



## Review Article

## Unique contributions of Keraleeya Ayurveda in pediatric health care

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## 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 *Praakaara 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* (*balavisarpa*), *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* (*DesmodiumTriflorum* L.), etc. and *yogams* like *Nalikerakwatha* (*Putapakakalpana*), *Mukkuti* (*Takrakalpana*) etc. were practiced commonly. Many effective therapies like *Shashitikapindasweda*, *Thalapothichil* (*Sirolepa*) 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 its importance. The present article also addresses, how these vernacular books and traditional knowledge waned away from the Mainstream Ayurveda.

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## 1. Background

“*Kaumarabhrthy*” the branch which deals with *Balacikitsa* (pediatric health care), has been given the foremost position among *Ashtangas* of Ayurveda by Acharya Kashyapa [1]. *Kaumarabhrthy* 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 *Kaumarabhrthy*.

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 imbibing 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 *Kaumarabhrthy*. Later on, Acharya Kashyapa wrote a detailed treatise on *Kaumarabhrthy Tantra*, which still remains as an important pediatric reference in Ayurveda. However, this is available only in an incomplete state. Now, *Kaumarabhrthy* 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 *Patrapotalisweda*

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(fomentation with leaves of medicinal plants tied inside a cloth) and *Pizhichil* (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 speciality. 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 Keraleeya*. 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*, *Koumaramanjari*, *Balarogacikitsamanjari*, *Vaidyatarakam*, *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 Kaikkulanga Ramavarier. This scripture is written in Sanskrit language using Malayalam script in the available textbooks. Text '*Koumaramanjari*' 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 Kodiakattil K S Vasuvaidyar. This book was written on the basis of his treatment experience. The Kodaikattil family at Trichur is well known for *Balacikitsa*. '*Vaidyatarakam*' 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 Vaidyaratnam 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 –1 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*, *Vishavaidyam* 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.

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 *Brihathrayi* 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 *Yogamritam*, it was observed that most of the texts are from *Alathyur 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), *Vishavaidyam* (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 be 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*, *Ekaabdhha* 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 *Hethuviparitha* (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 *Balagraha/Skandha* (evil demons) like *Pakshipeeda*, *Ashtavidha Balapeeda*, *Bhootagraha* can be included under this heading.

Amongst these, a descriptive analysis of *Shakuni Graha* (bird natured *graharoga*), which differs variously in pathogenesis is given. It is named as *Pakshi* (bird) *peeda*. Four types of *pakshipeeda* like *Vandhya*, *Sthree*, *Purusha* and *Kliba* are explained. The general treatment and some *Daiva vyapashraya Cikitsa* like chanting of *Pakshidurga* mantra with the application of *Matrikabhasma* over the forehead and joints is advised [A.K.D 34/1, 15–36]. *Ashtavidha balapeeda* like *neela*, *Chumappa*, *Neerpeeda*, *Kazhukan*, *Sundhari*, *Adappan*, *Anushtan* and *Swedana* are also explained. Unfortunately it is abandoned in today's era due to lack of scientific justification [7]. Varieties of *Bala Apasmara* like *Pashukarni* 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 *Uramarunnuprayoga* 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 *Praakaara* (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 regimen of *Praakaara 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 adjuvant, 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 swarasa* (*Phyllanthus emblica* Linn.) for seven days. *Moordha seka* of *Vacha* (*Acorus calamus* L.) mixed with *Tripadi 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 *Praakaara Yoga*.

*Vachadhatryadi Avaleha* prepared by using the most repeated drugs in *Praakaara 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 *Praakaara 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 baby care 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* (*Caesalpiniaaceaeauriculata* Linn.), *Vacha*, *Jatiphala* (*Myristica fragrans* Houtt.), *Mayaphala* (*Quercus infectoria* Oliv.), *Karpuravalli* (*Plectranthusamboinicus* Lous.), *Lakshmana* (*Ipomoea sepiasia* 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 *Sharghadara 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* (*Balavisarpa*), *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 *Shakharoga* which occurs only in the four *sakhas* are also described. It occurs due to the vitiation of *Kapha*, *Rakta* and *Vata*. They are *Raktolbuda*, *Ajagallika*, *Gallaka*, *Asrasopha*, *Kupaka*, *Indramma*, *Idhmaka*, and *Dadhmika* [A.K.D 20/1–5]. *Vatashonitha* is named as *Rakthasthamba*. *Rakta anvastha* which is included in *Vathasonitha*, 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* (*Vatashonitha* in adults), based on the *Dhatus* vitiated [A.K.D 18/300–330].

