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REVIEW ARTICLE **OPEN ACCESS**

Pediatric Fever – An Ayurveda View

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ABSTRACT
Fever is the very cardinal and primary symptoms in many diseases. It's the very initial symptoms force the patients to visit clinician. Children are more prone to develop fever and manifestation of much disease takes place as fever as initial clinical symptoms. Ayurveda the system of Indian traditional medicine defines the fever as separate and primary disease entity under the term of Jwara. Wide range of clinical variation of Jwara has been described in Ayurveda which are described in this text. To describe the Detailed review on childhood fever and Ayurveda Jwara with available literature has been done. Analysis of diagnosis and treatment protocol of different patients of Jwara in Parul Ayurveda Hospital (PAH), Vadodara Gujarat was done. Reviewing of different research article was done for preparation of this manuscript. Description of Jwara in children along with its different types is thoroughly explained in Ayurveda especially in Kashyapa Samhita. All types of Jwara are narrated in very scientific manner and useful to diagnose newer pediatric febrile illnesses. This article is an attempt to highlight the different types of Jwara in pediatric and to increase the utility of Ayurveda diagnostic terms in today's pediatric practice and to improve the child care.
Keywords: *Ayurveda, Fever, Jwara, Pediatric*

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INTRODUCTION

Jwara (fever) is described first among disorders because temperature (or body heat) is a life-sustaining force, and is the first condition afflicting patients of somatic conditions and it affects each and every individual. Atharvaveda (AV) refers to this as '*Takman*' (victimizer) and believes that gods inflict diseases. Several names/varieties of Takman, and a few drugs for its treatment are also mentioned in (AV). *Jwara* has also been referred in other literature like Mahabharata (one of the two greatest epics of India), Brhatsamhitd, Garudapurdna, Agnipurdna etc. It is important to note here that *Jwara* is an independent ailment, per Ayurveda, but also a secondary condition of other diseases, and also an etiology responsible for various diseases [1-4].

IN AYURVEDA:

Aacharyacharak – *Jwara* is described first, because it is the earliest (in appearance) of all the somatic diseases and originated by the anger of "Lord Maheswara" [1]. ***Aacharyasushruta-*** *Jwara* described in *Uttara Tantra* of *Susruta*as the king of diseases. Man comes into the world with Jwara and departs with it. It is such a difficult disease that gods and men could only with stand it. ***Aacharyavagbhatta –***In *Astana Hrdaya, vagbhatta* has given different nomenclature for *jwara* like, *Rogapati, Papma, MrtyuOjosana, Antaka, Krodha, Daksadhvaradhvamsi, Rudrodhbhava, Nayanodbhava, Janmantavayor, Mohamaya, Santdpa, Atmapacaraja* [2, 3]. Narahari, the author of Raja Nighantuhas also given some other names like Jiirti, ltyamara, Rogaprsta, Atanka, Rogasresta and Mahagada.

HISTORICAL VIEW [4]:

Jwara is the chief among diseases and has emerged "from the fiery wrath of Lord Rudra", per Vedic mythology. Explaining its nature, acharya says that it influences an individual particularly at the time of his birth and death. In the Tretayuga when Lord Siva was observing the vow of wrathless, the demons created mischief for thousand divine years in order to put obstacle Daksaprajdpati, the Lord of progeny and father in-law of Siva ignored and did not give due place to Lord Siva in the sacrifice organized by him, in spite of having been advised by the gods to do so. Thus Daksa made the sacrifice devoid of the mantras relating to the Lord of animals and offerings pertaining to Lord Siva which were necessary for the success of the sacrifice. When after completion of the vow, Lord Siva came to know the lacking of Daksa, he the knower of the self, came into the wrathful state and by creating an eye (third one) in his forehead, the potent one reduced all the demons to ashes and created a boy, heated with the fire of anger, who could destroy the

celebrations of the sacrifice, the gods were pained and the living beings afflicted with heat and pains. They were moving here and there in all directions. Then the congregation of gods along with seven sages praised the omnipresent Lord Siva with incantations till Lord Siva returned to his normal benevolent state. Knowing that he is now in the benevolent mood, the fire of wrath submitted to the Lord Siva with folded hands. Now, Sir, what should I do for you? The Lord replied to him. "You will be 'Jwara' in the world during the birth and death and also in conditions of unwholesomeness.[5]

