

Recent approaches of Pre-clinical Researches in Ayurveda

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Abstract

Research in Ayurveda is still in its primitive stage and has to upgrade and update to the current trends. Contributions by various ancient sears were not just speculation but collective work with clean neat acquisition of clinical data. This innovative approach has come to halt in past few decades and is not in accordance with current research designs. A thorough review through present research modules will help investigators to apply and adapt to the need of the hour. Appropriate research design and collaborative work with interdisciplinary approach is at most necessary to derive concrete conclusion.

Keywords: Ayurveda, Pre-clinical, Safety, Invivo, Invitro

Introduction:

Ayurveda -Traditional Indian System of Medicine has an enriched historical background and is one of the great living traditions. Considerable research on pharmacognosy, chemistry, pharmacology and clinical therapeutics has been carried out on Ayurvedic medicaments. Several preclinical studies have been carried out on cytoprotective, immunomodulatory and antidiabetic potential of Ayurvedic medicines. There is a growing need for an “evidence based medicine” hence research is the prime need of contemporary *Ayurveda*. [1] A narrative review of prior research by screening published research papers will lay the foundation for identifying strengths and gaps in the evidence base that is available to analyse the safety and efficacy of Ayurvedic interventions. [2] Although Ayurveda has contributed a lot to humanity, it fails to cope with current scenario due to poor data acquisition and research designs. Developing standards and SOP for raw drugs and formulation is a tedious and lengthy process but a good networking of

researchers can solve this problem. One can concentrate towards only single problem at a time by controlling all other possible variables. A single platform which can work in favor of science can be of great help. Holistic and systemic approach supported by experiential base can serve as an innovative and powerful discovery engine for newer, safer and affordable medicines. [3] Hence to analyze the different preclinical research modalities and their relevance present study was designed.

Materials & Methods:

A review of Research works available in pubmed was done to explore different research modalities and to understand nature of works carried out in conventional and with newer dimensions. Few words like Pharmacognosy, Characterization, In vitro, In vivo, Antioxidants, Cell-line, Antimicrobial, Safety, Toxicity etc were searched to find out the number of works carried out and their relevance Studies. The search was refined by adding the key term "Ayurveda" in all cases. A summarized overview of prior research on Ayurveda could be sketched on the basis of the comprehensive analysis.

Observations and results:**Table 1. Observation of search in Pubmed with different key words**

Sl.no	Type of study	Number of articles
1	Cell line studies	
	With Key word Ayurveda	122
	Free full text	40
	Without key word Ayurveda	816745
2	Anti microbial study	
	With key word ayurveda	12
	Free full text	01
	Without key word Ayurveda	31378
3	Anti oxidant study	
	Without key word Ayurveda	5398
	Free full text	07
	With key word Ayurveda	17
4	Anti inflammatory study	
	With key word Ayurveda	158
	Free full text	47
	Without key word Ayurveda	179816
5	Anti diabetic study	
	With key word Ayurveda	26
	Free full text	09
	Without key word Ayurveda	5569
6	Safety studies	
	With key word Ayurveda	112
	Free full text	52
	Without Key word Ayurveda	170291
7	Fingerprinting Techniques	
	With key word Ayurveda	07
	Free full text	01
	Without key word Ayurveda	12565
08	Pharmacovigilance	
	With key word Ayurveda	07
	Free full text	05
	Without Key word Ayurveda	3435
09	In vitro studies	
	With key word Ayurveda	81
	Free full text	26
	Without Key word Ayurveda	244951
10	In vivo studies	
	With key word Ayurveda	56
	Free full text	19
	Without key word Ayurveda	166221
11	Pharmacognosy	
	With key word Ayurveda	164
	Free full text	73
	Without Key word Ayurveda	10480
12	Immunomodulatory study	
	With key word Ayurveda	38
	Free full text	09
	Without key word Ayurveda	8165

Cell line studies:

122 studies related to Ayurveda were screened. Various herbs have been tried for their anti cancerous activity. *Ichnocarpus frutescens* root, aqueous extract of *Tinospora cordifolia*, water extract of *Ashwagandha*, z-guggululosterone and guggulolipid extract of *commiphora mukul* have shown significant action.[4] Also *Tulsi*, *Arjuna*, *Murraya koenigi*, curcumin, *eclipta alba* have shown positive results in anti cancerous study, *Eclipta alba* is reported to have anti-hepatitis C virus action.[5]

Anti microbial study:

Drugs like *Vasa*, *Jatropha*, *Chitraka* extract, *Terminalia chebula*, *Eclipta alba*, *Ocimum sanctum*, *caesalpinia bonduc*, *Nimba* have been reported for their anti microbial action. [6]

Anti oxidant study:

Anti oxidant action has been evaluated and reported in single drugs like *Haridra*, *Zingiber officinale*, *cassia occidentalis*. Two works on polyherbal formulations i.e *Maharasnadi kwatha* and *Vaysthapana Rasayana*, a non classical formulation named Pepticare , a mineral preparation i.e *Tamra bhasma* was found. [7]

