where predictability and dependability are featured as key components. An evidence-based search and development of the materials and methods to promote such practice in Ayurveda would go long in benefitting the human being. “Ayurveda for future” therefore is the most appropriate direction which should be focused with utmost zeal and care [43–45].

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