Review Article

Unique contributions of Keraleeya Ayurveda in pediatric health care

Seetha Chandran a, *, K.S. Dinesh b, B.J. Patgiri c, Prasanth Dharmarajan d

a Dep. of Rasasastra and BhaishajyaKalpana, IPGT&RA, GAU, Jamnagar, India
b Dep. of Kaumararbrthya, Vaidyaratanam P.S Varier Ayurveda College, Kottakkal, India
c Dep. of Rasasastra and BhaishajyaKalpana, IPGT&RA, Jamnagar, India
d Dep. of Panchakarma, All India Institute of Ayurveda, New Delhi, India

Abstract

Childhood is considered as the most important phase in life, which determines the quality of health, well being, learning and behaviour across the lifespan. This may be the reason for giving the foremost position for Balacikitsa among Ashtangas (8 branches) of Ayurveda. The regional growth of indigenous medicine gave significant contribution for the development of primary health care. Kerala has major contribution of many authentic textbooks of Balacikitsa like Arogyakalpadruma, Vaidya Tarakam etc. These are more practically oriented and it can be considered as a physician’s quick reference hand book. Many new diseases which are not mentioned in classical textbooks have found their place in these books. Medications like Praakara yoga, Uramarunnuprayoga were administered in children as a mode of immunization, which helps in the maintenance of health and prevention of disease. Many diseases like Karappan (balavasarpa), Shakarogas etc. were common in Kerala and various indigenous treatment modalities were developed for such diseases. Single drug Prayogas with herbs like Mayaphal (galls), Tripadi (DesmodiumTriforum L), etc. and yogams like Nahkerarokatha (Putapakalpana), Mukkuti (Takrakalpana) etc. were practiced commonly. Many effective therapies like Shashthikapindasweda, Thalapothichil (Siropea) etc. are an inevitable part of Balacikitsa. In this paper, an attempt is made to compile the theoretical concepts and unique practices of Balacikitsa in Kerala and to convey it’s importance. The present article also addresses, how these vernacular books and traditional knowledge waned away from the Mainstream Ayurveda.

Keywords:
Ayurveda
Balacikitsa
Newborn
Kerala
Pediatric

1. Background

“Kaumararbrthrya” the branch which deals with Balacikitsa (pediatric health care), has been given the foremost position among Ashtangas of Ayurveda by Acharya Kashyapa [1]. Kaumararbrthya deals with healthy upbringing of infants, purification of mother’s milk and also cure for diseases of infants caused by intake of vitiated breast milk or Balagraha (evil demons) [2]. Acharya Hareeta included antenatal care and post natal care in this field [3]. Early childhood is a critical period in development, as rapid gain in physical, cognitive, and socio-emotional domains constitutes the “building blocks” of children’s later growth [4]. Pediatric health care can be brought under the broad concept of Kaumararbrthrya.

Literature is the foundation and record of human experience. Ayurveda has a long history of being enriched by different types of contributions in different stages befitting the geographical, climatic and cultural situations of various regions, based on their thoughts and lifestyle. Considering classical literature as a base material and imbuing the wisdom from other indigenous knowledge, many regional books were compiled in different states of India periodically considering the contemporary needs. The earlier repositories of Ayurvedic knowledge like Brihathrayi have briefly documented the information on Kaumararbrthrya. Later on, Acharya Kashyapa wrote a detailed treatise on Kaumararbrthya Tantra, which still remains as an important pediatric reference in Ayurveda. However, this is available only in an incomplete state. Now, Kaumararbrthya has developed in to an important branch in Ayurveda.

The regional growth of indigenous medicine in Kerala significantly contributed to the development of primary child health care. The frame work of Ayurveda has an inherent capacity and flexibility to imbibe such changes. Many kriyakramas like Patrapatalisweda...
Ayurveda, practiced by the literate Vaidyas especially of upper caste, who knew Sanskrit was found to be more authentic than that which practiced by lower caste Vaidyas. The ambivalence existed in the attitude towards books written in vernacular languages and later they were marginalized as non-authentic sources. Learning of Ayurveda was purely based on Sanskrit text and all institutions started using Brighadranyi texts in teaching. The argument that, the vernacular texts were the redacted versions of the Samhita texts were used for this purpose. But upon analysing certain vernacular texts like Cikitsamanjari, Sahasrayogam and Yoganritam, it was observed that most of the texts are from Alathur Grantham (a pre-eighteenth century text), which has affinity with home medicine rather than the yogam. Caste based categorization helps in weeding out the lower caste practitioners (who were already part of the tradition) from the field of Ayurveda. They were specialists in particular areas of medical practice, such as Balacikitsa (paediatrics), Vishvaidyam (toxicology), Ottamooli (single remedy), and Kannuvaidyam (eye diseases). They strictly used particular texts and language for their transmission. By the second half of the twentieth century, Ayurveda became the classical medicine and other assorted medical practices became Nattuvaidyam [5].

3.2. Elite contributions of regional textbooks

These books were written with a purpose to provide a concise and simplified version of Balacikitsa to the physicians of Kerala. It is postulated on the basis of former literary works like Mahasaara, Bhela Samhita, local health traditions and folklore. They addressed issues such as health of an individual, contagious diseases, seasonal diseases and public health.

On analysing the existing literature on Balacikitsa, it can be classified into two categories:

(1) Theoretical concepts mentioned in classical texts and contributions in the field of diagnosis.