JWARA IN CHILDREN [5]: Kashyapa has mentioned neonatal (Jatamatra) fever, similarly in Kshirapa (breast fed) and Kshiranabhojina (breast + cereal fed) including treatment along with congenials and non congenials for infants suffering from fever. Two types of fever (Sama and Vishama) in Sutra sthan, eight types of fever in Nidana Sthana as well as treatment of JeeranaJwara (chronic fever) in Chikitsa chapter. Unfortunately, both chapters, having description of fever, are missing and Chikitsa chapter contains one page only. Ayurveda although has been considered fever as major disease but children being delicate and more vulnerable to various disorders due to immature Dhatus and deficient in Bala/Oja, are more prone to fluctuations in temperature. Moreover, the causes of fever also differ than adults. Fever caused due to vitiated breast milk; fever due to seizure by Grahas etc. are entirely different than that of adult fever. Ayurveda related material can be traced also in Garuda Purana as Jawara has been termed as king of all disorders and named as Mrityuraja. Similarly, Brahma Vaivarta Purana has mentioned Jwara as superem of all disorders.

SYNONYMS

JWARA- A disease which alleviates body temperature
ROGAPATI- Superior among all disease
ROGARAJA- King of various disease
PAAPMA- Disease caused by previous sinse
MRITYU- Disease which may end in death
ANTAKA-Disease which may end in death
OJAKSHAYA- Disease which destroys oja
KRODHA- Fever is caused by krodha(anger) and associated with krodha.

ETIOLOGICAL FACTORS

- Charka says Jwara has two Prakritis

a) Sharirika (Physical) : vata, pitta , kapha involvement.
b) Mansika (Psychic): raja , tama involvement.

- Both these can also be termed as etiological factors and clarifying it Charka says that the status of body, when there is no vitiation of Doshas, presence of Jwara is impossible. While classifying etiological factors.

CAUSATIVE FACTORS

1) Sannikrishta (proximate) factors: Vata, Pitta and Kapha
2) Viprakrishta (remote) factors:

- Mithya Athara Vihara: (Non-congenial food and life style.)
- Asatmendriyarth – samyoga: overuse, misuse, disuse of sensory and other organ
- Pragyaparadha: Disobedience of natural decisions of intlect.
- Parinama (Kala): Non-obserbance of rules of Dincharya, (day routines), Ritucharya (night-routines) and seasons as described by Ayurvedic texts

Prodromal Features – ***Poorvaroopa*** **[5]** - Laziness, lacrimation, yawning, heaviness, mental fatigue, uncertainty and intolerance about the liking and disliking for the heat, sun, wind and water; indigestion, anorexia, depletion in strength, complexion, and slight change in conduct, are the premonitory signs and symptoms of jwara [6].

SAMPRAPTI (PATHOGENESIS):