Anti diabetic Study:

Guduchi satva, *Yashada bhasma*, *Pterocarpus marsupium*, *Eugenia jambolana*, *Gymnema sylvestre* have been reported to have anti diabetic activity. A study on *Bilva* (*Aegle marmelos*) having a protective role in diabetic cataract has also been reported. [8]

Safety studies :

Various reports are found out of which some are *Vasaguduchyadi kwatha*, *Rasamanikya*, *yashada Bhasma*, *tamra bhasma*. [9]

Finger printing techniques:

The finger printing of mineral preparations like *Trivanga bhasma*, *swarnamakshika bhasma*, polyherbal formulation named BHU_x, herbals like *Asparagus*, sesame oil is found. [10]

Pharmacovigilance:

Seven articles related to Ayurveda are available which discusses ADR's and reporting system, change in scenario in field of Ayurveda, contribution of WHO in global acceptance of Ayurveda. [11]

In vitro studies:

In vitro assay of three indian medicinal plants was done to see if plants mediate their anti-diabetic effects through anti-oxidant and apoptotic action, cognitive effects of special extract of *Bacopa monniera*, a ten yrs research report, anti malarial and safety study of *Pluchea lanceolata*. Genotoxic and antigenotoxic potential of alkaloid Punarnavine from *Boerhavia diffusa* are some of the works. [12]

In vivo studies :

Molecular targets and mechanisms of cancer prevention and treatment by withaferin a, a naturally occurring steroidal lactone., *Achyranthes aspera* (*Apamarg*) leaf extract inhibits human pancreatic tumor growth in athymic mice by Apoptosis are few important works. [13]

Pharmacognosy:

Impact of Seasons and Dioecy on Therapeutic Phytoconstituents of *Tinospora cordifolia*, a *Rasayana* Drug. Pharmacognostical and Preliminary physicochemical evaluation of *Triphaladi* granules - A polyherbal **Ayurvedic** formulation are some important works. [14]

Anti inflammatory Study:

Anti inflammatory activity of *emblicca officinalis*, *Chandrashura*, *grewia asiatica*, *withania somnifera* and poly herbal preparation *Chandraprabha vati* are some of the works found in search. [15]

Immunomodulatory study:

Single drugs like *Convolvulus pluricaulis*, *Picrorhiza kuroa*, *Tinospora cordifolia*, *Caesalpinia bonucella*, *Asparagus racemosa*, *Withania somnifera*, *Tylophora indica*, *boerhavia diffusa*, and polyherbal preparations like *Shirishadi* compound, *amalako rasayana*, *vachadhatryadi avaleha*, *shirishavaleha*, *Brahma rasayana* are reported to have immune-modulatory activity [16,17].

Discussion:

Analysis of the preclinical work done in the field of Ayurveda gives important leads to identify priorities for future research [18]. Lack of adequate Pre-formulation studies like Qualitative and quantitative estimation of raw drugs, Characterization of mineral drugs, Pharmaceutical Standardization are the major

drawback for further studies on the single drugs or formulations. As Ayurveda utilizes drug as a whole, it is quite difficult to quantify the individual constituents, but to know the quality, parameters like HPTLC, HPLC, GCMS can be adapted to identify the active constituents. In case of metallic and mineral medicine Characterization of raw minerals and finished drugs is much easier task and has definite conclusive results. Research findings on inclusion of organic matter in mineral drugs has changed complete course of medicine and is looked in different way, known by organo-metallic complex molecule [19]. One can find lot of studies on Pharmaceutical standardization, but here the approach by researchers suggests that, very few follow the Pharmacopial references. Uniformity in pharmaceutical process is very important to find standard drug which may be prepared in any corner of the country. Controlling variables in pharmaceutical process to derive to definite conclusion is needed. One more interesting debate is on need for reforms in animal models according to Ayurvedic pharmacokinetics and dynamics. As such there have been only few attempts to design animal models as per Ayurvedic drug action but this can be a area of research for future. Safety studies of single or compound formulations with key word Ayurveda are limited to 112. There is urgent need of safety studies especially in organo-metallic compound formulations which are in day to day practice. Only few studies on safety of *Makaradhwaja*, *Tamra Bhasma*, *Kajjali*, *Trivanga Bhasma* are available. Efficacy study of Ayurvedic medicaments are also outnumbered by allied science. Most of the studies related to Ayurveda comprises of studies on isolates or extracts and not whole drug. The studies on whole drug are still lacking and there is need of rigorous works and data acquisition. The other concern is there are very few studies on compound formulation and more on single drugs as such the situation is reverse when it comes to actual utilization of these.

Conclusion:

A comprehensive review on articles available in pubmed showed lack of publication of Ayurvedic researches in reputed journals. Most of the studies were done by isolation of active constituents or extraction. There is need of quality research in

Ayurveda with interdisciplinary approach.

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