

EVIDENCE GAP IN ALTERNATIVE MEDICINE

Shivam Bharti¹, Mr. Sujeet Pratap Singh², Mr. Pramod Mishra³,
Dr Tarkeshwar Prasad Shukla⁴

^{1,2,3,4}Department Of Pharmacy, Scpm College Of Pharmacy, Gonda, Uttarpradesh, India.

ABSTRACT

Alternative medicine has been experiencing increased interest from the Public due to lack of balance between the number of patients and healthcare Professionals, leading to an increased workload for healthcare professionals, Diverse side effects of modern medicine, no complete remission for some chronic Diseases, exorbitant costs associated with newer drugs, and emerging new dis-Eases. Hence, people have begun to depend on treatment systems dominated by Alternative medicine or herbal medicine through traditional medicinal practitioners. Alternative medicine has grown by leaps and bounds over time, and it comprises several millennia of therapeutic systems. Major areas of alternative medicine involve mind-body therapies, body manipulation, and therapies based on Biological systems. The most popular therapies naturally-based remedy are celebrated for the abundance of effective pharmacological active phytochemicals that Nature has endowed us. These phytochemicals have diverse specific clinical .Health benefits-potential benefits include antioxidant, antidiabetic, anti-inflammatory, anticancer, anti-infectious, and analgesic effects. Besides, alternative. Medicine provides easy accessibility, low-cost treatment options, organically uninvasive, and that tonic under terminal conditions for some diseases. The lack of Well-designed clinical trials means that the effectiveness and safety of many alternative medicines/therapies are still vague, notwithstanding their traditional Use for millennia. This chapter will critically assess main areas of alternative Medicine, its uses, safety and regulation, current challenges and future perspectives.

1. INTRODUCTION

Alternative medicine is a holistic approach in its recognition as a heterogeneous set of products and practices, with powerful healing effects. However, they remain to be the oldest yet traditions co-op ante bellum for curing some disorders [1]. Earlier estimates suggest that over two-thirds of the world's population have sought health care and services from antiquated alternative medicine over modern medicine. Current statistics indicate that half of the people worldwide depend on alternative medicine, including 42% in the USA, 48% in Australia, 70% in Canada, and 49% in France, as shown in Figure 1 [3, 4]. Despite current advances in modern medicine, the recourse to alternative medicine remains concentrated on treating life-threatening epidemics such as the new coronavirus disease-COVID 19, for which, so far, no approved systematic therapy exists. The renewed public interest has taken great life from the lack of curative treatment for several emerging and chronic diseases, high cost of modern drugs, time constrain from both patients and healthcare providers, microbial resistance and side effects of modern medicine. In the medical panorama, the most common methods of AM consist of self-medication, traditional healing practices, indigenous systems of medicine particularly ayurveda, herbal preparations, unani, homeopathy, acupuncture, naturopathy, chiropractic manipulation, etc., which have made AM quite popular. In contrast, the underlying idea of modern medicine signifies symptom-oriented care, loosely using pharmacological or invasive procedures of elimination in tight spots. Although AM is not assuredly safe, effective, nor biologically plausible, there is a debate regarding which method can be claimed as useful and safe. It is worth noting that old records provide testimonials about alternative modes, while comprehensive clinical trials across the spectrum provide glue to conventional modes based on modern approaches. We find guidelines that have helped shape most of the practice of modern medicine; several physicians are now open to the benefits of both forms of medicine, incorporating such effective complementary approaches and modern ones into their work with patients, symptoms, and circumstances. This has led to the development of a knowledge bridge among physicians, traditional practitioners, pharmacists, and patients about AM treatments, their safety, usage, and toxicity or contraindication. In this regard, investment in research activities, minimizing publication bias, protecting patents and intellectual property rights, and the contribution of policymakers are required to decide the future of alternative medicine so that cost-effective treatments can be provided. This would effectively place AM industry's standing with gaining public acceptance in the near future. In this chapter, different areas of AM, its uses, safety and regulation, current challenges, and future perspective are discussed.

