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Advancements in Ayurvedic Researches in the past 20years-A Database Survey

Dr Gowri M*, Dr Rajmohan V, Dr S Thara Lakshmi *****

**PG Scholar, Dept of Rasashastra and Bhaishajya Kalpana, Govt Ayurveda College Tvm*

*** Assistant Professor, Dept of Rasashastra and Bhaishajya Kalpana, Govt Ayurveda College Tvm*

****Associate Professor, Dept of Rasashastra and Bhaishajya Kalpana, Govt Ayurveda College Tvm*

***Corresponding Author: Dr Gowri M**

ABSTRACT

Ayurveda is the personalized medicine practiced in India since 200BC. According to WHO 70 – 80% world population rely on nonconventional medicines mainly of herbal sources in their health care. Undoubtedly Ayurvedic treatment stands at par to the conventional medicines in treating the chronic diseases prevalent in the current scenario. Unfortunately due to lack of scientific validation in various concepts, Ayurveda is confronting various challenges which restrain its emergence in the frontier in world wide health scenario. Therefore evidence based research on the basis of advanced research methodology is in high need for the global recognition of the science. Proper research through appropriate Research methodology is the key for validation of a concept. A database survey was conducted on the ayurvedic researches published in the past 20 years using databases like pubmed and NCBI. Evaluation was done regarding the developments and methodologies which have occurred so far in these researches in 20 years. In the survey it was observed that there was a progressive development in numbers as well as application and utilization of various research designs in Ayurvedic Research. A changing trend was observed in these 20 years in the research methodologies from preliminary researches like standardization studies in the late 20th century to meta analysis studies in the 2nd decade of 21st century. It was also observed that out of approximately 2000 articles surveyed in total in the time period from 1996 to 2016, using the key words Ayurveda, Research, Ayurvedic Research, Ayurveda research, only around 323 of them were found to be published by Ayurvedic professionals. The Journals in which these articles were published was also evaluated in reference to scientific journal ranking list and Impact factor and was found that in this sphere too the advancements achieved in the course of time are praiseworthy. It was inferred that though the extent of advancements being achieved in Ayurvedic research, are progressing in the due course of time the number of articles being published in pubmed indexed journal are not in proportion to the works which are actually been conducted in various Ayurvedic Colleges and Research Institutes in India. Thereby due concern should be extended in regard to this issue for the progress of the Science.

Keywords: Ayurveda Research, Ayurvedic Researches, Researches in Ayurveda .

INTRODUCTION

The concept of evidence based medicine evolved in the second half of 19th century and first appeared in the published literature in 1991 [1] and since then its gaining tremendous importance as far as health care is concerned. Its impact lies in the fact that it helps establish universal standards in the field of healthcare with a systematic approach allowing the integration of the best available research evidences. Evidence based medicine aims in conducting systemic reviews and meta analyses through which various studies on a specific topic is identified, critically analysed and concluded to form an evidence in relation to the topic. [2]

As far as Ayurveda is concerned, it is a traditional personalized science of India, with holistic concepts pertaining to health promotion, disease prevention, early diagnosis and personalized treatment.[3] The need of scientific validation of its concept is in high need to globalize the empirical knowledge to evidence based wisdom. Undoubtedly Ayurvedic treatment stands at par to the conventional medicines in treating the chronic diseases prevalent in the current scenario and according to WHO 70 – 80% world population rely on nonconventional medicines mainly of herbal sources in their health care[4]. Still in India Ayurvedic treatment is being pushed aside as a secondary treatment option even after proving its efficiency in many areas of medicine where the contemporary science have failed.[5] With this growth of traditional and complementary medicines it still encounters problem in discovering adequate research designs and methodology to produce scientific evidence, to which Ayurvedic Science also holds no exception.[6]

In the present era, when the contemporary medicinal system has reached its peak as a result of its validated research and advanced techniques, there is an urgent need to validate basic principles as well as drugs used in the Ayurvedic system of medicine too, with the help of advanced research methodology [7]. Therefore, advancements in the ongoing research methodology are in high need for the promotion and global recognition of Ayurveda. In spite of a good number of PG thesis and PhD thesis being submitted each year, exploring and unveiling the various facts and concepts of the Science, still a lacunae exists which hinders the recognition of the science globally [8]. This article evaluates and emphasizes on the present status,

different challenges and possible rectifications that Ayurvedic Research faces today.