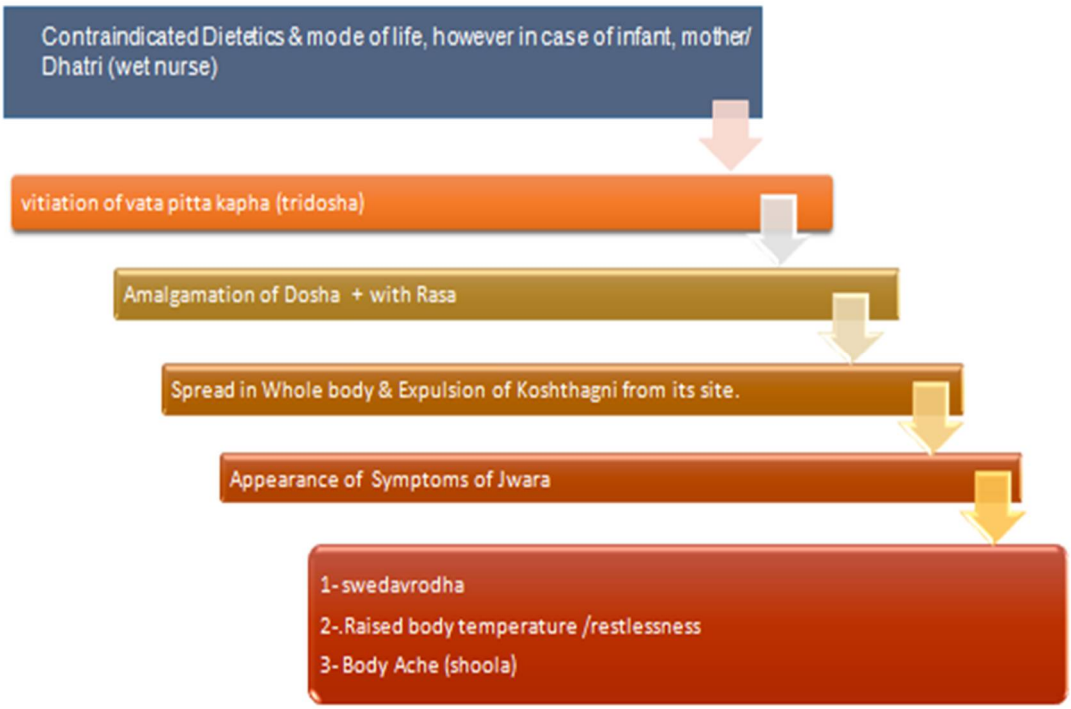

Image (Picture) 1: Jwara Samprapti – Pathogenesis of fever (Ayurveda View)

- Dosha = Single / Two / All Combined
- Dushya = Rasa, Kosthagni
- Adhishthana = *Amashaya*, whole body
- Srotas = *Rasavaha Strotas*

CARDINAL FEATURE: The clinical features invariably associated with *jwara* are the feeling of heat or increased body temperature and discomfort in body and mind. *Jwara* afflicts the whole-body including mind and sensory organs in all living beings.[i] **Usually, the following are the manifestations of Jwara.**

I. Pyrexia (Santapa)
II. Anorexia (Aruchi)
III. Thirst (Trishna)
IV. Bodyache (Angamarda)

Although, being in independent disease, fever is also one of the symptoms of many disorders. Due to this reason no specific etiological factor has been mentioned. Most of the Ayurvedic texts including Charaka Samhita have not provided any specific etiological factor except Sushruta Samhita who has enumerated few etiological factors for causation of fever.

CLASSIFICATION: *Jwara* is classified into two types each on the basis of the following criteria –

- *Sharira* (physical) and *manasa* (mental)
- *Saumya* (predominated by cold) and *agneya* (predominated by heat)
- *Antarvega* (internal) and *bahirvega* (external)
- *Prakrita* (according to seasons) and *vaikrita* (unseasonal)
- *Sadhya* (curable) and *Asadhya* (incurable)

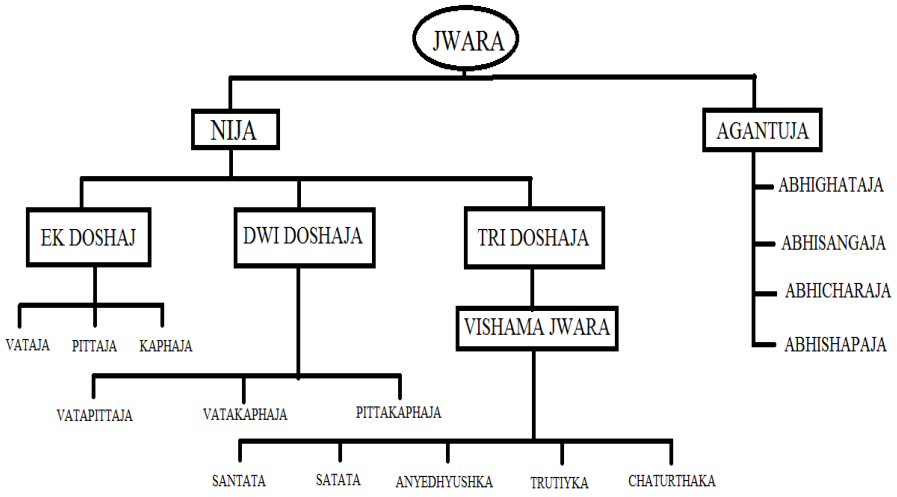

Image (Picture) 2: *Jwara* Types

CLINICAL FEATURES

VATAJ JWARA [7]