Several new diseases like *Kundalaka*, *Jatara vrana*, and *Raktalasa* are described. *Kundalaka* is a *Raktha mamsasritha roga* which manifests in three ways based on three *doshas* [A.K.D 19/1,2]. Symptoms of *Jataravrana* include discolouration 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 *Dosha* or *Vrana* in *Garbhasaya* 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]. *Rakthalasaka* 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 *Nakhavrana*, *Januvrana*, *Gopavrana*, *Veethivrana*, *Urovrana*, *Kakshavrana*, and *Siravrana* are explained [A.K.D – chapter 22]. In *Kshudraroga* context, some conditions like *Kandalika*, *Padasabda*, *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*, *Tripadi*, *Lakshmana*, *Karpooravalli*, *Koshataki* (*Luffa acutangula* Linn. Roxb.), *Jathi* (*Myristica fragrans* Houtt.), *Avarthini* (*Helicterus isora* Linn.), *Rudraksha* (*Elaeocarpus ganitus* Roxb) can be seen. Drugs like *Sahadevi* (*Vernoniacinerea* Linn.), *Nandyarvatta* (*Tabermontana divaricata* Linn.), *Lavali* (*Mussaenda frondosa* Linn.) are commonly used in ocular diseases (see Table 1).

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

Drugs	Indications	Administration	Mode of action	Textbook
1. <i>Jiraka</i> ( <i>Cuminum cyminum</i> Linn.)	Vomiting of breast milk	<i>Kalka</i> is applied over nipple	<i>Pachana, deepana, laghu</i>	<i>Balaroga cikitsamanjari</i> [15]
2. <i>Mayaphala</i> (galls on <i>Quercus infectoria</i> Olivier)	<i>Malamutra Vibandha</i> (difficulty in passing urine and stool)	Internal administration of <i>Kalka</i> of drug <i>Mayaphala</i> .	<i>Vatanulomana</i>	<i>Balaroga cikitsa manjari</i> [15]
3. <i>Ervaru</i> ( <i>samoola</i> ) – ( <i>Cucumis sativus</i> . L)	<i>Malamutra Vibandha</i>	<i>Kalka</i> of pulp, seed and root of cucumber is applied over umbilicus.	<i>Mootravarodhashamana, mootrala</i>	<i>Balaroga cikitsa manjari</i> [15]
4. <i>Durvapatra</i> (leaves of <i>Cynodon dactylon</i> Linn.)	<i>Nabhipaka</i> (inflammation of Umbilicus)	<i>Nabhi lepa</i> with <i>kalka</i> of tip of <i>Durva</i> leaves fried in ghee.	<i>Rakthapitta kaphaapaha</i>	<i>Balaroga cikitsa manjari</i> [15]
5. <i>Machinga rasa</i> ( <i>Swarasa</i> obtained by incising the top portion of small immature Coconut fruit)	mouth ulcer, excessive salivation	Internal administration in mouth ulcer.	<i>Vata-Pittahara, Shophahara</i>	<i>Cikitsa manjari</i> [16]
6. <i>Machinga rasa</i>	If the infant after birth doesn't cry or open his eyes.	Used as eye drop with milk.	<i>Tikshna</i>	<i>Bala cikitsa, Chapter 3</i>
7. <i>Godhuma</i> ( <i>Triticum aestivum</i> .Linn.)	<i>Urakshata</i> (chest injury)	Internally used as <i>kwatha</i> with honey.	<i>Vranaropana, Vata-pittahara</i>	[ <i>Arogyakalpadruma</i> , 5/19]
8. <i>Pippali</i> ( <i>Piper longum</i> Linn.)	<i>Swasakasavikara</i> (respiratory disorders)	<i>Pippali churna</i> is administered with honey.	<i>Vatakapha hara</i>	[ <i>Cikitsamanjari</i> , Verse -11]