METHODOLOGY

The primary objective involved in this study was to evaluate how far the Science is globally discussed and recognized thus the methodology adopted in the study was a database survey on Ayurvedic Researches conducted and published, using databases like pub med, pubmed central and NCBI using the Key words - Ayurveda, Ayurveda Research, Ayurvedic Research. These databases were used for the study as all the articles published in pubmed indexed journal are automatically updated in these databases and these are also the most commonly accessed sites by research and medical professionals and is the mostly accepted platform where research findings are shared and discussed. [7]

On accessing these sites using the key word Ayurveda research approximately 700 articles were obtained of which after screening only around 74 articles could be evaluated for the survey. On accessing using the keyword Ayurvedic research of the 1300 and above results obtained only around 249 of them were included in the survey.

Inclusion criteria

Only researches conducted by Ayurveda professionals were included in the survey after verifying the author information availed from the published article. Researches published in the time period from 1996 -2006 were only included for the survey. Drug development studies conducted by various Ayurveda based pharmaceutical companies were included in the survey.

Exclusion criteria

The various single drug researches conducted by pharmacy, biotechnology professionals (ie. other than Ayurveda professionals) were excluded from the survey

Points analyzed in the Survey

The years from 1996 to 2016 were divided into 4 groups

- 1996- 2000
- 2001- 2005
- 2006- 2010
- 2011- 2016

Analysing in this divided groups was done so that the changing trends and progressive development in the field of Ayurveda Research could be clearly evaluated and also it provided ease in computation. In the survey following points were evaluated in detail from the accessed articles availed after screening.

No of ayurvedic researches published in each year group were evaluated. The Research Designs adopted in each of these Ayurvedic researches were analysed and the extent to which each methodology was utilized in the field of Ayurveda were evaluated. The journals in which these researches were published in each year group were evaluated on the basis of the Scientific Journal Ranking List and Impact Factor. If a research article was seen to repeat in more than one journal, it was taken as 1 in frequency and the journal with more impact number was given the denomination. In a research, if more than one design was applied, 1 denomination each was given for each design.

OBSERVATIONS

In this period of 20 years the total number of articles which could be accessed in Ayurveda was just 323 and the total no of articles accessed in each year group, utilization of each research design in each year group and the journals commonly utilized in each year groups are tabulated below

Analysing the works published in the era 1996-2000 it was observed that very few articles were found to be published by the ayurvedic professionals (around 16) and that too were preliminary researches mainly focusing on standardization of commonly used formulations like eladi churna, Tribhuvanakeerthi rasa etc. Equal importance were also seen for literary reviews and it was observed that these type of studies predominated the field of Ayurvedic research than Clinical studies which formed only around 6% of the total evaluated articles of the period. Next to standardization and literary researches stood animal studies (around 37%) which reveals the fact that the then professionals were slowly gaining awareness relating to the need of toxicity studies of Ayurvedic drugs. It was also observed that researches mainly oriented around Herbal medicines rather than mineral or herbomineral combinations. All of the articles were seen to be published in the journal Ancient Sciences of Life which is not a commonly

cited journal or peer viewed journal. It also lacks a position in the Scientific journal rank list.

Evaluating the succeeding 5 years it was found that there was not much progress in numbers of the researches published (around 16 only) but there was a change in the trend of research designs adopted by the professionals. It was observed that invivo animal studies was reigning the field of ayurvedic research during this period which pin points on how important the concept of reverse pharmacology was during this era and how the professionals found it important to validate the information regarding the pharmacodynamics and kinetics of an Ayurvedic Drug. Next to it was invitro studies (around 25%) which also affirms the above situation of the time. In this period also Clinical trials were observed to have very less importance as the survey found only around 18% of the total works with this design. Literary research were also comparatively less in comparison to that in the last 5 years. Regarding the publishing of the works a significant change was observed as almost 40% found a place in the Journal of Ehnopharmacology, a journal with a good impact factor and a high place in the SJR list.

