

Herbal Medicines in Pediatric Neuropsychiatry

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- Herbal supplement • Neuropsychiatric • Pediatric • Adolescent
- Complementary medicine

Mainstream medicine in Western society is based on conventional medicine, also referred to as allopathic or biomedicine.¹ The National Center for Complementary and Alternative Medicine (NCCAM), a division of the National Institute of Health, was originally established in 1992 as the Office of Alternative Medicine and was promoted to a center in 1999.² The goal of the Center is to sponsor and support research in complementary and alternative medicine (CAM), with funding appropriations increasing from 2 million US dollars in 1992 to 128 million US dollars in 2010.³ NCCAM has devised 4 domains for CAM therapy, recognizing that there is the potential for overlap as well as whole medical systems that may cover all 4 domains.¹ Whole medical systems are based on systems of theory and practice and within the United States most commonly include homeopathic and naturopathic medicine.¹ Mind-body medicine encompasses techniques including cognitive-behavioral therapy, meditation, and prayer, whereas biologically based practices include the use of herbal and dietary supplements.¹ Manipulative and body-based practices include massage and chiropractic or osteopathic manipulation.¹ Energy medicine revolves around the use of energy fields and includes Reiki, therapeutic touch, and use of electromagnetic fields.¹ This article focuses on the review of just one aspect of CAM therapy, herbal supplements, which have been used for pediatric and adolescent neuropsychiatric disorders, and includes a discussion of the various supplements and limited literature surrounding their use.

Herbal medicines have been used since the Greek and Roman era and gained popularity in the United States in the 1700s and 1800s.⁴ As allopathic medicine became dominant in the twentieth century, use of herbal therapies diminished. In the 1990s the US Food and Drug Administration (FDA) proposed stringent regulations

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for the marketing of herbal supplements. Opposition by consumers and supplement manufacturers led to a compromise and passage of the Dietary Supplement Health and Education Act by Congress in 1994.⁴ This Act led to the classification of herbal products as dietary supplements when manufacturers can make claims about health and nutrient content as well as about how the supplement affects structure and function of the body but cannot claim to cure, prevent, or treat specific diseases.⁵ Herbal and dietary supplements are not subjected to the approval process that traditional medicines undergo by the FDA. The manufacturer should ensure safety and accurate labeling of the product but does not have to register the product or notify the FDA of its production unless a new dietary ingredient is used.⁵ The FDA is responsible for post-marketing activities, including monitoring of adverse events via voluntary reporting and product information (eg, labels, claims, package inserts).⁵

HERBAL COMPONENTS

There are many different chemical constituents in herbal plants that can have therapeutic as well as toxic effects. Herbal supplements may come prepared as tablets/capsules, powders, tinctures, syrups, and brewed teas for oral consumption.⁶ Other preparations for topical application include salves, ointments, and shampoos. Parts of the plant that may be used include the flower, leaves, stem, roots, seeds, and berries.⁶ Bioflavonoids, one of the major herbal components, include flavonoids that can be found in flowers, citrus fruits, red wine, and tea and are believed to have antioxidant properties.⁷ Essential oils give the characteristic odor of the plants and are often referred to as volatile oils or essences.^{6,7} They have been used for treating skin and respiratory disorders and in aromatherapy.⁷ Glycosides are derived from plant chemicals containing a carbohydrate residue attached to a noncarbohydrate residue. Common glycosides include digoxin (used in allopathic medicine for cardiovascular conditions), anthraquinones (laxatives), and isothiocyanates (alliin in garlic, used for food flavoring and cholesterol-lowering properties).⁷ Resins are protective substances secreted by plants that when mixed with volatile oils produce oleoresins and when mixed with cinnamic or benzoic acid produce a balsam.⁷

Other components include saponins (soaplike glycosides), which may be used for their mucolytic and expectorant properties, phytosterols (eg, soy), which claim to have antiinflammatory and antioxidant properties, and terpenes, which are the most common phytochemicals and are found in a variety of products including vegetables, soy, and grains.⁷ Terpenes are varied in chemical structure and are promoted for their antioxidant properties. **Table 1** lists the various herbal components, examples, sources, and claimed benefits.

PRODUCT QUALITY ASSURANCE

Quality control of herbal supplements within the United States remains largely unregulated. There are no standard governmental regulations that ensure good manufacturing processes and product reliability. Standardization of herbal supplements is challenging because of the chemical complexity of botanicals, which may contain multiple active ingredients, and because of uncertainty about which ingredient is contributing to the therapeutic effect.⁸ Laboratory analysis of multiple brands of a herbal supplement can reveal several-fold differences in the concentrations of the active components.⁸ A variety of factors can also contribute to differences in the concentrations of the active constituents, including the part of the plant used, growing conditions, timing of harvest, geography and soil conditions, processing methods, and storage conditions.^{6,8} Therefore, herbal supplements can vary in chemical composition,

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