9. <i>Amrabeeja</i> ( <i>Mangifera indica</i> Linn.)	<i>Pravahika</i> (IBS)	Mango seed powder should be soaked in salt water and this water is used internally	<i>Vatanulomana</i>	<i>Balaroga cikitsa manjari</i>
10. <i>Jiraka</i>	<i>Rakthathisara</i> (Anal bleeding)	Internal administration of <i>Jeeraka churna</i> with honey and ghee	<i>Kaphavatahara, grahi</i>	[ <i>Cikitsamanjari</i> , Verse-37]
11. <i>Vibeethaki beej</i> ( <i>Terminalia bellerica</i> Roxb.) or <i>hareethaki beej</i> ( <i>Terminalia chebula</i> Retz.)	<i>Balashukla</i> (Corneal opacity)	Prepare Collyrium with its <i>kalka</i> in honey or breast milk.	<i>Kaphapittahara, Chakshushya, shophagna</i>	[ <i>Balaroga cikitsa manjari</i> , Chapter 4]
12. <i>Vrischikali</i> ( <i>Heliotropium indicum</i> Linn.)	Ocular inflammations	Make paste of the leaves in breast milk and apply over forehead	<i>Chakshushya, Netrya, Pittakapha hara, ropana</i>	[ <i>Arogyakalpadruma</i> , 26/3]
13. <i>Sahadevi</i> ( <i>Vernoniacinerea</i> Linn.)	Conjunctivitis	Plant juice is mixed with honey and used as eyedrops	<i>Vatakaphahara</i> , Antiviral, antifungal, antibacterial	[ <i>Arogyakalpadruma</i> , 26/22]
14. <i>Kulatha</i> ( <i>Dolichos biflorus</i> Linn.) and <i>Madhu</i> (Honey)	Inflammation of ear	Honey processed in fried <i>Kulatha</i> is used as eardrops.	<i>Madhu-Rooksha, Tridoshagna, Vishada, Srothoshodaka, Yogavahi and Anti-inflammatory Kulatha-kaphavatahara</i>	[ <i>Balaroga cikitsamanajri</i> , Chapter 2]

3.2.2.4. *Exclusive formulations*. Some examples of modified formulations seen in these regional textbooks of Ayurveda are *Naliker* *kwatha*, *Bhmasma kanji*, *Varavu kwatha* and *Varattu kwatha*.

*Naliker*/*Karikkin kwatha* mentioned in *Vaidyatarakam* textbook is a *Putapaka kwatha*. It is a decoction prepared in *Naliker 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 *Pramathyakalpna* as well as *Takrakalpna*. Administration of *Mukkudi* in diseases like *Udara* (~ascitis), *Arsha* (~haemorrhoids), [A.K.D 6/24–29] *Grahani* (~IBS), *Athisara* (~diarrhoea), *Apasmara* (~convulsion disorder), and *Visarpa* [V.T 14/9–19] is a speciality of *Keraleeya cikitsa*.

*Bhasma kanji*, a modified *Anna kalpana* is indicated in *shoph* *ha* (oedema) [A.K.D 8/106]. In *Varattu kwatha* mentioned in *Vaidyataraka* textbook, *kalka* 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 *swarasa* obtained from above preparation and administered in fever, cough and chest congestion [V.T 9/124–131]. *Adappu kashaya* is also a similar *prayoga* 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], *Shashtikataila* [A.K.D 17/89–95], *Muttathaila* [V.T 20/109–114], *Bhunanagaditaila* [19] *Panthataila/Eritaila*, [V.T 40/137–144] *Kukkudataila* [V.T 40/123–137] were also practised commonly. *Thambula bhasma*, 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), *Thalapothechil/Sirolepa* (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 '*Chatharu 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 2**  
Certain kriyakrama practised in Keraleeya Balacikitsa.