(2) Therapeutic contributions involving existing preventive measures in child health care, diseases prevalent in Kerala and its remedies through traditional medical practice.

Though they are mutually overlapping, this categorization is done for better understanding. The materials highlighted in this section are found missing in Samhita Granthas. Such information will of great use in the present era.

3.2.1. Contributions in diagnostic perspectives

This section deals with the theory of knowledge and justified belief. The eleven fold classification of age in a different perspective like Jathamatra, Pakshateeta, Ekaabdathe are explained [6] and Balacikitsa is discussed in two perspectives i.e. preventive and treatment aspects [A.K.D 1/7]. Discussions regarding the treatment to infant in neonatal period especially before 15 days of age were also discussed. If any disease occurs in the new born within 15 days after birth, treatment is given to the mother because the child depends solely on mother’s milk during the period. But Hethuviparita (treatment against the cause of the disease) and Samanacikitsa (pacifying therapy) in very small doses can be administered in children, if they are seriously ill [A.K.D 1/58-60]. ’Prashana’ a unique way of Prakaara, the administration of such drugs even up to 12 years is mentioned here [A.K.D – Chapter 35]. Posology with respect to different therapeutic forms and in accordance with the age [month-wise and year-wise] is well explained [A.K.D 2/117–126].

Some of the diseases caused by unidentified vectors called Balagrah/Skandha (evil demons) like Pakshipeeda, Ashtavidha Balapeeda, Bhootagraha can be included under this heading.

(fomentation with leaves of medicinal plants tied inside a cloth) and Pizhichiil (oil bath), developed from the traditional practices in Kerala, are now practiced globally. This can be considered as unique contributions of those physicians who practiced in Kerala. Similarly, the knowledge hidden in regional textbooks should be adopted by the entire science community and brought to mainstream practice for further development of this specialty. Also, exclusive formulations, treatment modalities and many new diseases mentioned in these texts which are not found elsewhere make them unique and very much contributory. Application of such knowledge in clinical practice helps to tackle many of the serious epidemics, that our society is facing in the current era.

This paper provides a bird’s eye view of the literary contributions and ancient traditional medical practices in the field of Balacikitsa in Kerala. The article also deals with, how these vernacular books and traditional knowledge waned away from the mainstream Ayurveda.

2. Review of related literature

Regional textbooks of Balacikitsa like Arogyakalpadruma, Kumararamanji, Balarogacikitsamanjari, Vaidyaratarkam, Parambarya Balacikitsa and Balacikitsa Grantha were analysed. Some other traditional books of Ayurveda, e-publications and journals were also referred for the present work. All these textbooks are unique to Kerala tradition and all the original versions were written in Malayalam language.

Among these regional textbooks, Arogyakalpadruma, which belongs to the 19th century, is authored by Vaidya Kaikkulangara Ramavarier. This scripture is written in Sanskrit language using Malayalam script in the available textbooks. Text ’Kumararamanji’ is written by K. Gopalapillai, who was a high school headmaster and it was published by K.C. Narayanapilla in 1934. ’Parambarya Balacikitsa– Sidhoushadangalum Cikitsanubavangalum’ of Samrat publishers is written by Kodiakkattil K S Vasuvaidyar. This book was written on the basis of his treatment experience. The Kodiakkattil family at Trichur is well known for Balacikitsa. ’Vaidyaratarkam’ is written by Vaidya Kalanidi Sree N. Narayanan while ’Balrogacikitsamanjari’ is written by Panachirethu Krishnapilla. There are many textbooks published in the name of Balacikitsa in different regions of Kerala. The period and authors of those Balacikitsa Granthas are unavailable. The Balacikitsa Grantha that is quoted in this article was published by Vidyarambam Publishers, Alappuzha in 1982. Many traditional textbooks including Balacikitsa Grantha could be availed from the online library of Vidyarambam Moos. These textbooks were written in 20th century.

Even though an English version of text ’Arogyakalpadruma’ is available, translated version of other regional books mentioned above do not exist. Even though the text ’Arogyakalpadruma’ being included in schedule – I of Drugs & Cosmetic Act, it is not a part of graduate or post graduate curriculum of Ayurveda.

3. Observations

3.1. History of Balacikitsa in Kerala

Ayurveda got its present status, as the ‘Unique practice of Kerala’, during the course of systematization and institutionalization in the early twentieth century. The term ‘Ayurveda’ was not used anywhere in Kerala before that. Till that time, Nattuvaidyam (indigenous medicine) was the term used widely to represent all kinds of indigenous medicines like Siddha, Ottamooli, Vishvaidyam and Balacikitsa. Thus, amongst all the indigenous medical practices, it associated its identity with that of the region and also with the nation, elevating its role as a unique indigenous knowledge of the nation. S. Chandran et al. / Journal of Ayurveda and Integrative Medicine 9 (2018) 136–142
Amongst these, a descriptive analysis of Shakuni Graha (bird named graharoga), which differs variably in pathogenesis is given. It is named as Pakshi (bird) peeda. Four types of pakshipeeda like Vandyha, Shree, Parusha and Kliiba are explained. The general treatment and some Daiva vyapasrayha Cikitsa like chanting of Pakshidurga mantra with the application of Matrikabhahsma over the forehead and joints is advised [A.K.D 34/1, 35-36]. Asthitvada balapeeda like neela, Chamappa, Neerpeeda, Kuzhukan, Sundhari, Adappan, Anushant and Swedana are also explained. Unfortunately it is abandoned in today's era due to lack of scientific justification [7]. Varieties of Bala Apasamara like Pushakurni and Edupp are mentioned [B.C-Chapter 4]. Rakshakarma of such diseases is also narrated [A.K.D 1/48-56]. As far as written history goes back, people have named and classified what they observe. When a person doesn’t know the cause, they rely on observations. This is especially true in case of psychiatric diseases like Balagraha where causes are largely unknown, but identifiable pattern of thought and behaviour exist. Hence, we can describe it well enough to study treatments, thereby helping to design treatments [8].

