



Review Article

REVIEW ON COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) IN ORAL HEALTH

Janakiram Chandrashekar<sup>1\*</sup>, Balachandran Parvathy<sup>2</sup>

<sup>1</sup>Diplomate, American Board of Dental Public Health, Professor and Head, Department of Public Health Dentistry, Amrita School of Dentistry, Kochi, Kerala, India.

<sup>2</sup>Postgraduate Resident, Department of Public Health Dentistry, Amrita School of Dentistry, Kochi, Kerala, India.

**ABSTRACT**

**Background:** Complementary and Alternative Medicine (CAM) is a cluster of heterogeneous medical and health care systems, practices and products that can be used along with conventional medicine. This review article is about CAM system that is being used in oral health, challenges of such uses and the need for global regulations while using CAM products as medicines.

**Discussion:** These systems are integral part of culture. Ayurvedic therapies are used for alleviating various oral conditions. Herbal mouth rinses and dentifrices are used for plaque control which is the basic process in oral care. Though deficiency exists regarding reports of controlled studies of Homeopathic medicines in pain conditions, Homeopathy is effective in the treatment of idiopathic trigeminal neuralgia. Last decade had witnessed an increasing interest in medicinal plants thereby promoting them as alternatives to standard conventional medicines.

These therapeutics are gaining importance in a global scale. Limited access to conventional oral care, lower costs and general belief of minimal toxicity enhances the use of Ayurveda, Herbal and Homeopathic medicines and therapies in oral diseases. Budgetary allocations for this traditional system care of different countries, designing research programs to focus on traditional medicines and implementation of laws for propagation of CAM systems reflects the global inclination towards this system of healthcare.

**Conclusion:** Considering the broadened scope of CAM therapeutics in dental healthcare, it is recommended that a dental professional be consulted prior to using these products in an attempt to reduce the probability of side effects or drug interactions.

**KEYWORDS:** Complementary and Alternative medicine, Ayurveda, Homeopathy, Herbal medicine, Indigenous, Dental.

**INTRODUCTION**

National Center for Complementary and Alternative Medicine (NCCAM)<sup>[1]</sup> defines the term "Complementary and Alternative Medicine" (CAM) as "a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine." Therefore, while "complementary" medicine can be used together with standard medications, "alternative" medicine is used as a substitute for standard medicines. Furthermore, NCCAM classifies CAM therapies into five categories or "domains."<sup>[1]</sup> These are:

1. Biologically based practices
2. Energy therapies
3. Manipulative and body-based methods
4. Mind-body medicine
5. Whole medical systems

Most of CAM system in oral health care is based on domains such as biologically based practices involving the use of botanical products and whole medical systems like Ayurveda, Homeopathy, Chinese medicine and so on.

**Ayurveda**

According to one of the world's oldest holistic healing systems<sup>[2]</sup> Ayurvedic medicine (Ayurveda for short), health and wellness depend on a delicate balance between the mind, body, and spirit. Ayurveda is based on the principle that every person is constituted by space, air, fire, water, and earth. Combination of these basic universal elements in the human body results in three life forces or energies called *Doshas* namely *Vata dosha* (space and air); *Pitta dosha* (fire and water) and *Kapha dosha* (water and earth). Everyone inherits a unique mixture of this triad. Each of these *Doshas* controls a different body

function [3]. It is believed that chances of getting sick and experiencing health issues are linked to the balance between these *Doshas*.

### Homeopathy

Developed in Germany, this medical system is built on two unconventional theories viz. "Like cures like" the notion that a disease can be cured by a substance that produces similar symptoms in healthy people and the "Law of minimum dose" the notion that the lower the dose of the medication, the greater is its effectiveness [4].

### Herbal medicine

Herbal medicine uses whole plants either as an un-purified extract or through herb combining (polypharmacy). Another unique feature of herbal medicine is that its diagnostic principles are based on treating "underlying causes" [5]. Herbal medicine constitutes the largest proportion of CAM based therapeutics and can be classified based on their evolution, origin and forms of current usage [6].

