**SCOPE, INNOVATION AND CHALLENGES IN KUMAR KAUSHAL**

**(CHILD WELLBEING)**

*Article for double blind review*

**Abstract:** Starting with eight specialties in various medical fields Ayurveda evolved in current form having fourteen specialties in a relatively short span of about four and a half decades. Kaumarbhritya, one of the eight ancient specialties, was intended for promoting health of pregnant women to enable them to have healthy progeny, meet nutritional demands of all age groups of children, prevention of pediatric disorders, their treatment and make the enable children to grow into healthy adults, which would result into healthy continuity of human life form. Realizing the importance of genetics, epigenetics, teratology, embryology, neonatology and distinct illnesses of children of various age groups the Central Council of Indian Medicine (the present NCISM) to develop the field of kaumarbhritya into two separate specialties. This resulted in bifurcation of original specialty of kaumarbhritya in two different full-fledged specialties viz pediatrics, and gynecology and obstetrics fulfilling the expectation of the society for the health benefits of two concerned groups of population and in turn justifying the demand of ayurvedic professional. First batch of MD (Ayu) course exclusively in pediatrics started in 1979 in IPGT&R, Jamnagar and first batch coming out with specialization in ayurvedic pediatrics in 1981. The visionary ancient ayurvedic researchers’ health goals to enable healthy and successful reproduction, prevention of genetic and/or hereditary disorders, treating health conditions of children from various age groups with prevention strategies and maintenance their health are now the responsibilities of these two kinds of specialists. Since then there is no looking back for the ayurvedic pediatricians. It would not be a surprise if genetics, epigenetics and teratology also become full-fledged branches of ayurvedic pediatrics in future. It is now more than four decades since separation of ayurvedic pediatrics and it would be apt to discuss the scope, innovation and challenges that this specialty faces when this exclusive issue on ayurvedic pediatrics is getting published.

**Keywords:** Ayurveda, Challenges, Innovations, Kaumarabhritya, Pediatric Health, Scope.

Bird’s eye view over the span of origin of Ayurveda as a well-established multidisciplinary medical system, its subsequent nadirs due to several reasons including foreign invasions, and then successful reemergence as a full-fledged health care system acquiring its own space in the medical field has reinforced the conviction among the ayurvedic professionals as well as the beneficiaries to stretch its flexibility to adapt to the current demand of time. The latest assault with so-called superiority of conventional system over all the other ancient medical systems would have annihilated Ayurveda, had it not been having its inherent strength and potential of treating various types of human ailments. The proof of this was noticeable on several occasions including the pandemic of COVID19 infection.

Starting with ancient classification of eight specialties Ayurveda evolved in current form having fourteen specialties. Ancient specialty of kaumarbhritya was intended for maintaining health of gametes by taking overall care of well being of couples of reproductive age, promoting health of pregnant women to enable them to have healthy progeny, meet nutritional demands of all age groups of children, prevention of pediatric disorders including genetic and hereditary diseases, their treatment, and make the children to grow into healthy adults, which would result into healthy continuity of human life form. Realizing the importance of genetics, epigenetics, teratology, embryology, neonatology, and distinct illnesses of children of various age groups the Central Council of Indian Medicine developed the field of kaumarbhritya into two separate specialties. This resulted in bifurcation of this field in two different full-fledged specialties viz pediatrics, and gynecology and obstetrics fulfilling the expectation of the society for the health benefits of two concerned groups of population i.e. children and women. In 1979 IPGT&R, Jamnagar was the first to start MD (Ayu) (Balrog) course exclusively in pediatrics with the result of first batch coming out with exclusive specialization in ayurvedic pediatrics in 1981. The visionary ancient ayurvedic researchers’ health goals to enable healthy and successful reproduction, prevention of genetic and/or hereditary disorders, treating health conditions of children of various age groups with prevention strategies and maintenance their health are now the responsibilities of these two kinds of specialists. The specialists in gynecology and obstetricians take care from conception till birth for healthy progeny, and prevention of teratologic disorders and prenatal developmental defects while the pediatricians take care of children from birth till they become adult. This care includes not only prevention and treatment of illnesses specific to children, but also to ensure to the possible extent maintain the health of gametes that are going to participate in reproduction. Since then there is no looking back for the ayurvedic pediatricians. I would not be surprised if genetics, epigenetics and teratology also become full-fledged specialties of ayurvedic pediatrics in future.