Areas of AM

The National Center for Complementary and Alternative Medicine (NCCAM) has characterized the complementary and alternative medicine (CAM) as a community of various medical practices, methods and products currently excluded from modern medicine [14]. NCCAM has also categorized AM branches into five main groups: traditional medical

techniques, such as whole medical systems; mind–body therapy; biological substance-based treatment; manipulative and body-based treatment; and energy medicine.

2. WHOLE MEDICINE SYSTEM

The whole medical system is a well-fledged theory and practice that works either independently or along with allopathic medicine. The modalities consist of different groups of treatments that are in operation in diverse communities around the world. Indian Ayurveda and Traditional Chinese Medicine (TCM) are essentially practiced in the East while homeopathy and naturopathy are predominantly used in the West [16].

Ayurvedic medicine

Ayurveda is an extensive medical system that upholds the triad of body, mind, and soul as key to the effectiveness of an individual's well-being. It focuses more on sustaining health than on battling the disease. A variety of Ayurvedic herbs or medicinal plants, like turmeric, ashwagandha, amla, black cumin, rhubarb root, triphala, and kumanjam, are recognized for treating various ailments such as cardiovascular conditions, cancer, neurological disorders, and diabetes [17, 18]. More research with systematic investigation is required to evaluate the efficacy of the therapies used in Ayurveda.

Traditional Chinese medicine

Traditional Chinese medicine (TCM) started thousands of years ago in ancient China and continued to flourish over the centuries. Other systems, similar to which these treatments help to treat ailments, have developed in Japan, Korea, and Vietnam, as well [20]. TCM consists of a wide array of therapies, including acupuncture, moxibustion, Chinese herbal medicines, nutrition, t'ai chi, qi gong, and massage. Among these, the ones most frequently practiced are Chinese herbal medicine, t'ai chi, and acupuncture.

Chinese herbal medicine

Chinese herbal medicine re-establishes the command over the body, and the balance of qi, yin, and yang in human beings. Qi is considered to be an energy of vital force which runs throughout the human body through meridians. Yin is slow and cold and passive in strength, while yang is more exciting, hot, and active in nature. Chinese herbal formulas show some benefit by way of regulation of the state of the body. Several herbs tonify qi to treat the syndromes of qi deficiency. Some herbs tonify yin for yin deficiencies, and Phlegm-suppressing herbs for phlegm syndrome. While classical Chinese medicine, depending on context, also utilizes alternative

Forms of medicine such as powders, herbs, tablets, tonic teas, etc. The knowledge of plants used for medicinal treatments comes in different forms, as with the use of Chinese herbal medicine being predominantly used therapeutically as remedial intervention for restoring or bettering health by activating the immune response before the rise of diseases.

Acupuncture

Acupuncture is a form of AM originated in China over 2000 years ago. By inserting hair-thin needles through the skin at specific points on the body, acupuncture is commonly used to curb pain or stress. Traditional Chinese medicine explains acupuncture as a technique for balancing the flow of energy or life force each according to Yin and Yang. Acupuncture practitioners believe that the human body has more than 2,000 acupuncture points connected around 12 pathways or meridians each associating with different organs such as heart, liver and kidneys. Inserting needles into the skin at specific points along the meridians acts to rebalance the flow of energy. As a result of our contemporary lifestyle, a good deal of physical troubles arise because of inadequate physical exercise, unbalanced diet, and lifestyle. The positive effects of acupuncture against metabolic diseases, inflammatory conditions, and digestive disorders are numerous.

T'ai chi

Tai Chi is another type of AM of traditional Chinese medicine initiated during the 13th century in China. It is a highly appreciated movement therapy that helps with recovery through breathing and the slow movements of the body. From studies, the benefits of t'ai chi include improvement of mobility and balance and the relief of tension and anxieties [27]. There is evidence that tai chi improves the quality of life for patients with chronic diseases [28]. Numerous controlled and uncontrolled trials have shown the effects of tai chi on several health conditions and diseases, such as cardiovascular disorders [29], diabetes, osteoarthritis [30], anxiety, insomnia, functional mobility, and fall prevention [31, 32]. The benefits of Tai Chi are most significant prior to the development of a chronic illness or functional limitations. Tai chi is quite safe, and no expensive apparatus is needed for practice.