	CHARAKA	**SHUSHRUT**	**VAGBHAT**	**KASHYAP**
Fluctuating temperature	+	+	+	+
Dryness in eyes, nails, mouth, etc.	+	+	-	+
Constipation	+	-	+	-
Oliguria	+	-	+	+
Skin dryness	+	+	+	+
Numbness in feet and legs	+	-	+	-
Pricking pain	+	-	+	-
Bitterness of mouth	+	-	-	-
Loss of appetite	+	+	+	+
Excessive salivation	+	-	-	+
Indigestion	+	-	-	-
Yawning	+	+	+	+
Fatigue	+	-	+	-
Vertigo	+	-	-	-
Delirium	+	-	-	-
Sleeplessness	+	-	-	-
Goosebumps	+	-	-	-
Dental hypersensitivity	+	-	+	-
Thirst	+	-	-	+
Sneezing	+	-	-	+
Dry cough	+	-	-	+
Body stiffness	+	-	+	+
Loss of sweating	+	-	+	+

PITTAJA JWARA [8]:

	CHARAK	SUSHRUT	VAGBHATA	KASHYAP
Bitterness of mouth	+	-	+	+
Ulcers	+	+	+	+
Thirst	+	-	+	+
Drowsiness	+	-	-	+
Vertigo	+	+	+	-
Foul smell in breathing	+	-	+	+
Vomiting	+	+	+	+
Diarrhea	+	+	-	+
Loss of appetite	+	-	-	+
Fatigue	+	-	+	-
Sweating	+	-	-	+
Red rash	+	+	+	+

Pallor	+	+	+	+
High grade fever	+	+	-	+
Burning sensation	+	+	-	+
Desired to cold things	+	-	+	-
Delirium	+	+	+	+

KAPHAJA JWARA [9]:

	CHARAK	SHUSHRUT	VAGBHATA	KASHYAP
Sudden onset	+	-	-	-
Gradually decrease in temperature	+	-	+	+
Heaviness	+	+	+	+
Loss of appetite	+	+	+	+
Sweetness of mouth	+	+	+	-
Gabharamana	+	+	+	-
Vomit	+	+	+	+
Sleepiness	+	+	+	+
Coughing	+	+	+	+
Difficulty in breathing	+	-	+	-
Cold	+	+	+	+
Pallor	+	-	+	+
White patches over body/ urine	+	+	+	+
Urge for hot food	+	+	-	-
Body Stiffness	+	-	+	-

Vishama Jwara: i.e. the fever in which: i. Onset (Arambha) ii. Course (Kriya) iii. Duration (Kaala) are irregular, should be considered as Vishama Jwara. As per Sushruta6 in Vishama Jwara, patient behaves as if not having fever but it stays for longer period like garavisha in Dhatus [9].

S.N	Type	Seat	Course	Pattern	Line of Treatment
1	Santata	Rasa Dhatu	Vataja 7 days Pittaja 10 days Kaphaj 12 days	Remittent or Continuous fever 7-10- 12 days	Fasting (*Langhana*).
2	Satata	Rakta Dhatu	Two peaks in 24 hours	Double Quotidian	Tikta Rasa Kashaya
3	Anyedhyushka	Mamsa Dhatu	One Peak in 24 hours	Quotidian	Purgation Fasting
4	Tritiyaka	Meda Dhatu	Every third day	Tetrian	Purgation Fasting.
5	Chaturthaka	Asthi & majja	Every third day	Quartan	Basti (Niruha Anuvasan)

***Sannipatika Jwara* (compound of *Vata, Pitta and Kapha*) :**

Various signs and symptoms as well as different commutations and permutations of all the three Doshas have been mentioned by various ancient Ayurvedic scholars. However, two types of combinations have been described. . Sama- tridoshaya Sannipata.

ii. Visham – tridoshaj Sannipata. Common symptoms under Sama-Tridoshaja have been mentioned whereas in Visham Tridoshaj Samnipata these have been classified as per status of vitiation of Doshas in particular types of Sannipatti in a Jwara.

EXOGENOUS JWARA (AGANTUJA): Such fever is caused primarily due to external influences and not present with Doshika symptoms in early stage.

1. Traumatic (Abhighataja): Due to infliction of blunt/ sharp instruments there may be bleeding or excessive pain is present along with fever.

2. Black Magic (Abhichara) : For the purpose of creating high level pain, uneasyness along with fever certain type of hymns are practised. by the experts.