It is now more than four decades since establishment of ayurvedic pediatrics as a separate department and it would be apt to discuss the scope, innovations and challenges that this specialty faces when this exclusive issue on ayurvedic pediatrics is getting published.

**SCOPE**

 In the present times, medical studies are less preferred due to their lengthy course requiring sustained focus for many years, and hard work and full dedication to become a doctor. After graduation in the medical fields very few aspirants of higher studies opt for acquiring specialization and excellence in pediatrics. There may be several reasons, but mainly overwhelming fear of dealing with different age groups of pediatric patients who are dependent, either non-verbal or have difficulty in explaining their complaints. The typical presentation of illnesses, which are different from the adult patients create initial hesitation for many doctors. Paradoxically the same challenges encourage others for further studies in the field of pediatrics. This field is very exciting as well as satisfying when one sees a critically ill child recovering and smiling. Rewards in the form of attractive salary and a respectful status in the society are enough stimuli for one to pursue higher study in this field. At this point it would be highly appropriate to elaborate the scope in this field for those who want to pursue pediatrics as their career.

I would prefer to divide the scope available to an ayurvedic pediatrician into following types.

1. **Clinic-oriented:** One can become a successful ayurvedic pediatrician without any other burden of devoting time for academic or research aspects. Public or private sector hospitals, running a private clinic, government health centers, etc offer opportunity to ayurvedic pediatricians. The person can opt for a specialist clinic such as ayurvedic pediatric nephrologist, neurologist, or ayurvedic neonatologist, etc.
2. **Academic- and clinic-oriented:** An ayurvedic pediatrician can become a faculty in any government or private ayurvedic college. Here, majority of the time the professional faces two-fold task of teaching and attending the hospital duties dealing with pediatric patients. Academic aspect involves a tough task of teaching the subject, which had remained static for a sufficiently long time in Ayurveda. Hospital duties involve accepting the challenges of treating conditions, where the conventional modern pediatrics has less to offer to the pediatric community. However, this scope is very much satisfying, if one is able to update the self and the knowledge of the students with latest development in the field and to explain the ancient texts with their appropriate practical and clinical correlates.
3. **Research-oriented:** The more arduous vocation is of an expert contributor, who faces a formidable task of developing the field of ayurvedic pediatrics further and improving the extant ayurvedic books incorporating the evidence-based conceptual and clinical knowledge. This category of opportunity is open for those who love challenges and work with complete dedication and full focus in a difficult situation. Research areas include conceptual, clinical or technological aspects related to the fields of pediatrics. Many concepts were already established, but are difficult to explain in the current medical terms, and need further sophistication, or overall a fresh insight for their development and their subsequent applications in clinical fields. Many new concepts are needed to address the newly developing illnesses. Reseacr-oriented professional can contribute a lot in clearing the doubts raised by the students as well as others, and also in developing the field of pediatrics.

**INNOVATION**

Innovations and evolution are two sides of the coin of the advancement of any science. New ideas, new concepts and subsequent development of new theories based on ancient and modern scientific technologies, etc are guiding forces for the development of Ayurvedic field. In the field of pediatrics, all these help in prevention of diseases, early diagnosis to prevent progression of the disease and its consequences, improve the existing health services for pediatric patients, and ultimately the healthy younger population develop into a healthy nation. The pace of development depends on acceptance of the clinical challenges, and ability and determination of the scientists to deal with the subsequent stimuli. Several factors including availability of the skilled front-line scientists, policies, finances and required facilities determine the path to the development. After several years of near-stagnation, the field of ayurvedic pediatrics has geared up to face the challenges. Many ayurvedic pediatricians have started working beyond their comfort zone and dealing with those serious conditions, which were once considered to be incurable or manageable only with modern pediatrics. As a result, Ayurvedic pediatrics has observed a pragmatic shift in public perception and expectations, and it continues to do so with increased awareness in the mind of pediatricians about the demand and anticipations of improving not only the health of current pediatric population, but also of many future generations. Pandemic of COVID19 infection has witnessed this prospective side of Ayurveda when it withstood the substantial challenge of this virus posed by its ability to mutate into different strains. It also broke a long-standing prevalent myth that Ayurveda can help only in chronic and non-infectious conditions.