Naturopathy

Naturopathy is an integration category of AM by combining traditional volition and health care approach, became popular in Europe during the 19th century. It is a characteristic manner of treating the patient while maintaining

homeostasis, one that digs into the cause of and treats illness. Although in other branch of allopathies or holistic therapies each therapy is right for certain conditions, naturopathic practitioners tend to act on the self-healing process to achieve this by improving lifestyle, diet, and nutrition [33]. Some of the most common naturopathic therapies include physical treatments (light therapy, ultrasound and electric current), dietary supplements, homeopathy, medical counseling, hormone therapy and individualized treatment modalities designed to contribute to the relief of mental and emotional stress.

Homeopathy

Homeopathy is another school of AM established in the mid-19th century. The English term ‘homeopathy’ is derived from the Greek: homoios, meaning ‘similar’, and pathos, indicating ‘suffering’. Homeopathic medications cure disease by triggering the body’s natural defenses rather than the opposite. The essence of homeopathy is that like cures like. In other words-who she is good at a substance capable of producing similar symptoms in a healthy living organism, then in that context, under certain circumstances, in very small doses, the same substance could cure those symptoms (‘similia similibus curentur’) [36]. Hahnemann expressed that treatments for a given disorder could produce unwanted effects similar to the disorder itself to evoke a homeostatic or corrective response to amend those disorders [37]. The whole system of this trade is based on the so-called “minimum dose law”-the greater the dilution, the lesser the active potency. Most homeopathic treatments contain active ingredients diluted beyond and beyond the point at which any actual amount remains in a final treated product.

Mind blowing therapy

The mind possesses an aptitude for initiating changes in physical and biological processes. An attempt was made to balance and moderate the power of mind, body, spirit, and attitude through the so-called mental-body modality.

There is a vast number of treatments designed to stimulate the mind and body, whose strengths are harnessed in order to maintain wellness and to decrease impairments of health. Examples of mind-body therapies are relaxation, meditation, yoga, breathing therapy, hypnotherapy, cognitive behavioral therapy, and visualization. Through the effective treatment of patients with anxiety by music, movement, and dance therapy, while hypnosis, acupuncture, and music therapy have emerged as successful treatments for depression and anxiety in cancer patients.

Biology based therapy

Natural and biological-based practices are substances from nature or living things that serve to improve, control, and regulate the health of a human being. Out of these herbal preparations, being common in the United States are most interesting as alternative medical care. This kind of therapy acts by raising the immune power of the body to combat cancer, infection, and other diseases. Botanicals, nutritional supplements such as vitamins and minerals, probiotics, prebiotics, fatty acids, proteins, amino acids, and functional foods are the kinds of supplements that are used in biological-based therapy.

Manipulative and body based therapy

Manipulative and body-based practices rely heavily on systems of the body including joints, bones, musculature, circulatory, and lymphatic systems. It is through these manipulative therapies that the body gets to apply its own modalities for regulation and/or healing. The various manipulative and body-based methods in use today include but are not limited to massage (aiding in the normalization of the body’s soft tissues), reflexology, cranio-sacral therapy, chiropractic (which examines the interaction between spinal structure and functions), Rolfing, and osteopathic manipulation. These therapies provide the body’s energy to expel toxins from the system.

Energy therapy

Energy therapies are based on the ideation of the existence of vital life energy or electromagnetic energy that flows through the body. Energy therapies attempt to restore energy balance within the body by unblocking its energy channels. In traditional ancient systems of Chinese medicine, energy therapies emerged as a means of alleviating pain, reducing anxiety, and relieving the side effects of cancer treatment. Energy therapies work either on the biofields originating within the body or on electromagnetic fields derived from other sources. Hands up and down and remote therapies are among the different techniques included in this category of energy medicine. Biofield therapy aims to activate force fields called biofields, covering and penetrating the body, although experimental proof of their existence is awaited. Different types of energy treatments manipulate those biofields via techniques either in which pressure is placed upon the body or lie under the hand, for example, the ‘hands on’ or ‘hands off’ therapeutic touch. Different kinds of energy treatments can stimulate the biofields surrounding and penetrating the human body whether in acting with controlled or gentle strokes or in applying other auxiliary means. Qigong is one of the ancient Chinese arts that integrate subtle physical actions with deep breathing and mental focus to regulate the human body. A merger of body and soul is accomplished very effectively and productively. Another type of energy therapy recognized as bioelectromagnetic