#### Category 1: Indigenous herbal medicines

Historically, this category of herbal medicines was used in a local community or region and was very well-known by the local population through ages with respect to its composition, mechanism of action and dosage.

#### Category 2: Herbal medicines in systems

Owing to the wide acceptance of their concepts and theories by the respective countries this well-documented category is in practice since a long time. For example - Ayurveda, Siddha, Unani, Chinese and African systems of medicine.

#### Category 3: Modified herbal medicines

This category includes herbal medicines that are described in Categories 1 and 2, but have been modified with respect to their shape, dose, mode of administration and composition. Moreover, these medicines must meet the national regulatory requirements in relation to their safety and efficacy.

#### Category 4: Imported products with an herbal medicine base

This category includes all imported herbal medicines (raw materials and products) for which the national authority of the importing country is deemed to maintain a safety and efficacy data.

### Current status of CAM in Oral health

Estimates from the developing countries shows that around four billion people prefer CAM based therapeutics over others. Also, CAM based systems, which involves the use of herbs, is viewed as an integral part of the culture in those communities [6-9]. However, there is no available data regarding the

practice of CAM based therapies for dental/oral care in this regard.

Over the years, these systems have contributed variety of products for oral and dental uses that can be promoted as alternatives to standard commercial products. Last decade witnessed an increasing interest in the study of medicinal plants and their traditional uses in different parts of the world. Herbs have had a major role in medicine and public health, and this pharmacological potential of plants has been one of the major reasons for preserving the biodiversity [10].

Plaque control is the basic process in oral care and CAM based products can contribute to the formulation of toothpastes and mouth rinses besides alleviating other oral/dental conditions like dental pain/ stomatitis.

### Ayurveda

During the last decade, there have been several studies [11-23] on Ayurvedic formulations for oral/dental conditions. Most these studies were related to herbs or its active ingredients used for chemical control of plaque as in mouth rinses or toothpastes. Though studies have shown the marginal effectiveness of these formulations over standard or conventional products, only few are well designed studies [24]. Most the products are mouth rinses or toothpastes which are over the counter products and not therapeutic in nature.

Seven anatomic locations where 65 varieties of oral diseases can occur as per Ayurveda are - eight on the lips, fifteen on the alveolar margin, eight in relation to teeth, five on the tongue, nine on the palate, seventeen in the oropharynx and three in a generalized form [25]. Oral cleansing, tooth removal, excisions and flap surgeries are ayurvedic procedures for treatment of oral diseases. Besides treatment of orofacial diseases, Ayurveda recommends *Dant Dhavani* (Brushing) [1-3], *Jivha Lekhana* (tongue scrapping) [27], *Gandoosha* (gargling) or oil pulling [1,4,5] and tissue regeneration therapies [6] for the prevention and maintenance of oral health. Patients with limited or no access to oral health care services depends heavily on Ayurvedic treatment and those who have access to conventional oral health care might wish to complement it with Ayurvedic treatment [6,7].

An effective antioxidant *Triphala* (three fruits) is an Ayurvedic herbal formulation of: *Amalaki* (*Emblia officinalis*), *Bibhitaki* (*Terminalia bellirica*), and *Haritaki* (*Terminalia chebula*) in equal parts. Other uses of *Triphala* includes appetite stimulation, reduction of hyperacidity, anti-inflammatory, immunomodulating, antibacterial, antimutagenic, adaptogenic, hypoglycemic, antineoplastic,

chemoprotective and radioprotective effects in addition to prevention of dental caries [32]. Use of Ayurvedic formulations as mouth rinses is supported by well-designed clinical trials and systematic research reviews. Turmeric (*Curcuma longa*), rhizome, often used in Ayurvedic preparations, is being tested as a mouth rinse for oral precancerous conditions [17,18].

Active ingredients like *Neem* (*Azadirachta indica*), Aloe Vera, Thyme, Charcoal, Miswak, Tea leaves, Licorice, Propolis, Clove, Mango, leaves, Lavender, *Bergenia* roots, *Triphala*, *Streblus asper*, Ginger and *Eucalyptus*[8-11] have been incorporated in dentifrices in different cultures around the world and sold as herbal products by local and multinational companies. The efficacy and effectiveness of these active ingredients in reducing dental plaque,

however, has been inconclusive. Systematic reviews have shown that herbal toothpastes are only effective against non-herbal toothpaste but not superior to fluoride toothpaste [22].