3.2.2. Therapeutic contribution

3.2.2.1. Immunological contribution. Prevention being the primary tool for health maintenance, the role of immunology in literature is really important. Ayurvedic medicines especially Rasayanas enhance the body’s overall natural resistance to the disease causing agent rather than directly neutralizing the agent itself. The preventive measures mentioned in Praakaara Yoga and Urammarunnuprayoga can be studied as an Ayurvedic approach of way of immunization, as this is also age specific [9]. This plays a key role in the maintenance of health and prevention of disease.

Praakaara Yoga is an indigenous method of enhancing body immunity, which is narrated only in the text Arogya Kalpadruma. It protects the children from the disease just as Praakaaraa (fence) protects a house from enemies. In this, the drug schedule starts with birth and continues up to the age of 12 years. In the whole regimn of Praakaaraa Yoga, good number of drugs are used at various developmental stages. The drug combinations detailed are as per the age of the child. It is advisable to consume each formulation along with a suitable adjunct, for seven consecutive days in a dose varying with corresponding age [A.K.D 35/558-566]. For example, a child of 15 days should be administered the powder of Panchanga of Bilwa (Aegle marmelos (L) Correa) with Amalaki swaras (Phyllanthus emblica Linn.) for seven days. Moordha seka of Vacha (Acorus calamu L.) mixed with Tripdapi rasa (juice of Desmodium triflorum (L) DC), is also advised in the early neonatal period [A.K.D 35/3]. Opinion of the ancient scholar, Sarngdhara was considered while fixing the dose of the recipes of Praakaaraa Yoga.

Vachadhatravyadi Avaleha prepared by using the most repeated drugs in Praakaaraa yoga, having immunomodulatory activity, were subjected to experimental and clinical trial in 1999. In the clinical study, the drug significantly enhanced antibody formation and moderately suppressed the immunological oedema [10]. Another two studies were also done to assess the efficacy of Praakaaraa yoga in 2012 and 2013. The drug was administered in 3rd and 6th month in the first study and in the 2nd study it was administered in 1-1½ years [11,12]. Both the studies showed significant results when compared to the control group.

Ura-marunnu is a traditional babycare practice comprising of a group of drugs administered to the child in the form of paste. This is widely practiced in the states like Kerala, Tamil Nadu and Karnataka. Different ingredients of Uramarunnu which are prevalently used in Kerala are Avartaki (Caesalpiniaaeueruculata Linn), Vacha, Jatiphalaa (Myristica fragrance Houttt.), Mayaphala (Quercus infectoria Olik.), Karpuravalli (Plectranthusamboinicus Lous.), Lakshmana (Ipomoea sepiasias Koenig Ex. Roxb.), Tripadi, and Koshataki (Luffa acutangula Linn.) [13]. Any of these drugs alone or as group are triturated with breastmilk/honey/butter/cow’s milk and administered once in a week, after 28 days till the age of 2 years. Dosage is the drug obtained with a single rub on an abrasive material. There is no proper standardization on its dosage. Sticking to the concept of Oushadamatra mentioned in Sharhada Samhita, dosage can be restricted to 1-2 ratti. It is a preventive and curative aid for digestive disorders like colic pain, Krimiroga (worm infestation), Swasakasa (respiratory disorders) and Graha in infants and children, and also helps in proper development of milestones [14].

3.2.2.2. Contributions to the disease field. Many new diseases were introduced in old Balacikitsa textbooks and their treatments were also mentioned. Skin diseases like Karappan (Balavasarpa), Shakaroga (skin disease of extremities and head), and Varppan are narrated. Karappan, which are limited to 9 types in adults are elaborated in to 51 types in children [A.K.D 13/63]. Eight types of Shakkaroga which occurs only in the four sakhas are also described. It occurs due to the vitiation of Kapha, Rakta and Vata. They are RaktoBudha, Ajagallika, Gallaka, Asrasopha, Kupada, Indrarmra, Idhmaka, and Dadhmika [A.K.D 20]1-5]. Varasikonitha is named as Rakthasthamba. Rakta anvaastha which is included in Varasikonitha, is a term used to denote various conditions that result because of the exaggerated movement of raktha through different parts of the body by the vitiated vata. They are 18 in number. They are broadly divided into Nija and Agantu. Different types of Varppan like Manal varppan, Neer varppan are explained under Rakthasthamba (Vata- shonitha in adults), based on the Dhatu vitiated [A.K.D 18/300-330].