Analysing the next 5 years ie from 2006-2010, a drastic increase in the number of articles published was observed in comparison to the past 10 yrs (around 78 articles) and also a good variant of research designs were adopted in the field of Ayurvedic Research. Of which the Clinical studies predominated the others amounting to around 23% just followed by invivo animal studies (around 20%) and literary researches and standardization studies amounting to approx. 18% and 15% respectively. Though in minor percentage, the other designs adopted during the period include case studies, invitro studies, fundamental research and tool development studies which emphasize on the fact that Ayurveda is growing in the aspect of research. Further more in regard to the publishing aspect most of the works were published in the journal AYU, an Indian journal and the usage of journals with a high impact factor was not observed.

Succeeding to the next set of years i.e. from 2011-2016, the total articles published in Ayurveda during this period has almost tripled when compared to the last group and also it was observed that the variance in designs are also progressing as years go forth. Percentage wise each of the designs

remained more or less the same compared to the preceding years with clinical trials in the prime front with around 30% and next to it with animal trials coming around 19% and literary researches around 12% and others in minor percentages. The point to be highlighted is that meta analysis were also conducted during this period and such studies

reflects the extent to which Ayurvedic Research has developed over these years. In the area of publishing too the professionals were turning cautious enough to choose journals with high citations and impact factor thus revolutionizing the field of Ayurvedic Research in total