3. Curse (Abhishapa): Due to showing disrespect to holy persons, sainitly people, elderly persons, many types of undesirable physical and psychological ailments associated with high fever can appear suddenly. The intensity of these depends on gravity and status of the person who is cursing.

4. Psychogenic (Abhishangaja) : Due to indulgence in Kama, Krodha, Shoka, Bhaya etc. psychological factors or by affliction by Grahas, this type of fever appears.

5. Toxic fever (Vishajanya) are caused due to ingestion of poison by chance/ deliberate consumption or got ingested by mixing in food material. Common symptoms are cynosis, diarrhoea, thirst, anorexia, pricking pain, coma etc. along with fever.

6. Drug induced/ Allergic fever (Aushadhagandhaja) is associated with fainting, headache, vomiting, sneezing etc. which can be compared with hay fever or allergic fever.
7. Cupid fever (Kama fever) usually presents with depression, fainting, delirium, excessive thirst, insomnia, chest pain, drowsiness, progressive weakness and weight loss etc.
8. Shokaja and Bhyaja Jwara is commonly associated with loss of appetite, excessive sleep, delerium along with high grade fever. Krodhaj Jwara is associated with tremers and in Bhutabhi-shangaja is accompanied with bizzare behaviour along wtih sudden laughing or weeping and tremers.

MANAGEMENT PRINCIPLE [13]

- *Langhana, Swedana,* is given at time *Yavagu* and Tikta Rasa dravya is given. Pachaka drugs cure *Taruna Jwara*.
- Sweet and blunt drugs should be given with milk.
- very heavy to digest, dry, sour, pungent and very oily druds, diet,or drink should not be given

Formulations used for jwara-

- ***Sudarshana Churna***
- *Guduchi Ghana Vati (Samshamanivati)*
- *Ayush64*
- *Tribhuvanakirti Rasa*
- *Lakshamivilasa Rasa*
- *Trishun(Zandu)*
- *Godanti*
- *Balachaturbhadra* Etc.

FEVER IN PEDIATRICS: Core body temperature is normally maintained within 1° C to 1.5° C in a range of 37° C to 38° C. Normal body temperature is generally considered to be 37° C (98.6° F; range, 97° F to 99.6° F). There is a normal diurnal variation, with maximum temperature in the late afternoon. Development of fever begins with release of endogenous pyrogens into the circulation as the result of infection, inflammatory processes, or malignancy. Microbes and microbial toxins act as exogenous pyrogens by stimulating release of endogenous pyrogens, including cytokines such as interleukin-1, interleukin-6, tumor necrosis factor, and interferons These cytokines reach the anterior hypothalamus, liberating arachidonic acid, which is metabolized to prostaglandin E2. Elevation of the hypothalamic thermostat occurs via a complex interaction of complement and prostaglandin-E2 production Antipyretics (acetaminophen, ibuprofen, aspirin) inhibit hypothalamic cyclooxygenase, decreasing production of prostaglandin E2. The response to antipyretics does not distinguish bacterial from viral infections. The pattern of fever in children may vary, depending on age and the nature of the illness Neonates may not have a febrile response and may be hypothermic, despite significant infection, whereas older infants and children younger than 5 years of age may have an exaggerated febrile response with temperatures of up to 105° F (40.6° C) in response to either a serious bacterial infection or an otherwise benign viral infection. Fever to this degree is unusual in older children and adolescents and suggests a serious process. The fever pattern does not reliably distinguish fever caused by infectious microorganisms from that resulting from malignancy, autoimmune diseases, or drugs. Children with fever without a focus present a diagnostic challenge that includes identifying bacteremia and sepsis. Bacteremia, the presence of bacteria in the bloodstream, may be primary or secondary to a focal infection. Sepsis is the systemic response to infection that is manifested by hyperthermia or hypothermia, tachycardia, tachypnea, and shock .Children septicemia and signs of central nervous system dysfunction (irritability, lethargy), cardiovascular impairment (cyanosis, poor perfusion), and disseminated intravascular coagulation (petechiae, ecchymosis) are readily recognized as toxic appearing or septic.