Several new diseases like Kundalaka, Jatara vrana, and Raktaarasaka are described. Kundalaka is a Raktha mamsasriitha roga which manifests in three ways based on three doshas [A.K.D 19/12]. Symptoms of Jataraavarna include discoloration of tongue, continuous crying, crying increases on touching stomach, greenish veins on abdomen, bloating, diarrhoea and fever [A.K.D 19/19,20]. Another disease named ‘Ulbarus’ which occurs due to vitiation of Dosa or Vrana in Garbhhasaya or due to vitiation of Rakta, are manifested as carbuncles on the body of the child. It is either present at birth or formed soon after birth. Such children will suffer from cracking of skin of palm and sole and excessive hairloss. Ulbarus is of 7 types and the clinical manifestation is similar to that of Phiranga [A.K.D 19/33-35]. Rakthasalaka is a condition, where Kapha blocks the passage of Raktha, and this stagnant Rakta gets mixed with Kapha and forms masses, which enlarge and become painful, itchy, cold, heavy and whitish or reddish in colour [A.K.D 19/53-55]. Different types of Vranas like Nakahvarana, Januvrana, Gopavarna, Veethivrana, Urovrana, Kakshavrana, and Siravrana are explained [A.K.D – chapter 22]. In Kshudraroga context, some conditions like Kandalkaa, Padasaba, Dehasphutana, Dehasweda, and Dehadurgandha and methods to remove thorns from the body are narrated [A.K.D 24/93-102].

3.2.2.3. Contributions to medical care. Due to the close association with traditional practices, many new and effective drugs which are not mentioned in Samhitas and Nighantus found their place in the treatment of diseases. Analysis of Rasapanchaka and therapeutic application of locally available drugs like Ishvaramuli (Aristolochia Indica L.), Mayaphala, Tripdapi, Lakshmana, Karpuravalli, Koshatak (Luffa acutangula Linn. Roxb.), Jathi (Myristica fragrans Houtt.), Avarthini (Helicterus isora Linn.), Rudraksha (Elaeocarpus ganitum Roxb) can be seen. Drugs like Sahadevi (Vernoniacinerea Linn.), Nandyavarrta (Tabernomata divaricata Linn.), Lavalii (Musaeendo frondosa Linn.) are commonly used in ocular diseases (see Table 1).
2.2.2.4. Exclusive formulations. Some examples of modified formulations seen in these regional textbooks of Ayurveda are Nalikera kwatha, Bhasma kanji, Varavu kwatha and Varattu kwatha.

Nalikera/Kariikkin kwatha mentioned in Vaidyaratramak textbook is a Putapaka kwatha. It is a decoction prepared in Nalikera phala (fruit of Cocos nucifera Linn.), indicated in Samanya Visarpa Cikitsa. It is effective in 18 types of Karappan [17]. As two types of Mukkudi preparations are seen in classics, Mukkudi can be included under Pramathyakalpana as well as Takrakalpana. Administration of Mukkudi in diseases like Udara (ascitis), Arsha (haemorrhoids), [A.K.D 6/24-29] Grahanı (I-B), Athisara (diarrhoea), Apasmara (convulsion disorder), and Visarpa [V.T 14/9-19] is a speciality of Keraleeya cikitsa.

Bhasma kanji, a modified Anna kalpa is indicated in shopha (oedema) [A.K.D 8/106]. In Varattu kwatha mentioned in Vaidyaratrama textbook, kalpa of certain drugs are pasted on some leaves. It is folded and again covered with banana leaves and roasted in fire. Certain metals like gold are rubbed in the swaras obtained from above preparation and administered in fever, cough and chest congestion [V.T 9/124-131], Adappu kashaya is also a similar pravyoga mentioned in the same text [V.T 9/124-131], Ajamodadi Varavu kwatha is an example of Varavu Kwatha mentioned in Parambarya Bala cikitsa [18].

Some exclusive types of Tailas like Rasataila [A.K.D 17/59-61], Shashhtikitala [A.K.D 17/88-95], Muttathaila [V.T 20/109-114], Bhunagaditaiali [19] Panthataila/Eritaila, [V.T 40/137-144] Kukkdatalaila [V.T 40/123-137] were also practised commonly. Thambula bhasna, is a Putapaka preparation administered in Shula (pain) [A.K.D 8/25-26].

Many of the commonly and widely practiced yogas like Dhanwantharam gutika, Swasanandham gutika are the contributions of old Balacikitsa textbooks.

Kriyakrama (Special Therapeutic procedures): Some of the kriyakrama practised commonly in children are Uzhinh Kulippikal (Abyanga before taking bath), Thalapothichil/Sirolep (covering scalp with medicaments) and different types of Dhara (Table 2).

Practices of Kerala Tradition: In Kerala, experts from different castes and families, belonging to different Vaidya traditions like Chathar nair are specialised in Balacikitsa. Among these, few physicians who have been using traditional knowledge and regional textbooks as a guidance for treatment in

Table 1
Illustration of single drug usage in Keraleeya Balacikitsa Grantha.