Essential oils, polyphenols, Tea tree oil, chamomile, echinacea, myrrh, fennel, ginger, licorice root, witch hazel, nettle leaves, watercress, clove oil, eucalyptus, *Sanguinaria canadensis* (bloodroot), Chinese herbal products and Ayurvedic herbal preparations constitute widely used herbal oral rinses. Herbal mouth rinse is less effective than chlorhexidine in the reduction of gingivitis and its oral risk factors both at short and long-term duration. Chlorhexidine is proven to be a specific agent against oral microflora causing dental caries and periodontal disease. Herbal mouth rinses are widely available in market and are non-specifically recommended.

**Table 1 Various CAM systems products on dental/oral health conditions**

| Ayurvedic/Herbal products   | Oral / dental conditions  |
|---|---|
| <p><i>Euclea undulata</i> (Ebenaceae or Ebony)<br/> <i>Euclea natalensis</i> (family Ebenaceae)<br/> <i>Triphala</i>. It is a combination of <i>Amalaki</i> (<i>Emblica officinalis</i>), <i>Bibhitaki</i> (<i>Terminalia bellirica</i>) and <i>Haritaki</i> (<i>Terminalia chebula</i>)<br/> <i>Streblus asper</i> (Moraceae)<br/> <i>Zingiber officinale</i> (ginger)<br/> <i>Allium cepa</i> (onion)<br/> <i>Annona muricata</i> (Soursop)<br/> <i>Murraya koenigii</i> L (curry leaves)<br/> <i>Vaccinium macrocarpon</i> (cranberry)<br/> <i>Aloe vera</i> (Alebardensis)<br/> <i>Azadirachta indica</i> (Neem)<br/> <i>Mangifera indica</i> (Mango)<br/> <i>Salvadora persica</i> (miswak)<br/> <i>Gymnema sylvestre</i> (Asclepiadaceae)<br/> <i>Psidium guajava</i> (guava)<br/> <i>Terminalia chebula</i> (Haritaki)<br/> <i>Diospyros lycioides</i><br/> <i>Syzygium aromatum</i> (clove)<br/> <i>Curcuma longa</i> (turmeric)<br/> <i>Cinnamomum tamala</i> (Lauraceae, Indian bay leaf)<br/> <i>Ricinus communis</i> (Euphorbiaceae, Castor bean)<br/> <i>Hyoscyamus niger</i> (henbane)<br/> <i>Solanum nigrum</i> (nightshades)<br/> <i>Amaranthus spinosus</i> (Amaranthaceae)<br/> <i>Annona squamosa</i> (Annonaceae)<br/> <i>Cleome viscosa</i> (cleomaceae)<br/> <i>Hemidesmus indicus</i> (Periplocaceae)<br/> <i>Plumbago zeylanica</i> (Plumbaginaceae)<br/> <i>Secamone emetica</i> (Solanaceae)<br/> <i>Tridax procumbens</i> (Asteraceae)<br/> <i>Sanguinaria canadensis</i> (Bloodroot)</p> | <p>Dental caries,<br/>                     Antiplaque agent</p> |