**Technical innovation:** Based on prototypes of panchkarma equipment developed in ancient times many private players including the successful ayurvedic practitioners with sound financial support and ability have developed newer equipment, which are easy to maintain, easy to apply in the clinical setting, provide good adaptability for any mobile or immobile patient and in any decubitus of the patient. These equipments can be used in very hygienic condition and are financially cost effective while providing aesthetic look.

**Innovation in teaching practices:** Taking advantage of fast development, several teaching technologies have been established in general, and since last two decades they are being used in ayurvedic teaching field also. All aids cannot be listed here, but power point presentations with videos and photographs of the patients treated in the hospital leave lasting effects on the students, other learners, and ultimately beneficiaries. In fact, many students start developing their own album during their clinical duties and later learn the technicality from the teaching faculties or clinicians. Digitization of ayurvedic pharmacopeia and online availability of read-only pdf files have been started since 2000.

**Conceptual innovations:** Several clinical conditions and medical principles, which were once considered difficult to decipher and which could not be explained with the then latest medical knowledge, are now explained with scientific understanding. In fact, here I would propose that the credit for the first reported cases or invention of the fundamental medical principles should be given to ancient ayurvedic researchers. For example, Sushrut (Su. Sha. 2/47 and 43) was the first to report a case of skeletal dysplasia1 and also 5-alpha reductase 2 enzyme deficiency2. Similarly, Punarvasu Atreya first explained in brief the uniparental inheritance in humans and certain species3, which undergo heterosexual reproduction. In fact, I have already started writing Bhardwaj Principle of Matrijadi Bhavas (Uniparental Inheritance) while explaining six heredity factors and Arunadatta’s Principle of Sex Determination4 while explaining sexual differentiation of the embryo. I want to emphasize that such innovations should be adopted by entire Ayurveda fraternity and help disseminate such difficult subjects to educate the concerned students and scientists for the ultimate purpose of providing best care to pediatric population.

Since last more than two decades, attempts are being made to decipher the cryptic knowledge stored in ancient database of Ayurveda. At times the teaching faculty was not sure how certain verses could be explained. Take the example of Jataharinis described by Kashyap5. This is a reported incidence of an epidemic involving a genetically manufactured microorganism resulting in very lethal and highly infectious condition finally annihilating many life forms including flora and fauna of a particular area. The microorganism exhibited high adaptability to the then used treatment and ability to develop into a new strain. Unfortunately, this is removed from undergraduate syllabus. Similarly, Matrukas described by Ravan6 also met the same fate because they were difficult to explain; however, the current knowledge explains that they are a specific group of disorders striking in the neonatal period and majority of them are fatal. Certain infectious conditions, which are described in ancient texts might have been eradicated now e.g. small pox or poliomyelitis. Even the small pox vaccination is out of immunization schedule of Govt. of India, but the clinical conditions are reality. This way one has to take such scenario into account while understanding any medical condition found in ancient text instead of discarding it altogether.