| Drugs | Indications | Administration | Mode of action | Textbook |
|-------|-------------|----------------|----------------|----------|
| 1. Jiraka (Cuminum cyminum Linn.) | Vomiting of breast milk | Kalka is applied over nipple | Pachana, deepana, laghu | Balaroga cikitsamanjari [15] |
| 2. Mayaphala (galls on Quercus infectoria Olivier) | Malamutra Vidhanda(difficulty in passing urine and stool) | Internal administration of Kalka of drug Mayaphala. | Vatanulomana | Balaroga cikitsamanjari [15] |
| 3. Ervaru (samoola) – (Cucumis sativus. L) | Malamutra Vidhanda | Kalka of pulp, seed and root of cucumber is applied over umbilicus. | Mootravarodhashamana, mootrāla | Balaroga cikitsamanjari [15] |
| 4. Durvapatra (leaves of Cynodon dactylon Linn.) | Nabhipaka (inflammation of Umbilicus) | Nabhi lepa with kalka of tip of Durva leaves fried in ghee. | Rakthapitta kshaupapa | Balaroga cikitsamanjari [15] |
| 5. Machinga rasa (Swarasa obtained by incising the top portion of small immature Coconut fruit) | mouth ulcer, excessive salivation | Internal administration in mouth ulcer. | Vate-Pittahara, Shophahara | Cikitsa manjari [16] |
| 6. Machinga rasa | If the infant after birth doesn’t cry or open his eyes. | Used as eye drop with milk. | Tikshna | Bala cikitsa, Chapter 3 |
| 7. Godhumu (Triticum aestivum Linn) | Urukshata (chest injury) | Internally used as kwath with honey. | Vranaropana, Vata-pittahara | Arogyakalpadruma, 5/19 |
| 8. Pippi (Piper longum Linn.) | Swasakasavaka (respiratory disorders) | Pippi churna is administered with honey. | Vatakapha hara | Cikitsamanjari, Verse -11 |
| 9. Amrabejja (Mangifera indica Linn.) | Prauvihika (IBS) | Mango seed powder should be soaked in salt water and this water is used internally | Vatanulomana | Balaroga cikitsa manjari |
| 10. Jiraka | Rakthathisara (Anal bleeding) | Internal administration of Jiraka churna with honey and ghee | Kaphavathara, grahi | Cikitsamanjari, Verse-37 |
| 11. Vibeethaki beejja (Terminalia belllerica Roxb.) | Balashukla (Corneal opacity) | Prepare Collyrium with its kalka in honey or breast milk. | Kaphapittahara, Chaksushya, shphagna | Balaroga cikitsa manjari, Chapter 4 |
| 12. Veischikili (Heliotropium indicum Linn.) | Ocular inflammations | Make paste of the leaves in breast milk and apply over forehead | Chaksushya, Netrya, Pittakapha hara, ropana | Arogyakalpadruma, 26/3 |
| 13. Sahadevi (Vernonia cinerea Linn.) | Conjunctivitis | Plant juice is mixed with honey and used as eyedrops | Vatakapha hara, Antiviral, antifungal, antibacterial | Arogyakalpadruma, 26/22 |
| 14. Kukthara (Dolchlos biflorus Linn.) and Madhu (Honey) | Inflammation of ear | Honey processed in fried Kulathra is used as eardrops. | Madhu-Rooksha,Tridosha, Vishada, Srothoshadaka, Yogavali and Anti-inflammatory Kalathra-kshaupapa | Balaroga cikitsamanjari, Chapter 2 |
**Table 2**

| Kriyakrama | Indication | Textbook |
|------------|------------|----------|
| Abyanga (massage) with coconut milk and bath is given with water boiled with tender leaves of Vata (Ficus benghalensis Linn.), Body massage of Taila processed with Daruva swarasa (juice of Cynodon dactylon Linn.) and Navaneetha (Butter). | Healthy baby | Arogyakalpadruma 1/43-44 |
| Siro Abyanga (hair oil massage) with Navaneetha. Navaneetha mixed with Daruva swarasa is applied. | Healthy baby | Yogamrtham |
| Sirodhyanga with ghee or oil purified by heating with bronze piece (This helps to remove the moisture effectively). | Pinasa (common cold) and Jwara (Fever) | Ciktis manjari
| Abyanga with oil, which is added with Gairika (Red ochre) and Arjuna (Collyrium). | Keshya (Hair vitalizer) and Krimigna (Wormicide) | Yogamrtham |
| Thala/Sirolopa (application of herbal paste over scalp) with Rasnadi or Kachuradi or Triphaladi churna. | Jwara, Jatardwargara (Disease occurring above the clavicle), Murcha (Giddiness), Pralapa (Delirium) | Vaidyatarakam 22/30-31 |
| Thala with Neetumutta (egg of weaver ant) kalki in breast milk and butter [23]. | Epilepsy | Sarvarogacikitsanool |
| Many exceptional Sweda prayogas (fomentation therapies) like Erandadi Ushmisveda (steaming using water boiled with medicated water), Shashthika pindasveda (using processed shashthika rice), Danyamla dhara pouring warm dhanyamla all over the body, Patraparolasveda (using leaves). | Vatayyadi | Arogyakalpadruma 17/34-38 |
| Sarvangadhara including head with Tokra processed with inflorescence of coconut tree and Amalaki. | Gastric ulcer | Ciktisamanjari,chapter-33 |
| Seka with Matsu (waterey portion of curd). | Injury due to Snauhiksheera (Euphorbia nivul Buch- Ham) | Arogyakalpadruma 26/70 |
| Procedures like Padangusha nakalepana (applying herbal paste over toes and nails) and Pada tala (sole) lepana with paste of Padma, Lodra and honey at bed time. | Diseases affecting vision | Arogyakalpadruma 26/11 |
| Seka (pour) with the juice of Bringoraja (Eclipta alba (L.)Hask) over head and smelling Bhumyamalaki (Phyllanthus urnaria Linn.). Repeated Virechana is advised with a combination of Draksha (Vitisvinifera Linn), Vrischicha (Boerhaavia difusa Linn.) and Pathya (Terminalia chebula Retz.) in honey. | Kamala (Jaundice) | Arogyakalpadruma 8/70-71 |
| It is advised to do Vatsih (medicated enema) with Uruba taila and Saindhava. | Vridhi | Vaidyatarakam 30/60-62 |
| Blood letting using medicinal leeches. | Localised swelling over lid | Arogyakalpadruma 26/61 |
| Draining of pleural fluid from pleural space using Trikarchanyastra. | Urashthoya (Pleural effusion) | Vaidyatarakam 25/129-133 |