therapy is based on an electromagnetic field used to treat or prevent diseases and promote health and longevity. It can be given in isolation or in association with any combination of therapy. It involves various forms of magnetic fields, pulsed fields, and direct or modified electric sources for treatment of many varying ailments, including such diseases as asthma, cancer, and migraine pain.

Use of Am in different ailments

Alternative medicine blossomed during the last few decades. Its general use among Chinese and other Asian patients in Korea, Taiwan, Singapore, India, and Hong Kong is commonplace. In quite a number of instances, AMs are frequently employed to manage some chronic diseases, such as diabetes, cancer, cardiovascular diseases (CVD), asthma, menopause, rehabilitation, and autism spectrum disorder, among others. The knowledge, attitudes, and practices of being influenced by certain factors have been proved to be important in influencing the use of alternative medicine. What follows describes the spheres of application of A.M.

3. MANAGEMENT OF INFLAMMATION

The body naturally becomes active in answer to other stresses through infection, irradiation, chemical, or physical injury. Short-term inflammation is protective to the body; however, when inflammation persists thus, damaging the body's healthy cells, tissues, and organs, the consequent cascade of social diseases like arthritis, Alzheimer's disease, and extremely cancer manifests [65-66]. The conventional approach to managing inflammatory diseases, by and large, has been nonsteroidal anti-inflammatory drugs (NSAIDs), which include COX-2 inhibitors or steroid hormones, especially corticosteroids. It is noted that most of the NSAIDs have safety issues, but long-term use may complicate other diseases such as stomach ulcer, hemorrhage, liver or kidney dysfunction. According to the reports by the National Kidney Foundation, nearly 10% of kidney failings each year are directly connected to excessive use of NSAIDs. The treatments used in the AM (Alternative Medicine) for chronic inflammation include various practices based on antioxidative alternative medicine for centuries and even into millennia, especially dietary supplements and therapies with natural products. Some strong scientific evidence recommends the use Surgery with radiation and chemotherapy and/or immunotherapy are most common treatment modalities in managing cancer. However, these therapies come with plenty of side effects to a majority of cancer patients, including fatigue, skin problems, hair loss and low blood count [83]. This therefore attracts cancer patients and health care practitioners towards using a wider approach such as AM as a possible management option for chemotherapy and radiation-induced symptoms [84]. AM may confer a range of health benefits, such as the management of symptoms of disease, prevention of illness or enhancement of immune functions [85]. Noticeably attested and safe alternative practices include acupuncture, aromatherapy, massage therapy, exercise, hypnosis, meditation, music therapy, various relaxation techniques, tai chi and yoga [86]. AM perfused widely among all cancers is most prevalent in breast cancers (93%), followed by colorectal, prostate and lung cancers (83%/77%/77%) respectively. Out of the four cancers studied, dietary supplements were the leading alternative modality (52%-82%) while energy medicine, mind-body medicine and body-based therapy with significance of 39%-55%, 16%-52% and 14%-42% were present [87,88]. Though AM does not seem to become strong enough to encroach on modern medicine, it still may be advocated for usefulness in parallel with modern medicine to achieve better management for patients with cancer symptoms. Some of the commonly used alternative practices in various symptoms while caring for cancer patients are

- Hypnosis, massage, meditation, prayer, relaxation techniques for mainly alleviating the patient's anxieties [89].
- Exercise, message, relaxation techniques and yoga are reducing fatigue and improving quality of life in cancer patients of products such as omega-3 EFAs (ω -3) as an alternative and/or complementary agent to NSAIDs [70]. For muscle soreness, capsaicin has been used locally for other traumatic painful injuries as well. There are epidemiological studies providing strong correlational evidence suggesting that plant polyphenol-rich diets such as red and blueberries, green and black teas may protect the body against several diseases, including cancer, cardiovascular diseases, diabetes osteoporosis, and neuro-degenerative diseases [71,72]. Other alternative practices, such as exercises, mind-body therapies such as t'ai chi, qigong, yoga, meditation, massage, acupuncture, and moxibustion, reduce the pain by decreasing proinflammatory cytokines in circulation, such as (IL)-6, IL-18, C-reactive protein, and other circulating inflammatory cytokines like (IL)-1 α and TNF- α , through their regulation of the expression of both proinflammatory and inflammatory cytokines.