FEVER OF UNKNOWN ORIGIN

FUO is defined as temperature greater than 100.4° F (38° C) lasting for >14 days without an obvious cause despite a complete history, physical examination, and routine screening laboratory evaluation. It is important to distinguish persistent fever from recurrent or periodic fevers, which usually represent serial acute illnesses. The initial evaluation of FUO requires a thorough history and physical examination supplemented with a few screening laboratory tests. Additional laboratory and imaging tests are guided by abnormalities on initial evaluation. Important historical elements include the impact the fever has on the child's health and activity; weight loss; the use of drugs, medications, or immunosuppressive therapy; history of unusual, severe, or chronic infection suggesting immunodeficiency ; immunizations; exposure to unprocessed or raw foods; history of pica and exposure to soil-borne or waterborne organisms; exposure to industrial or hobby-related chemicals; blood transfusions; domestic or foreign travel; exposure to animals; exposure to ticks or mosquitoes; ethnic background; recent surgical procedures or dental work; tattooing and body piercing; and sexual activity. The etiology of most occult infections causing FUO is an unusual presentation of a common disease. Sinusitis, endocarditis, intra-abdominal abscesses (perinephric,

intrahepatic, subdiaphragmatic), and central nervous system lesions (tuberculoma, cysticercosis, abscess, toxoplasmosis) may be relatively asymptomatic. Infections are the most common cause of FUO in children, followed by inflammatory diseases, malignancy, and other etiology. Inflammatory diseases account for approximately 20% of episodes. Malignancies are a less common cause of FUO in children than in adults, accounting for about 10% of all episodes. Approximately 15% of children with FUO have no diagnosis. Fever eventually resolves in many of these cases, usually without sequelae, although some may develop definable signs of rheumatic disease over time. Common infections causing FUO in patients with known or newly diagnosed immunodeficiency includes viral hepatitis, Epstein-Barr virus, cytomegalovirus, *Bartonella henselae*, ehrlichiosis, Salmonella, and tuberculosis. Factitious fever or fever produced or feigned intentionally by the patient (Munchausen syndrome) or the parent of a child (Munchausen syndrome by proxy) is an important consideration, particularly if family members are familiar with health care practices. Fever should be recorded in the hospital by a reliable individual who remains with the patient when the temperature is taken. Continuous observation over a long period and repetitive evaluation are essential. Screening tests for FUO include complete blood count with WBC and differential count, platelet count, erythrocyte sedimentation rate, C-reactive protein, hepatic transaminase levels, urinalysis, cultures of urine and blood, chest radiograph, and evaluation for rheumatic disease with antinuclear antibody, rheumatoid factor, and serum complement (C3, C4, CH50). Additional tests for FUO may include throat culture, stool culture, tuberculin skin test or interferon-gamma release assay, HIV antibody, Epstein-Barr virus antibody profile, and *B. henselae* antibody. Consultation with infectious disease, immunology, rheumatic disease, or oncology specialists should be considered. Further tests may include lumbar puncture for cerebrospinal fluid analysis and culture; computed tomography or magnetic resonance imaging of the chest, abdomen, and head; radionuclide scans; and bone marrow biopsy for cytology and culture.

INFECTIONS CHARACTERIZED BY FEVER AND RASH

Virus	Bacteria	Rickettsia	Other
Adenovirus Measles Rubella Roseola (HHV-6 or HHV-7) Erythema infectiosum (fifth disease, parvovirus B19) Epstein-Barr virus Echoviruses HBV (papularacrodermatitis or Gianotti-Crosti syndrome) HIV	*Erythema marginatum* (rheumatic fever) Scarlet fever (group A streptococcus) Erysipelas (group A streptococcus) *Arcanobacteriumhaemolyticum* Secondary syphilis Leptospirosis Pseudomonas aeruginosa *Meningococcal infection* (early) Salmonella typhi (typhoid fever, "rose spots") Lyme disease (erythema migrans) *Mycoplasma pneumonia*	Rocky Mountain spotted fever (early) Typhus (scrub, endemic) Ehrlichiosis	Kawasaki disease Rheumatoid arthritis Drug reaction

"After analysis of Ayurveda Jwara and modern fever in detailed it is very clear that, all types of fever can be diagnosed on the basis of fundamentals of diagnosis of Ayurveda Jwara and are very useful to diagnose pediatric fever in modern era."

CONCLUSION

Ayurveda diagnosis of fever is very time tested and rational and useful in today's scientific era for diagnosis of childhood fever.

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