Balacikitsa were interviewed as a part of this study. All of them were general practitioners. They have inherited the knowledge of regional textbooks through family apprenticeship and self study of many regional textbooks of Balacikitsa. They gained expertise in this field by practicing this knowledge in their clinical practice. Though there is consensus among these practitioners regarding the formulations, indications and use, certain formulations as per experience of some experts showed good result in diseases which is not mentioned in indications. An illustration of such formulations are given below (Table 3) (Supplementary file).

**Table 3**

| Formulation | Indication in classics | Indications in practice | Name of Physicians | Tradition |
|-------------|------------------------|-------------------------|-------------------|-----------|
| Vatanguradikashaya. [A.K.D 19/43-46] | Ulbarus | Herpes Zoster | Dr.sasikumar Necuyi, MD (Rasasastra) | Dravidan vaidy tradition, Cherupulassery |
| Balamrtha Rasayan. [A.K.D 14/37-15] | Charalwarpan, Visarpa | Breast cancer, Lichen planus, Vrdadi, all stages of tonsillitis | Dr.Manikandan, K. P, BAMS, PGCH | Chatharhu nair vaidy tradition, Mezhathur |
| Balagopamajadikavatha. [A.K.D 18/88] | Emergency medicine in Udarashoola | It is also given as a preventive drug of many Graha. Asthma. | Dr.B. Prabakaran, DM (Ayu) | Ashwavidya Guru parambary, Kannur |
| Ksheeridrupallavadi lepa. [A.K.D 14/1,2] | Vitrudnra | As a preventive drug in Bala Aparshana | Dr. Rajeev Shenoy, Shenoy vaidy tradition, Cherthala |
| Ashtachurna in Marichagaramana. [A.K.D 8/28] | Balapeeda, Visarpa, Jwara, | As a preventive drug in Bala Aparshana | | |
| Indravallihera | Balapeeda, Apasmara | | | |
| Shankupushpadikavatha [V.T 6/40-47] | Balapeeda | | | |
| Kombanjigadigotu [V.T 9/71-78] | Jwara, Visarpa, Balapeeda, Apasmara | | | |
| Vettumaramantika administered in the form of Gudavarthi (Anal suppository) Cheriyaradralkadi kayshaya | Anubutha | To stop Epileptic convulsions | Bala Aparshana | |

4. Analysis

In ancient times, the study of Ayurveda was not divided in to branches as today. Later, when the science developed to the extent of exploring the minutest cells in the body, the precise knowledge about each domain became inevitable. As a part of reductionism in
medical science, *Kaumarabrihyata* developed as a separate branch. After the *Samhita* period, different authors compiled the information available in *Samhitas* and indigenous medicine. Consequently, various *Granthas* like *Arogvakalpadruma* were written in regional languages giving utmost importance to the diseases prevalent in Kerala and the drugs available during that period. During the refashioning of institutionalized and systematized Ayurveda, diverse medical practices existed and Ayurveda adopted many of the popular practices into it, except those written in vernacular languages. As a result, many of these regional textbooks didn’t come to light. So even after many years this knowledge remains as a hidden data to majority of Ayurvedic fraternity.

4.1. Contributions in diagnostic perspectives

Classification of age, is based upon the therapeutics and mode of action of the drug used in that period. In *Bruhatthrayi* too, we can see the classification of lifespan. But it is obvious that, both are done in different perspectives. Though posology is mentioned in almost all texts, monthwise and year wise description of dosage is not mentioned anywhere. This indicates that, authors of those regional textbooks have a clear and specific idea about the pharmacodynamics of drugs and gastrointestinal tract of children.

4.2. Therapeutic contribution

4.2.1. Immunomodulatory contribution

*Praakaara* yoga and *Uramarunnu* recipes can be practised as an effective baby care measure right from the birth of a child. Some of the drugs in *Praakaara* yoga and *Uramarunnu* seem to be overlapping.

4.2.1.1. Advantages. Immunomodulatory regimens offer an attractive approach as they don’t have any side-effects like the existing drugs used in vaccination. They are *Rasayana* drugs (~immuno-modulators), which enhance the immune responsiveness of an organism against a pathogen by non-specifically activating the immune system. On analysis, most of these drugs have properties like *Deepana* (~increases appetite), *Pachana* (~kindles the digestive fire), *Grahi* (absorption), *Mutrala* (~diuretic), *Shulahara* (~analgesic), *Krimigna* (~antihelmintic), and *Kapha nissarakara* (~expectorant) property. They are *Vyadhiikkshamatvakaraka* (~increases immunity) and *Medhya* (~nootropic drugs) too. Hence, proper and scientific use of these formulations increases immunity and protect the child from various diseases [12]. The *Deepana*, *Pachana* and *laghu* properties of these drugs help in correcting the *Agniivay gunya* (deranged digestion) and thereby pacifies the vitiated *Kaphadosha*. In 10–12 years age group, drugs in *Praakaara* yoga are administered in the form of *Griha kalpana*, which substantiate the fact that, the children of that age group are more prone to diseases due to vitiated *Pitta* and *Vata*. As only lipids could cross the blood brain barrier, it acts as the best brain booster. Along with this, the *Yogavatihwa* and *Balya* property of ghee makes it as an apt *kalpana* in this context.