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|---|--------------------------------------|
| <p><i>Jatropha curcas</i>, <i>Jatropha gossypifolia</i><br/> <i>Acacia nilotica</i> (babool)<br/> <i>Solanum surrattense</i><br/> Leek seeds in sesame oil<br/> <i>Ocimum sanctum</i><br/> <i>Punica granatum</i> (Pomegranate)<br/> Propolis<br/> Oil pulling therapy</p>  |                                      |
| <p><i>Heliopsis longipes</i><br/> <i>Ottonia anisum</i> (Piperaceae)<br/> Propolis<br/> <i>Bombax ceiba</i> (silk cotton tree/ Bombacaceae)<br/> <i>Datura stramonium</i> (Solanaceae)<br/> <i>Juglans regia</i> (Juglandaceae, walnut)<br/> <i>Myrica esculenta</i> (Myricaceae, box myrtle)<br/> <i>Ocimum sanctum</i> (Lamiaceae, holy basil)<br/> <i>Urtica dioica</i> (Urticaceae, stinging nettle)<br/> <i>Vitex negundo</i> (Verbenaceae)<br/> <i>Zanthoxylum armatum</i> (Rutaceae)<br/> <i>Zingiber officinale</i> (Zingiberaceae, ginger)<br/> <i>Mentha piperita</i> (peppermint)<br/> <i>Calotropis gigantean</i> (Asclepiadaceae)<br/> <i>Carissa spinarum</i> L. (Apocynaceae)<br/> <i>Ferula foetida</i> L. (Umbelliferae)<br/> <i>Maytenus emarginata</i> (Celastraceae)<br/> <i>Naravelia zeylanica</i> (Ranunculaceae)<br/> <i>Pongamia pinnata</i> (L.) (Papilionaceae)<br/> <i>Rosmarinus officinalis</i> (Rosemary)<br/> <i>Jatropha curcas</i><br/> <i>Nicotiana tabacum</i><br/> <i>Euclea undulata</i> (Ebenaceae or Ebony)<br/> <i>Cocos nucifera</i> (coconut)<br/> <i>Angelica dahurica</i><br/> <i>Annona emarginata</i><br/> <i>Tanacetum parthenium</i> (Feverfew)<br/> <i>Kirkia acuminata</i><br/> <i>Allium cepa</i> (onion)<br/> <i>Allium sativum</i> (garlic)<br/> <i>Murraya paniculata</i><br/> <i>Cynodon dactylon</i></p> | <p>Dental pain</p>                   |
| <p>Macrocarpals A, B, and C (phloroglucinol derivatives of eucalyptus leaves)<br/> <i>Zingiber officinale</i> (ginger)<br/> Propolis<br/> Green tea<br/> <i>Anacardium occidentale</i> (cashew)<br/> <i>Nelumbo nucifera</i> (lotus)<br/> Oil pulling therapy (with sesame oil)<br/> <i>Azadirachta indica</i> (Neem)<br/> <i>Curcuma longa</i> (turmeric)<br/> Cayenne pepper</p>  | <p>Periodontitis<br/> Gingivitis</p> |