Kriyakrama	Indication	Textbook
<i>Abyanga</i> (massage) with coconut milk and bath is given with water boiled with tender leaves of <i>Vata</i> ( <i>Ficus benghalensis</i> Linn.).	Healthy baby	[ <i>Arogyakalpadruma</i> 1/43-44]
Body massage of <i>Taila</i> processed with <i>Durva swarasa</i> (Juice of <i>Cynodon dactylon</i> Linn.) and <i>Navaneetha</i> (Butter).	<i>Karshya</i> ( <i>Emaciation</i> )	<i>Yogamrtham</i> [20]
<i>Siro Abyanga</i> (hair oil massage) with <i>Navaneetha</i> . <i>Navaneetha</i> mixed with <i>Durva swarasa</i> is applied.	Healthy baby	<i>Yogamrtham</i> [21]
<i>Siroabyanga</i> with ghee or oil purified by heating with bronze piece (This helps to remove the moisture effectively).	In case of vitiated blood	<i>Cikitsa manjari</i>
<i>Abyanga</i> with oil, which is added with <i>Gairika</i> (Red ochre) and <i>Anjana</i> ( <i>Collyrium</i> ).	<i>Pinasa</i> (common cold) and <i>Jwara</i> (Fever)	<i>Cikitsa manjari</i> -Chapter 13
<i>Thala/Sirolepa</i> (application of herbal paste over scalp) with <i>Rasnadi</i> or <i>Kachuradi</i> or <i>Triphaladi churna</i> .	<i>Keshya</i> (Hair vitalizer) and <i>Krimigna</i> (Wormicide)	<i>Yogamrtham</i> [22]
<i>Thala</i> with <i>Neetumutta</i> (egg of weaver ant) <i>kalka</i> in breast milk and butter [23].	<i>Jwara, Jathrurdwaroga</i> (Disease occurring above the clavicle), <i>Murcha</i> (Giddiness), <i>Pralapa</i> (Delirium)	[ <i>Vaidyatarakam</i> 22/30-31]
Many exceptional <i>Sweda prayoga</i> (fomentation therapies) like- <i>Erandadi Ushmasweda</i> (steaming using water boiled with medicated water), <i>Shasthika pindasweda</i> (using processed <i>shasthika</i> rice), <i>Danyamla dhara</i> pouring warm <i>dhanyamla</i> all over the body, <i>Patrapatolasweda</i> (using leaves).	<i>Thala</i> is indicated in almost all types of <i>visarpa</i> too.	
<i>Sarvangadhara</i> including head with <i>Takra</i> processed with inflorescence of coconut tree and <i>Amalaki</i> .	Epilepsy	<i>Sarvarogacikitsanool</i>
<i>Seka</i> with <i>Mastu</i> (watery portion of curd).	<i>Vatavyadhi</i>	[ <i>Arogyakalpadruma</i> 17/34-38]
Procedures like <i>Padangushta nakalepana</i> (applying herbal paste over toes and nails) and <i>Pada tala</i> (sole) <i>lepana</i> with paste of <i>Padma</i> , <i>Lodra</i> and honey at bed time.	Gastric ulcer	[ <i>Cikitsamanjari</i> , chapter-33]
<i>Seka</i> (pour) with the juice of <i>Bringaraja</i> ( <i>Eclipta alba</i> (L.) Hask) over head and smelling <i>Bhumyamalaki</i> ( <i>Phyllanthus urinaria</i> Linn.). Repeated <i>Virechana</i> is advised with a combination of <i>Draksha</i> ( <i>Vitisvinifera</i> Linn), <i>Vrishchiva</i> ( <i>Boerhaavia diffusa</i> Linn.) and <i>Pathya</i> ( <i>Terminalia chebula</i> Retz.) in honey.	Injury due to <i>Snuhiksheera</i> ( <i>Euphorbia nivulia</i> Buch- Ham)	[ <i>Arogyakalpadruma</i> 26/70]
It is advised to do <i>Vasthi</i> (medicated enema) with <i>Uruba taila</i> and <i>Saindhava</i> .	Diseases affecting vision	[ <i>Arogyakalpadruma</i> 26/11]
Blood letting using medicinal leeches.	<i>Kamala</i> (Jaundice)	[ <i>Arogyakalpadruma</i> 8/70-71]
Draining of pleural fluid from pleural space using <i>Trikurchayantra</i> .	<i>Vridhi</i>	[ <i>Vaidyatarakam</i> 30/60-62]
	Localised swelling over lid	[ <i>Arogyakalpadruma</i> 26/61]
	<i>Urasthoya</i> (Pleural effusion)	[ <i>Vaidyatarakam</i> 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).