Analysing the various combinations of *Uramarunnu* used in the different parts of the state, variations were observed in the ingredients of *Uramarunnu*. All combinations have *Sangrahi*, *Deepanapachana*, *Vyadhiikkshamatwa*, *Nidrakara*, *Medya*, *Shulagna*, *Grahi* and *Bhutagna* property, predominantly. Even though many *Anupanas* are in use, breast milk is considered as the best, as it is *Jamnasatmya* as well as *Dhatuposhana*. *Swadupakarasa* and *Vatapitihara* property of breast milk will provide a soothing effect to the highly *Tiksha* and *Ruksha* property of the drugs. Also, milk can complement the transmission of active ingredients through the lipid vehicle form [13].

4.2.1.2. Disadvantages. The pace of development in modern medical science and it’s pediatric care, coupled with communication gap in between traditional practitioners, had waned off almost all traditional practices from our culture. Other reasons are, the unavailability of few drugs mentioned in this *Praakaara* yoga and *Uramarunnu* yoga and the fast lifestyle. Clinical evidence of these practices are not documented. Also, side-effects are often observed by practitioners due to improper administration and over dosage of these drugs. As *Praakaara* yoga is concerned, it is not practical to routinely prepare these combinations, each month for every child up to the age of 12. As it should be administered in fresh form, drug modification also has limitations.

4.2.2. Contributions towards knowledge of disease

Many new disease conditions like *Rakthanavastha* are well explained. These can be taken as a detailed form of crude and abbreviated *samprapthi* of many diseases narrated in *Samhitas*. Treatment with cheap and easily available drugs were in practice in almost all region. In medical textbooks belonging to Kerala, it is quite usual to see the drugs available in that region. Many single and combined *prayoga* of *Rudraksha* can be seen in old *Grantha* in the context of *Balapeeda, Graham, Apasnara* and *Visarpa*. Magnets have positive (+) and negative (−) poles just as every cell in the blood. It helps to enhance the blood circulation, due to the attraction of opposite poles. When there is a streamlining of blood circulation most of the illness get automatically healed and the person feels better and rejuvenated [9].

On analysing the innovations in pharmaceutics, it is evident that, they might have developed due to the properties like palatability, good digestibility and enhanced bio availability. In this era, where there exist a scarcity of herbal drugs, practice of formulations with minimum drugs without compromising the quality is essential.

Due to the restrictions in adapting conventional routes of administration in children along with emergency management, new treatment methodologies developed. Most of the mainstream therapies like *Vamana* (~emesis) and *Nasya* (~nasal drops) are contraindicated in children, this crisis might have lead to the development of many new therapies like *Shirolepa* and *Dhara* in children. In ocular inflammations, certain drugs are mentioned to apply over forehead instead of topical application over affected area. This may reduce the risk of ocular irritation, as children are less tolerant to strong medications [24], *Padangushthanakah lepana* (anointment of drug over foot, toe and nail) and *Padatala lepana* (anointment over sole) mentioned for *Nakthandya* (nightblindness) can be justified with the principles of Reflexology [25]. From this, it is clear that, the observations and trials done in those period could find out the most suitable drugs which could break the pathology indirectly, by acting on some other areas/nerve endings of the body.

5. Conclusion

On the basis of historical studies, it is evident that the attempt to standardize learning of *Vaidya* ended up delegitimizing all other practices of *Vaidya* that used hundreds of regionally available vernacular texts. English or Sanskrit versions of such books will enlighten the budding Ayurveda community. Research works has to be carried out to establish the efficacy and applicability of this unique legacy for documentation and evidence creation. Besides expressing the rich tradition of Ayurveda, incorporating regional and indigenous knowledge and healing practices, the paper shows that Ayurveda is a dynamic and continuously evolving science, thus challenging the stereotypical notion of it being a ‘closed’ and ‘stagnant’ medical system.
Acknowledgement

The authors acknowledge the valuable contribution of the following physicians: Dr. Raman Kutti Varier, Dr. Rajeek Shenoy, Dr. Prabakaran P, Dr. Sasikumar Nechiyil, Dr. Manikandan, Dr. Jomon Joseph Daniel and the technical authority involved, whose works have been screened in the current attempt.

We express our sincere gratitude to the following physicians for their needful actions and guidance at every stage of this work: Dr. Aravind S, Dr. Vidya G. Unnikrishnan, Dr. Remya E. A, Dr. Safna. N, Dr. Archana V K, Dr. Narayan Nambi, Dr. Reshmi. R, Dr. Maneesh, Dr. Presannan, Dr. Jayadev, Dr. Rahul Shingadiya, Dr. Harmeet Kaur, Dr. Ajayan, Dr. Saritha, Dr. Viji Vikraman, Dr. Rajagopala S, Dr. Mohan Prasad and Dr. Serena. K.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jaim.2017.10.008.

References

[1] Tewari PV. Commentary Vidyotheni of seer satyapalabhisagacharya on Kashyapa Sanhitro of Vridha Jeewaka, Vimanarthana; chapter 1, verse-10. Varanasi: Choukamba Visvabharati Oriental Publishers; 2008. p. 97.