Asthma treatment

Asthma is a common respiratory disease with chronic inflammation of the respiratory system affecting over 300 million people worldwide and 25 million people in the USA, including one in ten (10%) children. Common symptoms include wheezing, coughing, shortness of breath, and chest tightness. Even with the advent of modern medical treatments and the associated treatment modalities, many patients have turned towards alternative treatment approaches for respiratory

diseases. Types of alternative medicines used in asthma therapies include herbs and supplements, yoga, relaxation therapy, and biofeedback. Herbal products and dietary supplements have been used for thousands of years for respiratory ailments. Ethnobotanical Survey of Nigeria found 87 local medicinal plant species belonging to 39 families, used for the treatment of cough associated with respiratory diseases. Whole plants preferred for, as well as leaf, root, fruit, etc., are the coverage of the species promoted for treatment of respiratory diseases. The extract of Korean ginseng root has a probable role in treating inflammatory lung diseases. Some Chinese herbs, such as ding-chan tang, may decrease the intensity of inflammation and relieve bronchospasm. Fruits of *Momordica charantia* L. are used for cold, cough, tuberculosis, and asthma. Again, caffeine is a natural and mild bronchodilator that can enhance airflow in patients with asthma. The benefits of supplementation may include magnesium and fish oil (omega-3 fatty acids), vitamin C, D, and E could, therefore, reduce inflammation and help alleviate asthma symptoms. Moreover, both breathing exercises in yoga and massage therapy can control breathing and relieve stress. While a great deal of research is undergoing for this subject, therefore far the findings tend to reveal considerable improvements of the diseased conditions yet some show many natural and over-the-counter products to have possible side effects.

Management of cancer

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Management of blood pressure and CVD

Cardiovascular diseases represent a vast chunk of deaths all over the globe. Though modern progressive western medicine has largely succeeded in the treatment of CVDs, yet complications and disease recurrence have often compromised patient's quality of life. In this regard, alternative medicine has been seen as a treatment modality that has caught great attention relative to these chronic CVDs, with the prospect of long-term benefits through symptomatic relief, rehabilitation, and preventative measures against these diseases.

Many natural products restore cardiovascular homeostasis more directly to improve lipid profiles and vascular reactivity and to reduce undesirable immune responses [95, 96]. Diet should be regarded as a cornerstone of preventive medicine at least to a certain extent for the treatment of blood pressure, cardiovascular diseases, and other chronic diseases [49]. Certain dietary supplements, including fish oil, multivitamins, and coenzyme Q10, have rank in the highest class of preventive medications [97].

Beyond dietary strategies, some other non-pharmacological modes of treatment have been shown to decrease blood pressure. These approaches can be broadly categorized into three groups: behavioral therapies (e.g. meditation, yoga, biofeedback); noninvasive procedures or devices (including device-guided breathing modulation, acupuncture); and exercise-based regimens, including aerobic, resistance, and isometric methods [98].

Alternative medicine for management of anxiety or sleep disorders

Anxiety disorders are the most common psychiatric condition, with the lifetime prevalence estimated at 29 percent in the general population [105]. Because of the very high incidence and clinically significant comorbidity associated with the incidence of sleep disorders, when such disorders are coupled with insomnia, it raises special barriers in older individuals because of adverse effects on physical and mental health and, therefore, poorer quality of life, with important clinical implications in conditions such as obesity, diabetes, hypertension, cardiovascular diseases, and neurological diseases [106]. The treatment of anxiety or insomnia has been greatly documented and is known to result in an