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|--|---|
| <p><i>Terminalia chebula</i><br/>Sage (<i>Salvia officinalis</i>)<br/><i>Glycyrrhiza glabra</i> (Liquorice)<br/><i>Trifolium pratense</i> (red clover)<br/><i>Gaultheria procumbens</i> (Wintergreen)<br/><i>Berberis vulgaris</i> (barberry)<br/><i>Acorus calamus</i> Linn. (Araceae)<br/><i>Phyllanthus emblica</i> (Euphorbiaceae)<br/><i>Citrus medica</i> (Rutaceae, lemon)<br/><i>Justicia adhatod</i> (Acanthaceae, Malabar nut)<br/><i>Matricaria recutita</i> (Chamomile)<br/><i>Aerva lanata</i> (Amaranthaceae)<br/><i>Sambucus arborescens</i> (elderberry)<br/><i>Vaccinium macrocarpon</i> (cranberry)<br/><i>Melaleuca alternifolia</i> (tea tree oil)<br/><i>Salvadora persica</i> (Miswak)</p> |   |
| <p><i>Aloe vera</i> (<i>Alebardensis</i>)</p>  | <p>Candidiasis, Dental pain, Herpes simplex infection, Endodontic irrigant, Recurrent Aphthous Stomatitis</p> |
| <p><i>Psoralea corylifolia</i><br/><i>Morinda citrifolia</i> (Indian mulberry)<br/><i>Triphala</i> - combination of <i>Amalaki</i> (<i>Emblca officinalis</i>), <i>Bibhitaki</i> (<i>Terminalia bellirica</i>) and <i>Haritaki</i> (<i>Terminalia chebula</i>)</p>   | <p>Endodontic irrigant</p>  |
| <p><i>Acalypha indica</i> L. (Euphorbiaceae)<br/><i>Acacia catechu</i> (Fabaceae)<br/><i>Achillea millefolium</i> (Compositae)<br/><i>Cordia dichotoma</i> (Boraginaceae)</p>  | <p>Aphthous ulcer</p>   |
| <p><i>Euphorbia hirta</i> (Euphorbiaceae)</p>  | <p>Lip cracks</p>   |
| <p>Homeopathic Products</p>  |   |
| <p>Belladonna</p>  | <p>Dental Pain, dental abscess, bruxism, post extraction, (dry socket)</p>                                    |
| <p><i>Antimonium crudum</i>, <i>Aconitum napellus</i>, <i>Aranea diadema</i>, <i>Calcarea carbonica</i>, <i>Chamomilla</i></p>   | <p>For alleviation of dental Pain</p>   |
| <p><i>Arsenicum album</i></p>  | <p>Gingivitis, Pulpitis and Periapical diseases</p>   |
| <p>Aconite</p>   | <p>Trigeminal neuralgia</p>   |
| <p><i>Calcarea phosphorica</i></p>   | <p>Trismus</p>  |
| <p><i>Calcarea carbonica</i></p>   | <p>For prevention of delayed eruption of Permanent teeth</p>  |
| <p>Kreosotum</p>   | <p>prevention of the decay of deciduous teeth</p>   |
| <p>Belladonna</p>  | <p>Dental Pain, dental abscess, bruxism, post extraction treatment of dry socket</p>                          |
| <p>Naturopathy and other traditional system products</p>   | <p>Oral / Dental Conditions</p>   |
| <p><i>Danggui-Shaoyao-San</i> - Traditional Chinese herbal medicine</p>  | <p>Pain caused by orthodontic treatment</p>   |
| <p>Traditional Japanese herbal medicine - Kampo</p>  | <p>Persistent dentoalveolar pain disorder (PDAP)</p>  |
| <p><i>Houttuynia cordata</i> (HC, Saururaceae) - Japanese herbal tea</p>   | <p>Antibiofilm and Anti-Inflammatory Activities</p>   |
| <p><i>Polygonum aviculare</i> L. (Polygonaceae) - Traditional Mexican medicine</p>   | <p>Gingivitis</p>   |

|   |  |
|---|--|
| <i>Uncaria tomentosa</i> (Rubiaceae) - Traditional Mexican medicine | Direct pulp capping  |
| Clay  | Bhils of Rajasthan use baked clay from the earth                   |
| Ants  | Traditional healing in Cameroon                                    |
| <i>Helianthus annuus</i> (Compositae, Sunflower)                    | Dental phytotherapy in Balkan region                               |
| <i>Rheum palmatum</i> (Chinese rhubarb)                             | Chinese herbal medicine  |
| Aromatherapy agents   | Oral / Dental conditions   |
| Lavender  | Dental anxiety   |
| Essential oil   | Inhibition of biofilm production on the surface of dental implants |
| Pranayama techniques or rhythmic breathing exercises                | Maintenance of oral hygiene and gingival bleeding                  |

## Homeopathy

Therapeutic potential of Hypericum for dental pain control, although suggested by case reports, lacks evidence from clinical studies. Homeopathic treatment is an effective and safe method proposed for the treatment of idiopathic trigeminal neuralgia<sup>[12]</sup>. Lack of stringent research, however, is evident in several studies that evaluate Homeopathic products for various oral conditions<sup>[13,14]</sup>.

Though Homeopathic remedies are commonly suggested for oral care, reports of controlled studies with Homeopathic products for oral care have not been identified. Some of these products that are used for alleviation of toothache is listed in table 1. Homeopathy claims that there is in fact a great deal of evidence for homeopathy being more effective than placebo, but these so called 'evidences' are flawed in one way or another, often due to failure to properly randomize or blind trials<sup>[15]</sup>.

CAM based medicines are believed to be benign thereby minimizing their severe toxicity. Lower costs as compared to those of conventional medications, is another important appealing feature of CAM based medicines. Despite the general belief, use of CAM based medicines can cause severe toxicity.