[2] Kaviraj ambikadutta shastri. Susruta samhita of Susruta, sutrasthana; chapter-1, verse -8. Varanasi: Choukamba Sanskrit Sansthan; 2014. p. 6.

[3] Harithara Prasad Tripadi. HareethaSamhita of Hareeta, Pratham sithana; chapter- 2, verse-17. 2nd ed. Varanasi: Choukamba Krishnadas Academy; 2009. p. 7.

[4] Marc H. Bornstein, Pia Rebello Britto, Yoko Nonoymaya-Tarumi, Yumiko Ota, Oliver Petrovic, and Diane L. Putnick. Child development in developing countries: introduction and methods. HHS Author manuscript. [Available from: http://www.ncbi.nlm.nih.gov/pubmed/27096306

[5] Girja KP. Retgurting of Ayurveda as a classical tradition. Pragnata J Hum Sci 2016;3. 1–43-62.

[6] Kaikulangaramavarier. Arogyakalpadruma [A.K.D] (Malayalam);7th ed. Chapter-1, verse 3, vol. 6. Thrisur: Sulabha Publishers; 2005. p. 2.

[7] Anonymous. Balacikitsa [B.C] PracheenavaidyaCromho (Malayalam); 4th ed. Chapter -4. Alappuzha: Vidyarambham Publishers; 2005. p. 36.

[8] Available from: http://www.scienceblogs.com/denialism/2008/04/03/is-that-really-a-disease-epist/. [Accessed 20 September 2016].

[9] Arunraj GR, Shailaja U, Rao Prasanna N, Ajayan S. Review on the concept of immunomodulation in Ayurveda with special emphasis on prakara yoga. Int J Pharm Sci Res (IJPSR) 2014;5, 4–1116-1123.

[10] Rajagopala S. A critical review of prakarayogas and pharmaco-clinical studies on a combination of certain drugs therein for vyadhikshamatra and brhmana in children. Phd. Thesis. Jamnagar: Department of Kaumarabrthya, IPGT & RA, Gujarat Ayurved University; 1999.

[11] Anu C Mathew. Effect of pragraara yoga to prevent morbity in children between 1 and 1½ years. M.D dissertation. Thiruvananthapuram: Department of Kaumarabrthya, Govt. Ayurveda College, Kerala University; 2013.

[12] Shalini A. Randomised controlled trial on the efficacy of prakara administered in 3rd and 6th month in preventing morbidity during infancy. M.D Ayurveda dissertation. Thiruvananthapuram: Department of Kaumarabrthya, Govt. Ayurveda College, Kerala University; 2012.

[13] Chandrakumari S, Kumar InduC. Relevance of Urameranru in Balacikitsa. Saraswatam Souvenir of National Seminar on Developmental disorders in Children. Govt. Ayurveda College:Thiruvananthapuram, Kerala: Dept. of Kaumarabrthya; 2008. p. 63–6.

[14] Arun Raj GR, Shailaja U, Rao Prasanna N, Ajayan S, Thomas Nivya P. Review on the contribution of Ura-Marunnu- A traditional baby care practice in southern India. Pharma Innovation 2014;2:11.

[15] Panachiredathukrishnapilla. Balarogacikitsamanjari [B.C.M], (Malayalam). 7th ed. Chapter- 4. Alappuzha: Vidyarambham Publishers; 199364Crossref.

[16] Sreeman Namboothiri D. Cikitsamanjari [C.M], (Malayalam). 16th ed. verse-1. Alappuzha: Vidyarambham Publications; 2003. p. 450.

[17] Narayanan Vaidya kalanidhi Sree N. Vaidya tarakam [V.T],(Malayalam) 2nd ed. Chapter -18, verse-20-25. Kottayam: Published by Dr. M. N. Sasidharan; 1986. p. 127.

[18] Vaidya visharad Ayurveda shiromani Kodakkattil Vasu vaidyar, ParambaryBalacikitsa Sidhoushadangalum anubavangalum, chapter- 9. Thiruvananthapuram; 2002. p. 95.

[19] Anonymous. Indian medical practitioners co-operative stores LTD (IMPCCPS); Vaidya yoga ratnavali. Madras: IMPCCPS Publication; 1968. p. 166.

[20] Sreeman namboothiri D. Yogamrtham (Malayalam). 5th ed. chapter-Balaci- kitsa, verse-1. Alappuzha: Vidyarambham Publishers; 2010. p. 295.

[21] Ibidem Yogamrtham (20), chapter-Balacikitsa, verse-1. Alappuzha: Vidyarambham Publications; 2003. p. 450.

[22] Ibidem Yogamrtham (20), chapter-Balacikitsa, verse-26, p. 302.

[23] Mayyanaatu mamootupurayidathil John Alexander. Sarvarogacikitsanool Chapter -4. Alappuzha: Vidyarambham Publishers; 199364Crossref.

[24] Manjusha R, Archana VK. Management of netrarogas in Paedeatric age group in children. Ph.d. Thesis. Jamnagar: Department of Kaumarabrthya, IPGT & RA, Gujarat Ayurved University; 2016. p. 68.

[25] Bengtsson S, Solheim BG. Enforcement of data protection, privacy and security in medical informatics (Conference paper). In: Lun KC, editor. MEDINFO 92. Proceedings of the 7th world congress on medical informatics: Geneva, Switzerland; 1992 Sep 6–10. Available from: http://www.takingcharge.chsl. unna. [Accessed 28 June 2016].