improvement not only in the comorbidity but in several other instances as well. Alternative therapies for insomnia would include herbal remedies, supplements, relaxation and meditation, acupuncture, and exercise. Herbal- or nutritional-based interventions and mind-body therapies constitute the most frequently utilized interventions. Some, like herbal supplements particularly valerian root and chamomile, may facilitate faster onset of sleep and elevate sleep quality, yet more research is warranted concerning safety and efficacy [107]. Melatonin is the main natural hormone of the sleep-wake cycle and is a biogenic amine synthesized from serotonin in the pineal gland regulating numerous biological functions such as circadian rhythm, sleep, stress response, aging, and immunity [108]. Aromatherapy with lavender (*Lavandula angustifolia*) has been reported in a case of an older adult to elevate serum melatonin levels as evidenced by nonrandomized clinical trials [109].

Treatment of menopause

Hormone therapy is among the most effective treatment strategies for managing the symptoms of menopause. However, due to risks of stroke, heart attack, and cancer, many of them have to avoid hormone therapies. Here, AM would be favourably considered for symptom relief [51]. There are several alternative interventions to treating menopause. Broadly though, these may be separated into two diverse types: a) the first is comprised of various mind-body techniques such as meditation, hypnosis, cognitive behavioral therapy, biofeedback, yoga, and tai chi for proprioception and physical body awareness which promotes relaxation of the body and calmness of the mind and secondly, their undeniable health benefits such as pain relief, alleviation of stress and anxiety, and lifting of the mood. The second main type of intervention is what are termed natural products interventions such as herbs, vitamins, minerals, and dietary supplements [51, 119]. Apart from these categories, there are currently some well-utilized types of AM, examples being traditional Chinese medicine, reflexology, acupuncture, and homeopathy [120]. There are a number of studies that indicate mind-body practices such as hypnotherapy, meditation, relaxation, etc. are beneficial in reducing problematic menopausal symptoms [119, 121]. Therefore, AM may positively enhance the quality of life in women particularly in the transition to menopause. Finally, in spite of the fact that natural products like herbs, vitamins, minerals, and so on are commonly used as a remedy for menopause-related symptoms, consistent evidence validating SAC safety and efficacy is still elusive [122].

Management of rehabilitation

Patients undergoing rehabilitation with musculoskeletal conditions commonly utilise complementary medicine or vertical therapy modalities. Massage therapy, acupunctures, manipulation of medicine, yoga and pilates, mind-body medicine, effleurage, petrissage, friction, tapotement, and vibration therapies are generally common remedies [52, 123, 124]. Massage therapy is one of the most commonly used treatments by athletes to enhance recovery and performance, particularly after training [123]. The benefits that can come from therapeutic massage include, but are not limited to, relief of muscle tension and stiffness, healing of sprains and strains; the reduction of muscle spasms, swelling, and pain; the improvement of flexibility and range of motion; and, more, are somewhat endless [125-126].

Treatment of autism spectrum disorder

Autism spectrum disorder (ASD) is biologically a heterogeneous group of neurodevelopmental conditions that are characterized by impaired social interactions and communications, restricted, repetitive, and stereotyped patterns of behavior and interests [127]. Genetic and environmental factors are commonly believed to play a central role in the etiology of ASD without clear pathogenic correlations to date [128]. Autism is lifelong, and although a causal treatment is not yet known, AM may present a potential additional approach to relieve some of the symptoms that trouble autism spectrum disorder patients. Biologically based therapy including dietary supplements (vitamins and minerals), herbal medication (meadowsweet, calendula, chamomile, marshmallow root, and lemon balm, etc.) can be adapted to ASD treatment.

Mind-body medicine, obliquely, includes prayer, yoga, music, dance and art in general, manipulative and body-based practices (massage, chiropractic care, and acupuncture), and energy medicine include reiki and homeopathy [129]. Whereas music therapy showed a quite strong correlation with autistic children, the Cochrane meta-analysis showed significantly improved cooperation and communication skills with music listening in autistic children [130]. Another research indicated that music therapy may offer an initial and consistent therapeutic approach for children with delayed speech development [131].