**Clinical innovation:** Clinical developments in ayurvedic pediatrics in the last three decades have been very conspicuous. Striking innovations have taken place in panchakarma (PK) techniques for their applications in pediatrics without leaving their fundamental principles. All the PK procedures (except those requiring oral administration of drugs) involves bypassing the hepatic first pass effect. This in turn means less number of oral drugs and thus these are very useful tools in pediatric patients. Even neonates, infants and toddlers benefit a lot out of these noninvasive procedures. These newly developed techniques are applicable in many pediatric conditions with consistent reproducible results. Pediatric patients of various neurologic disorders (irrespective of their etiology) including seizure disorders and various CNS and PNS conditions receiving Ayurvedic treatment from the expert pediatricians are common sights in various hospitals. Improvement in motor and sensory neuroplastic ability of brain through abhyanga and svedana is proven beyond doubt. Parents have started receiving ayurvedic treatment for their children with neurodeficit from the infantile period itself, which means good prognosis ranging from almost complete recovery to acquiring full independence when such children grow. As a result, many Ayurvedic pediatricians have successfully established their specialized neurology clinics. Proper understanding of the indications of PK procedures with applied aspects of physiology, physics, and pharmacodynamics and pharmacokinetics of drugs along with developmental stages of various organ-systems in children of different age groups and with different types of comorbidity has opened the doors towards success in dealing not only with neurologic disorders, but also diseases of gastrointestinal tract, respiratory system, skin, joints, muscles as well as autoimmune disorders. The scope of applicability of PK procedures is expanding at a fast pace with many ayurvedic pediatricians accepting the challenges and successfully dealing with many of these illnesses. In certain conditions ayurvedic treatments improve the QOL and enhance the longevity of life in pediatric patients in several ways like possible postponement of inevitable dialysis and renal transplantation because both these therapies are not within the reach of a common man in our country. Ascites in pediatric nephrotic syndrome is a common complication, which is also treated by basti treatment. Contribution of panchakarma procedures in pediatric oncology to counteract the side effects of conventional treatment for the malignant conditions is also now recognized, but only a few hospitals are doing such therapies.

Certain treatment protocols with pediatric specific-guidelines at individual level have also been established for seriously morbid conditions such as pediatric neurodegenerative disorders or chronic kidney disease (CKD), which consistently produce reproducible results. Now, these guidelines need to be adopted by others so that such children can be served better.

 On-line consultation and counselling, which became inevitable due to lockdown have now become routine since then. These facilities have enabled the patients to consult any ayurvedic pediatrician in any part of the world.

**CHALLENGES**

There is huge responsibility of developing this ancient health science on par with the current status of conventional pediatrics in the management of health issues. Additionally, the field of ayurvedic pediatrics faces arduous task of filling the lacuane caused by lost topics in ancient texts and establishing the bridge to connect the current topics to make the science up to date and applicable to all pediatric age groups. Retaining basic ayurvedic principles, the newly developed ayurvedic pediatrics should also cover all the prevalent fields of pediatrics, which are not found in ancient texts such as pediatric neurology, nephrology, hematology, oncology, etc. It should provide all the latest conceptual, theoretical and evidence-based clinical knowledge with children-friendly advanced technologies for the benefits of Ayurveda practitioners and ultimately the society. For these, the system needs individual ayurvedic pediatricians working in specialized fields to contribute in building up digitized data bases, which would go a long way in developing ayurvedic theories, treatment protocols, guidelines and prognosis. This would also generate the interest of the students in the field of ayurvedic pediatrics.

However, there are challenges within the field (internal) and from outside the field (external).

**Internal challenges:** Certain internal challenges are inevitable because the ancient wisdom was stored in Sanskrit and mostly in poetic form. The first translators obviously might have faced a daunting task if they were not clinicians. Moreover, the ancient concepts were judged on the then existing modern science with the narcissistic attitude of quasi experts in the latter system. Very few subject experts with good clinical skill, having sound knowledge of modern diagnostics and latest development in the field of pediatrics, comprehensive ability to decipher ancient Sanskrit texts and determination are willing to accept the challenges that the ayurvedic pediatrics faces. This in turn means that these limited dedicated experts are under constant pressure to develop this field. This is the biggest internal challenge. Others are -