The use of herbal supplements in North America is steadily growing and it raises concerns regarding their safety, efficacy, and how they provide effective patient care. Around 40% of adults and 12 % of children are using some form of CAM products in the United states<sup>[16]</sup>. In accordance with the present trend of increased acceptability, CAM is popular particularly among women and those in the upper crust of society.

Remarkable increase in the use of herbal products for prevention and treatment of oral conditions is primarily attributed to their appealing

characteristics of being non synthetic. Despite reports on allergy /hypersensitivity reactions, consumers prefer CAM products due to their alleged safety.

## Challenges for Cam in Oral / Dental Care

CAM systems in dental care possess several challenges that need to be addressed. These are:

### Safety

Though natural, CAM based herbs may not always be safe. Various herbal supplements have been reported or are suspected to interact with certain dental drugs. The most notable health risks associated with herbal supplements (for examples garlic, ginkgo, ginseng, and ginger) include hypertension, prolonged bleeding, and the potential for drug-herb interactions<sup>[17]</sup>, which is of concern for patients undergoing both general and local anesthesia. Others are as follows:

- bromelain, cayenne, chamomile, feverfew, dong quai, eleuthro/Siberian ginseng, garlic, ginkgo, ginger, ginseng and licorice interact with aspirin<sup>[17]</sup>;
- aloe latex, ephedra, ginseng, rhubarb, cascara sagrada, licorice, and senna interact with corticosteroids<sup>[17]</sup>;
- kava, St. John's wort, chamomile, and valerian interact with central nervous system (CNS) depressant drugs<sup>[17]</sup>;
- Aphthous ulcers, irritation of lip and tongue, swelling with fever are being reported with some herbal supplements
- Use of echinacea can cause numbness of tongue; Kava is associated with xerostomia; oral and lingual dyskinesia and salivation with yohimbe<sup>[17]</sup>.

In relation to pharmacodynamics, herbal extracts can be considered as drugs as their effectiveness is attributed to their interaction with specific chemical receptors within the body. Owing to

their natural sources, herbal medicines are deemed to be safe with resultant laxity not only in their premarket safety and efficacy testing but also in their exemption from post market surveillance. Despite the perception of being safe, herbal medicines are reported to cause life threatening adverse effects.

### Research

Most of CAM based products are targeted for dental conditions like oral mucositis, periodontitis and dental caries. Topical application rather than systemic use dominates for dental conditions therefore mouthwashes, toothpastes, oral patches and gels have been the most commonly tested pharmaceutical forms. Deficiency of evidence on the action and side effects of herbs in oral environment pose the biggest challenge for its use in oral diseases. Regardless of the large number of in vitro, in vivo and clinical studies testing these materials, only few of them are phase IV clinical trials. This may be attributed to poorly designed, superficial basic research that does not provide evidence to support the clinical testing of derived molecules. Also, there are several practical challenges regarding research centered around CAM system.

### Design issues

- In any standard drug development, a stepwise process of drug testing occurs - a compound is isolated, tested in tissue cultures and animals and then investigated in phase 1, 2 and 3 clinical trials. However, the widespread use of CAM based medicines which are often used in combination and the variability of plant sources not only within the species but also in relation to their growing conditions and biologically active constituents pose a challenge in this regard. Often, indigenous practices over centuries use, by a process of trial and error and claimed benefits from ancient scriptures attributes to the popularity of CAM based therapeutics. In CAM research, there is rarely a strong preclinical basis for dosing, and there are significant unanswered questions about product purity, quality, and active constituents at the time when Phase 3 trials are proposed. So, a tension exists while comparing CAM based medicines using conventional scientific principles which often results in double standards in such comparisons<sup>[18]</sup>.
- CAM based medicines involves multidimensional treatment approaches like counseling, listening, explaining, lifestyle and dietary advices when compared to conventional medicines. However, inability to have double blinding in RCTs often compromise on the scientific evidences of these approaches.