While some trials regarding alternative therapy (e.g., equine therapy) have gained credence in scientific circles, in general, many of them do not provide enough evidence to assess the safety and efficacy of AM [9, 132]. Hence, a combination of standard conventional medical therapies along with safe alternative approaches such as diet, exercise, and lifestyle modification may be beneficial for patients suffering from functional disorders such as autism.

Prevention or treatment of COVID-19

COVID-19 is considered as a life-threatening disease, which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [133]. To date, it has been accounted as a global public health emergency and declared as a pandemic by World Health Organization (WHO) as there is no specific antiviral treatment available in the modern medicine system [5, 19]. Although several attempts have been initiated after the disease onset, truly effective vaccine is still unavailable [134, 135]. A few vaccines exist in the market but the safety and efficacy need further scrutiny using multi-site clinical data [134]. Under this circumstance, a more rational phytotherapeutic choice to the disease may be a cheaper option for prophylaxis or treatment against this virus [136]. Strikingly, the phytochemicals of *Momordica charantia* L. and *Azadirachta indica* have been recently shown adequate inhibitory potential against SARS-CoV-2 when compared with FDA reference drugs such as ribavirin, remdesivir and hydroxychloroquine [137]. In China itself, the total number of confirmed cases treated by TCM has reached 60,107 [138]. Indian government ministry of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy (AYUSH) recommended homeopathy and ayurveda for prophylaxis and unani medicines for symptomatic management of COVID-19 [139, 140]. In Bangladesh, herbal and fruit extracts have been used to get relief from COVID-19. Infected people are advised to drink masala tea, ginger tea, and lemon with hot water for recovery [141]. It has been shown that Chinese, Indian and Iranian herbal medicine with 1000 years' experience in the prevention of pandemic and endemic infectious diseases are worth learning, and provide alternative candidates for controlling patients with COVID-19 infection [19, 142]. As there are no effective treatments for COVID-19, it provides one of the biggest opportunities to test different plants and discover new targeted bioactive compounds for therapeutic management of this disease.

Safety and regulatory issue of AM

Although more than 80% of sick individuals in developing nations count on AM for primary healthcare, or as a modality of traditional medicine [143], scientific evidence regarding possible toxicity is scant for many kinds of AM [9]. Above all, most of the AM remained untested with either poor or no safety and effectiveness monitoring [144]. Additionally, doctors and nurses did not receive much training to express possible side effects and contraindications to their patients [145]. Again, not all health professionals are in favor of integrated health methods, nor do they have much confidence treating in CAM due to the unclear notion of standardized practices and the larger benefaction of holistic approaches. However, most patients who use CAM methods are reluctant to tell their primary health care provider about it lest the provider is displeased with them for it [145]. Furthermore, prescriptive accounts notwithstanding, these biological substances are subjected to neither rigorous testing for safety nor efficacy in a pharmaceutical context, owing to the fact that FDA's approval is not mandatory for new therapeutic components [146]. Suppliers only simply need to declare the safety, purity, and contents of a dietary supplement through labeling prior to marketing. However, a few medicinal plants can be toxic in their essence. Herbal products can induce side effects such as hypersensitivity reactions, cardiovascular events, neurological dysfunction, liver and kidney failure, and the development of malignant disease due to contaminants such as mercury, lead, arsenic, corticosteroids, and poison standard organic substances [147, 148]. Adverse events may also arise, due to ignorance, from the unwise selection of a species of medicinal plants, incorrect dosage, interaction with other drugs, and mistake in the administration of herbal medicines [144]. For instance, the herbs arnica, black seed, and feverfew have been shown to stimulate uterine contractions and to potentially induce abortion in pregnant women [149, 150]. With that in mind, therefore, it would be most beneficial for the health care fields to avail training opportunities for practitioners and share with their patients information on the possible interactions of AM with modern treatments. The outcome may be that other health care providers gain more powers to enable them to follow the guidelines, given the knowledge of AM usage, safety, and efficacy, as well as an increased awareness in their evolution.