* Creating a scientific attitude for innovations in true sense.
* Rewriting of the currently available extant texts. It was difficult to understand the reason for assertiveness of always hovering around the Sanskrit verses (reciting, translating and reproducing the same in the text books or examination). Changes were long due. After initial hurdles, finally the adaptation is taking place, but a lot is required that interests graduate as well as post graduate students, young and experience teachers and clinicians equally and ultimately benefit the children for their health.
* Laying down of lattice of the knowledge acquired by a few clinically sound pediatricians would be sufficient to meet the appropriate temporal changes required in textbooks, pediatric treatment aspects, hospital setting fulfilling the current needs of various pediatric age groups. Perseverance by a few knowledgeable and clinically sound ayurvedic pediatricians is the need to change the flawed attitude adopted by the others (mostly from other ayurvedic specialties) due to misunderstanding the ayurvedic pediatric concepts. Few clinically skilled ayurvedic pediatricians have already started in this direction, but for significant effects many more are required.
* Samhitas are symptom-based texts (in terms of modern medicine). To make them student- and practitioner-friendly elaborations standard textbooks with modern equivalents, relevant investigations required to come to diagnosis and choice of treatment (which is evidence-based and practicable in modern times) are the needs of time. Such types of symptom-based textbooks are now being published in modern medical fields for those who want to acquire super specialization in one particular field. Plethora of books is being published with focus hovering around translation of the verses, loosely used medical terms with half-hearted attempts to interpret the medical conditions and sometimes even ignoring the basic ayurvedic principles. Such books do more harm.
* Various scoring systems for the purpose of achieving prognostic values, and various criteria based on clinical features for the purpose of diagnosis need to be developed. For several conditions these are already explained in the classical texts. We need to give credit to ancient researchers who have developed these systems.
* Certain treatment components, which cannot be practiced due to government prohibition should be removed from the syllabus without diluting the ayurvedic basic principles.
* Egocentric attitude would pose a big hurdle in developing new concepts, treatment protocol and guidelines, new techniques, etc.
* Resistance to modification for the progress of the field and required plasticity are other areas of concern.
* Scientific techniques for generating, storing and sharing the data would also pose hurdles as many ayurvedic pediatricians would keep the successful treatment secret for their self interests such as monetary benefits, intellectual property right, etc. This means these data are not available to all pediatric patients.

**External challenges:** Financial constraint is a big challenge. Private sector should come forward to play in the ayurvedic pediatric field. Their contribution can be in the fields of promoting the construing of the ancient knowledge, developing new concepts for newly developing illnesses, application of latest technology in diagnostics, posology, prognosis, PK procedures; app development, testing innovation in a clinical setting, etc.

Removing the myths about the system as a whole needs concerted efforts by all interested parties. Ayurveda is a technical medical science, not home remedies as is usually vilified by those with vested interests and who lack even the basic knowledge of the principles of Ayurveda. Another prevalent myth about Ayurveda is that it helps only in chronic conditions. This falsification is deliberately promulgated as a standard rule by the same individuals. Take the example is of neonatal cholestatic hyperbilirubinemia where early ayurvedic treatment would save the life of a neonate; instead the modern neonatologists usually advise for liver transplantation, which is most of the time not possible due to various reasons including financial issues and availability of the donor liver. There are several medical conditions, where ayurvedic treatment can save the life, improve the quality of the life of the patients with terminal illnesses or avoid costly modern medical treatment. The fact is that there without any comparative study between conventional and ayurvedic systems of medicine about which treatment acts faster than the other the myths and adverse comments are propogated. Such mindset and biased attitude need to be changed. This itself is a big challenge, but there is always a beginning. Several measures may be required. For example, publishing case studies in peer-reviewed journals. There has to be set time-limit within which the author should be informed whether article would be published or not. Certain guidelines for reviewers are required, especially for ayurvedic case studies.

Pandora’s box is opened as a consequence of subtle, but substantial control exerted by the powerful players in the health sector. Digitization, imposition of hastily developed guidelines, altered diagnostic approach and technologies, subtle undercurrent of forcing the public to accept a particular treatment (which may be more harmful than the condition and the relatively poor QOL of the patient), and other such factors have resulted in poor clinical skills in all the medical fields. Time is not far where artificial intelligence would take over the human intelligence. This in turn means restrained freedom of a clinician during diagnosis and treatment. One can easily escape the responsibility in the names of sensitivity and specificity of any diagnostic test or treatment modality. This double-edged sword is used differently on different systems of medicines. Withstanding this approach is a big challenge in itself.

Finally, I hope this volume would be successful in generating interests among the ayurvedic graduates to enable them to go for higher studies in ayurvedic pediatrics, make them successful pediatricians and ultimately provide quality health to children who are the future of our country.

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