#### 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

**Table 3**  
Interview with subject experts.

Formulation	Indication in classics	Indications in practice	Name of Physicians	Tradition
<i>Vatanguradikashaya</i> . [A.K.D 19/43-46]	<i>Ulbarus</i>	Herpes Zoster	Dr.sasikumar Nechiyl, MD (Rasasastra)	Dravidan vaidya tradition, Cherupulassery
<i>Balamrtha Rasayana</i> . [A.K.D 14/37-15]	<i>Charalvarppan</i>	Breast cancer		
<i>Balagopathmajaadikwatha</i> . [A.K.D 18/88]	<i>Visarpa</i>	Lichen planus		
<i>Ksheeridrupalavadi lepa</i> . [A.K.D 14/1,2]		<i>Vidrathi</i> , all stages of tonsillitis	<i>Dr.Manikandan</i> , <i>K. P, BAMS, PGCCH</i>	<i>Chatharu nair vaidya tradition</i> , <i>Mezhathur</i>
<i>Ashtachurna in Marichapramana</i> . [A.K.D 8/28]	Emergency medicine in <i>Udarashoola</i>	It is also given as a preventive drug of many <i>Graha</i> . Asthma.	Dr.B. Prabakaran, DM (Ayu)	<i>Ashtavaidya Guru parambarya</i> , Kannur
<i>Indravalligrtha</i>			Dr. Rajeev Shenoy,	Shenoy vaidya tradition, Cherthala
<i>Shankupushpadikwatha</i> [V.T 6/40-47]	<i>Balapeeda</i>	As a preventive drug in <i>Bala Apasmara</i>		
<i>Kombanjadigutika</i> [V.T 9/71-78]	<i>Jwara, Visarpa, Balapeeda, and Apasmara</i>	As a preventive drug in <i>Bala Apasmara</i>		
<i>Vettumarangutika</i> administered in the form of <i>Gudavarthi</i> (Anal suppository)	<i>Anubutha</i>	To stop Epileptic convulsions		
<i>Cheriyarudrakshadi kashaya</i>		<i>Bala Apasmara</i>		

medical science, *Kaumarabhrithya* developed as a separate branch. After the *Samhita* period, different authors compiled the information available in *Samhitas* and indigenous medicine. Consequently various *Granthas* like *Arogyakalpadruma* were written in regional languages giving utmost importance to the diseases prevalent in Kerala and the drugs available during that period. During the re-fashioning 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 (~immunomodulators), 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 nissaraka* (~expectorant) property. They are *Vyadhikshamatvakaraka* (~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 *Agnivaigunya* (deranged digestion) and thereby pacifies the vitiated *Kaphadosha*. In 10–12 years age group, drugs in *Praakaara yoga* are administered in the form of *Gritha 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 *Yogavahitwa* 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*, *Vyadhikshamatwa*, *Nidrakara*, *Medya*, *Shulagna*, *Grahi* and *Bhutagna* property, predominantly. Eventhough many *Anupanas* are in use, breast milk is considered as the best, as it is *Janmasatmya* as well as *Dhatuposhana*. *Swadupaakarasa* and *Vatapittahara* property of breast milk will provide a soothing effect to the highly *Tikshna* 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*, *Apasmara* 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 pharmaceuticals, 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 main stream 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]. *Padangushtanakra 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.

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## Appendix A. Supplementary data

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

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