- Existing variations in the comprehension of concept of “disease” and disease criteria between CAM based systems and modern medicine has an undeniable effect on trials involving CAM products. CAM based medicines fully utilize the placebo effects as in providing patients psychosocial support along with physical treatments in order to maximize the nonspecific factor that play a pivotal role in the success of any practice. Moreover, treatments in CAM based medicines are complex consisting of a mixture of active components and specifications regarding their administration.
- To ensure the external validity of research results, the inclusion and exclusion criteria for research participation should be in accordance with existing diagnostic categories in the target population specified by the research question. However, agreement on valid inclusion and exclusion criterias to select a homogenous group of subjects for the trial is difficult due to the diversity in conceptualizations of health and illness across CAM medical systems and populations. It has therefore been suggested that the inclusion criteria of the patient with oral conditions can be based either on modern medicine or herbal medicine diagnosis.

### Evidence

- CAM based products contains a variety of herbs or plant extracts, which accounts for substantial clinical heterogeneity. The term ‘herbal’ is used to collectively refer to all those ingredients that are botanical extracts and which should not be inferred as necessarily therapeutic within the composition of the product<sup>[19]</sup>. For example, if a herb like *aloe vera* or *neem* is added to a toothpaste, the component of *neem* or *aloe vera* which might act against the *cariogenic microflora* is unknown or has been isolated. This plurality of effects results in non-specific action of herbal or botanical extracts. Though studies show that herbal extracts are indicated for their cleansing, astringent, anti-microbial, and refreshing properties, these are non-specific actions<sup>[20-24]</sup>.
- None of the dental professional associations or societies around the world have any guidelines regarding the use of CAM products for dental/oral conditions. This infers the lack of credible evidence in developing clinical practice guidelines for these products.
- Equivalence in efficacy of CAM products (for example, herbal toothpastes or mouth rinses) should be tested against the use of a positive control using standard products (fluoride or chlorhexidine) rather than the use of non-

standard or conventional products. Currently, heterogeneity in methodology and evaluation, including the duration of follow-up and assessment, is hindering the development of synthesized evidences to determine product effectiveness.

- Treatment outcomes in CAM based systems are largely dependent on the patient's participation and is there by individualistic in approach. Hence this system cannot be regarded as generalized standard treatment modality for a population.
- However, CAM based systems claim that effectiveness & efficacy is based on the ancient wisdom of time-tested theories proven by observation, trial and error and experimentation, and that the system had evolved over thousands of years through observation and experience. These therapies have been in practice for thousands of years even before the development of placebo-controlled experiments. Other factors include cultural practices, religious beliefs, past experiences, traditional beliefs and behaviors, influence of friends and relatives, economic consideration and poor health. The recognition of supernatural causes of illness, though a variance with western medicine, has a profound influence in the subscription to CAM based system care.

#### Regulatory

- Though around 70 countries have national regulations on CAM based systems, each country has unique CAM based therapeutics and their regulations regarding licensing, formulation, promotion and trades. Lack of a universal CAM system guidelines and overexploitation of natural resources to meet the high commercial demands, pose challenges to this alternative system of medicine. Deficiency of laws regulating CAM based medicines across countries<sup>[27]</sup>, reflects the voids in evidence and regulations of this vast system thereby highlighting the need for further research in this field.
- Budgetary allocations for CAM based system care and research in different countries and population utilizing the CAM based system reflects genuine public, industrial and governmental interest in this area. China has launched a safety research program focusing on herbal medicine injections from traditional Chinese medicines. South Africa's National Drug Policy has recently included the necessity for investigating traditional medicines. Government of India has established the Ministry of AYUSH (CAM based system involving Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy) for the propagation of AYUSH systems of health care and research<sup>[28]</sup>.

#### CONCLUSION

CAM therapeutic care are not evidence - based substitutes to conventional care or visit to a health care provider for a dental/oral problem. It is advised to consult dental health care provider before using CAM product as it may help the dental care provider to determine whether the product might pose a risk of side effects or drug interactions.

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**\*Address for correspondence**

**Chandrashekar Janakiram**

Diplomate, American Board of Dental Public Health

Professor and Head, Department of Public Health Dentistry, Amrita School of Dentistry, Kochi, Kerala, India.

Email: [sekarcandra@gmail.com](mailto:sekarcandra@gmail.com)

Contact no: +919481789572

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