Year Group	No of articles
1996-2000	16
2001-2005	16
2006-2010	78
2011-2016	213

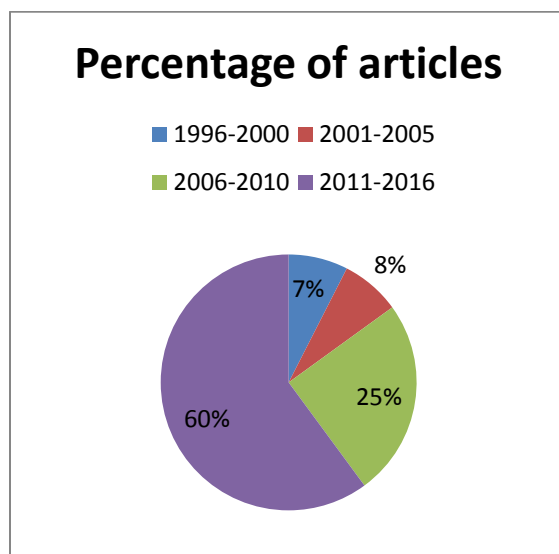


Fig 1.1

No of articles accessed in each year group

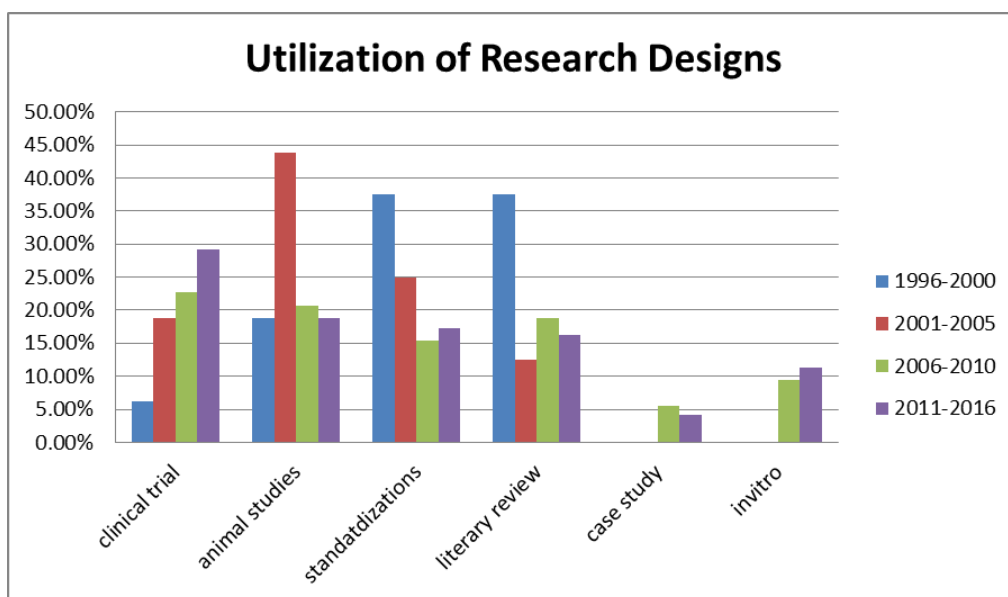


Fig 1.2

Utilization of research designs in each year group

1996 – 2000	
Research designs	No in %
Clinical trials	6.25%
Invivo animal model	18.75%
Standardization and analysis	37.5%
Literary research	37.5%

2006 – 2010	
Research Design	No in %
Case study	5.6%
Clinical Trials	22.64%
Invitro	9.4%
Invivo animal model	20.75%
Standardization and analysis	15.41%
Tool Development	1.8%
Fundamental Research	5.6%
Literary Research	18.8%

2001 - 2005	
Research Designs	No in %
Clinical trials	18.75%
Invivo animal model	43.75%
Invitro	25%
Literary research	12.5%

2011 - 2016	
Research Design	No in %
Survey studies	1.25%
Case study	4.10%
Clinical trials	29.25%
Invitro	11.25%
Invivo animal model	18.75%
Standardization and analysis	17.25%
Meta analysis	0.75%
Fundamental research	1.25%
Literary Research	16.25%

Journals commonly in use

Only those journals which was observed to be commonly used in each of the year group are tabulated below :

1996 - 2000	2001- 2005	2006-2010	2011-2016
Majority in Ancient Science of Life	Ancient Science of Life- 6	Ancient Science of Life – 9	Ancient Science of Life-24
	Journal of Ethnopharmacol-5	AYU – 23	AYU – 69
		JAIM-4	Journal of Ethnopharmacol-6
		International Journal of Ayurveda Research-5	Evidence Based Complimentary and Alternative Medicine- 5
			JAIM- 27

RESULTS AND DISCUSSIONS

As the survey included the Ayurvedic researches conducted during the past 20 years, a clear cut demarcation in the advancements and changing trends could be clearly accessed through this study. On the basis of the observations made during these time period the results obtained are discussed below:

1996-2000

Majority are preliminary researches which included standardization of eladi churna, pinda taila etc and the clinical studies conducted were also RCT studies with placebo controls to access the efficacy of commonly used ayurvedic formulations

Majority of the articles were seen to be published in the journal Ancient Science of Life which is not included in the Scientific Journal Ranking List(SJR) thereby showing the less prevalence of the then Ayurvedic professionals about the importance of publishing the research articles in journals of good impact factor or pubmed indexed journals.

2001-2005

No significant advancements were observed in the type of researches or research designs adopted. Invivo studies with animal models dominated the list among the research designs during this period which shows the importance of preclinical toxicity studies regarding ayurvedic formulations during this era. Phase II trials for accessing safety of medicines in healthy volunteers which are presently banned in India was conducted for a short period from 2002 – 2006 in the field of Ayurvedic research. [9]

Publications were done more scientifically in journals with higher impacts like Journal of Ethnopharmacology also, along with the majority being published in Ancient Sciences of life. Usage of world class journals like Journal of Ethnopharmacology shows that the professionals were getting aware about the global acceptance of their works thereby promoting the science world wide.

2006- 2010

More researches in the field of Rasasastra were initialized mainly in animal models and as phase II trials (only in 2006) conducted in regards to the boom of issues relating to the heavy metal toxicity

of the rasa medicines used in Ayurvedic treatment. Preceding these years, the researches were mainly oriented around herbal drugs rather than mineral or herbomineral combinations and it could be inferred that may be because of the then alleged issues regarding the toxicity of mineral or herbomineral drugs in Ayurveda which might have eventually lead to more researches concentrating the safety profiles and toxicity studies of these alleged drugs. It was observed that Standardization and analysis of most of the bhasmas, its cytotoxicity , genotoxicity etc. were evaluated during this period.