The current marketplace of AM

In accordance with an analysis conducted in 2019, the worldwide demand for AMs stood at USD69.2 billion and is increasing on a daily basis. Various energy healing therapies comprise reflexology, reiki, and havening techniques; these are increasingly being used for the treatment of patients suffering from anxiety and mood disorders in various countries. Nowadays, many magnetic therapies—such as bioflex magnets, mattresses, and magnaplore—for pain alleviation have gained popularity. Other alternative therapies, such as yoga, meditation, and spas, have become more globally recognized due to their popularity, which has led to increased numbers of yoga studios, meditation centers, spas, and complementary healing institutes in specific communities [154-156]. Moreover, some alternative medicine services are now offered as benefits in state Medicaid programs, Medicare, and private health insurance plans [157, 158]. Research shows that 50% of the American medical schools are currently offering courses in alternative medicine to their medical students. Among them, 25% of the courses mentioned personal growth or self-care through alternative practices, while 11% mentioned inter-professional education activities in which alternative medicine providers participated [159]. A government initiative could serve a vital role in the promotion of CAM. In India, the “Ministry of Ayush” has been set

up by national authorities to control research, development, enhanced funding opportunities, education, and other facilities that relate to Ayurveda, yoga, naturopathy, and homeopathy [154]. Consequently, the expensive existence of mainstream treatment and governmental facilities devoted to alternative therapies may act as an encouraging factor for companies to invest in alternative medicine markets.

Major challenges for AM

We nevertheless face great challenges to integrate AM successfully into the contemporary biomedical treatment system, despite its growing publicity and vision change overall. Despite the great prospects that NCCAM of NIH opened to AM research over two decades, scientists still found it exceedingly impossible to elucidate the safety and efficacy of AM, with work dating back thousands of years of clinical research questions against culture and other fields of interests [160]. The highly complex and intricate, multivariate and multifaceted interplay of AM systems sustains the need for innovative maintenance for further thorough, complete, and better-design studies. The controlling tendencies imposed upon AM research by biomedicine are bound to be neither expanded nor prolonged [161]. For the exploration and possible expansion and demonstration of AM within the paradigm of modern medicine, such key excursions into integrating scientific mechanistic accounts, theoretical and historical investigations, will be crucial to expand and deepen understanding of the holistic role alternative medicines can claim [162]. Many alternative treatments are often falsely reported for public awareness [124, 146]. Modern practitioners' apprehension about proposing the significance of effective new AM treatments to patients remained conspicuous. A study demonstrated that 89% of patients referred themselves to an alternative practitioner and only 72% informed their physician as to AM use [163]. Furthermore, alternative treatments defy scientific procedures in terms of objectivity, measurement, codification, and classification, as it embraces both spiritual and physical realms, which are not subject to scientific inquiry [154]. Therefore, this demands immense efforts into comparative clinical efficacy trials aimed at improving the treatment of patients with more long-term perspective.

4. CONCLUSION

AM has been practiced in many countries before the advent of modern medical science but its usage is not supported by the medical due to lack of evidence-based safety and effectiveness and evaluation. Despite the promising results reported with various natural and biologic products, the clinical efficacy of such alternative therapies is yet to be determined. Over half of the world's population does not have access to modern medicine, where most funding for healthcare in the developing world goes to 20% of the population and it can certainly be presumed that healthcare costs will be expected to double over the next decade. Low-cost intervention like lifestyle modifications, diet, supplement therapy and behavioral medication can be a substitute for the prescribed expensive medications and technological innovations. There is a need to do further studies of AM treatments in humans to elucidate whether alternative treatments might have beneficial effects when used alone or additional benefit when used with modern treatment methods. This therefore necessitates exploration and eventual discovery of plausible scientific mechanisms, theoretical, and historical investigations, continual innovations, comprehensive and well-designed studies for validation, advancement, and full understanding in terms of the holistic roles of AM and its positioning appropriately in the context of modern medicine. Medical practitioners and physicians need to know potential alternative therapies and should talk to patients about any benefits and possible adverse effects or limitations of such treatments. With collective efforts of various relevant stakeholders such as medical and research councils of all the countries, systematic approaches may be devised and inclusion of standardized procedures, awareness of validated, authenticated and easily accessible scientific resources may significantly better the present scenario of AM and fulfill the growing healthcare needs of global population.

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