Standardization of the putas used in preparation of different rasa preparations were also conducted to avoid a bias while preparing different formulations as mentioned in the classics. These studies were conducted to make the Ayurvedic concepts more scientific.

In addition to these credits, a wide range of Research Designs like tool development, fundamental researches, case studies etc. began to be utilized for conducting various researches which emphasized on the advancements and awareness of the Ayurvedic professionals regarding the importance of conducting researches in Ayurveda. It was observed that though so many variant designs were utilized in Ayurvedic research during this period, contrary to the preceeding years, Clinical Trials was gaining more importance

More drug development Researches began to be conducted by various Ayurveda based pharmaceutical companies regarding their products thus giving the ayurvedic products a global acceptance.

It was in this period that the Journal AYU was introduced by the Jamnagar University [10]. Though with a low ranking in SJR list, but being a pubmed indexed journal and an Indian Journal the acceptance of this journal among Ayurvedic Professionals were high thus during this period it was observed that a good percentage of journals were published in this journal, thereby declining the usage of other international high indexed journals like Ethnopharmacol, Rheumatol etc.

2011- 2016

Ayurvedic researches improved dramatically not only in the number of publishing's but also in the variances in Research Designs adopted for each study. In number itself the researches have almost tripled. Quite similar to the preceeding group the

Clinical Trials topped the list in this time period also. More clinical trials with Rasa yogas were also conducted to prove its efficacy with placebo controls. These studies have helped in changing the perspective of the world regarding the efficacy of Herbomineral drugs.

Researches in the field of Invitro level with cell models started gaining its importance mainly to assess the immunomodulatory anti cancerous and adaptogenic activity of different Rasayanas. Such studies have gained international acceptance as these were welcomed by the Biotechnology and Biochemistry professionals thus promoting collaborated works in different levels in Ayurveda to develop anti cancerous, anti diabetic ,anti arthritic combinations using traditional drug combinations.

Initialization of Meta analysis and Survey studies were great milestones in the advent of Ayurvedic research. Among the publications, in spite of majority being published in the Journal Ayu, quite a good no of publications were also done in other peer viewed and high cited journals like Rheumatology, Cell Biology, PLOS one etc which was included high in the SJR list, which emphasizes that the genuineness of Ayurvedic researches were high in this period.

RECOMMENDATIONS

In regards to Ayurveda, all types of researches need to be encouraged as each design have its own importance in validating the various concepts and practices in Ayurveda. As far as the formulations used in Ayurveda practices are concerned the analysis and standardization of its drugs, their combinations, ratios, method of preparation and parametrical values are all important. For drug

development, to understand the basic pharmacology of the formulations and to access the safety and efficacy profile preclinical studies like cell line studies and animal model invitro studies are important. To validate the different conceptual knowledge's regarding Agni, tridoshas etc. fundamental researches and tool development studies are important. To access the efficacy of one formulation or treatment protocol over the other or to compare its efficacy with the existing conventional treatments clinical trials also plays a major role. To understand the incidence rate, the causative factors etc observational studies also should be encouraged and to conglomerate the results regarding different studies relating to one topic meta-analysis studies are also important. Thus a multidisciplinary approach is essential incorporating all types of research designs to convert our Empirical knowledge to evidence based wisdom.

Each year when a lot of resources in the form of Man Material and Money are being utilized for Researches in Ayurveda, just conducting the research will never globalize the science but the results need to be published in a platform accessible worldwide. This can be achieved only by publishing the research works as scientific articles in journals with a good impact factor and publishing in accessible sites like pubmed and ncbi.

It should be made mandatory in PG curriculum to publish their PG thesis in peer reviewed journals to improve the quality and standards of researches conducted in PG level as Research process is complete only when the results obtained are published. Thus rightly emphasizing the fact that '*publish or perish*'.

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