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## Review

## Medicinal plants used for menstrual disorders in Latin America, the Caribbean, sub-Saharan Africa, South and Southeast Asia and their uterine properties: A review

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trachylobane (PubChem CID: 521405)

warifteine (PubChem CID: 5490189)

zingerone (PubChem CID: 31211)

## ABSTRACT

**Ethnopharmacological relevance:** Menstrual disorders are generally not perceived as major health concerns by global health organizations, despite being disruptive to women's daily activities, particularly when access to sanitary facilities or analgesics is limited. Improving menstrual health requires access to safe and effective medication, but many women in Latin America, Africa or Asia prefer traditional medicine above modern remedies (such as contraceptives), as they can cause physical symptoms associated with fertility loss. Many medicinal plants are used for menstrual disorders, but few have been examined for their pharmacological activities related to traditional uses. Plants that have a smooth muscle-relaxant effect could ease menstrual cramps, but there are indications that dysmenorrhea in low-income countries is commonly treated with emmenagogues. This review aims to assess the most salient plants used to treat menstrual morbidity in Latin America and the Caribbean, sub-Saharan Africa, South and Southeast Asia, their uterine properties and adverse effects. To test whether plants used for painful menstruation could have uterine contracting properties, we recorded whether these species were also used to ease birth, induce menstruation, abortion or expel the afterbirth, as these suggest spasmogenic activities.

**Materials and methods:** We reviewed the literature documenting traditional plant use in the study area for dysmenorrhea, regulating or inducing menstruation, uterine cleansing, uterine fibroids, expelling the placenta and lochia and for easing childbirth. Thirty genera (59 species) used in at least two continents or frequently throughout one continent, were shortlisted from the 90 most salient plant species emerging from our literature review. Using Medline, we searched for pharmacological properties and/or mechanisms of action relevant to their traditional uses of the shortlisted species. We searched Vigibase<sup>TM</sup>, the WHO global individual case safety report database, on reported adverse drug reactions associated with these species.

**Results:** More than 2000 plant species are used for menstrual disorders in the study area. The most salient uses are to treat painful menstruation, induce or regulate menses, and induce abortion. Around half (29) of the 59 most salient species have been tested for their pharmacological effects, of which 48% act as uterine spasmolytics and 31% as uterine spasmogenics. Several frequently used species contain toxic constituents, which may put women and their unborn children at serious risk. Vigibase<sup>TM</sup> listed adverse drug reactions for 18 of these species, but few reports came from the study area.

**Conclusions:** Research into the risks and benefits of medicinal plants for menstrual complaints should be given a higher priority in reproductive health programs that respect traditional knowledge and practices.

**Abbreviations:** WHO, World Health Organization; UMC, Uppsala Monitoring Centre; ICSR, the WHO global individual case safety report database (Vigibase<sup>TM</sup>); ADR, adverse drug reactions; SOC, system-organ-class; MedDRA, Medical Dictionary for Regulatory Activities

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Increased data collection is needed on adverse drug reactions among women using herbal medicines for reproductive health, especially in countries with limited reproductive health facilities.

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## 1. Introduction

Complications related to reproductive health remain the leading cause of morbidity and mortality for women of childbearing age worldwide (United Nations, 2012). Nonetheless, menstrual disorders are generally not perceived as major health concerns, and therefore not considered in global reproductive health programs (Harlow and Campbell, 2000), despite the fact that research in various low-income countries reveals that menstrual morbidity has a huge impact on women's health status, quality of life, social integration and access to education (Caldwell and Caldwell, 1987; Daar and Merali, 2002; Harlow and Campbell, 2004; Tjon A Ten, 2007). Moreover, menstrual disorders are a risk marker for other reproductive morbidities. Abnormal or irregular uterine bleeding may be a symptom of cervical tumors, uterine fibroids, genital tuberculosis or hemorrhagic dengue fever, while excessive or prolonged bleeding can cause anemia and may eventually be life-threatening if left untreated (Harlow and Campbell, 2000). Infrequent (oligomenorrhea) or absent (amenorrhea) menses may reflect underlying endocrine disorders, malnutrition, endometrial tuberculosis, AIDS or cancer (Harlow and Campbell, 2000). Although not always life-threatening, menstrual disorders can be particularly disruptive to daily activity patterns, particularly in the absence of appropriate sanitary facilities, or analgesics in the case of painful menstruation (Harlow and Campbell, 2000; Tjon A Ten, 2007). Improving reproductive health of women requires access to safe and effective medication and methods of fertility control (Siedlecky, 2001). In Western countries, menstrual disorders are often treated with hormonal therapy (including contraceptions) or nonsteroidal, anti-inflammatory medications. For many women in low-income countries, these treatments are unavailable or unaffordable. Moreover, modern oral contraceptives can cause symptoms that are perceived to be similar to fertility loss, such as

amenorrhea or mid-cycle breakthrough bleeding. For this reasons many women in Latin America, Asia and Africa continue to prefer traditional medicine for menstrual disorders or family planning (Bearinger et al., 2007; Castle, 2003; Levin, 2001; Williamson et al., 2009). Some researchers argue that in countries where access to modern healthcare facilities is limited or where traditional therapies are generally considered more culturally appropriate, research on the efficacy and safety of indigenous therapies for menstrual disorders should be encouraged to promote their use as an acceptable alternative to synthetic pharmaceuticals (Gwekwe and Monera, 2012; Harlow and Campbell, 2004; Lindsey et al., 1998; Michel et al., 2007). Others advocate culturally sensitive integration of traditional and modern practices to reduce infant and maternal mortality without replacing significant cultural heritage (De Boer and Lamxay, 2009; De Boer et al., 2011; Lamxay et al., 2011; van Andel et al., 2008).

Many plant species are used worldwide in traditional herbal remedies for reproductive health issues, but very few species have been examined for their pharmacological activities related to menstrual disorders. Plants used traditionally for female reproductive health, in particular those used for abortion, have received little attention from researchers, as for a long time these were considered as used for sinful or illegal objectives (Schiebinger, 2004). In recent decennia, however, a growing number of ethnobotanical studies have been published on plants used for reproductive health in the tropics (e.g., De Boer and Cotingting, 2014; Kamatenesi-Mugisha and Oryem-Origa, 2007; Michel et al., 2006, 2007; Ososki et al., 2002). Some authors are still struggling with prejudices regarding women's choices over their own sexuality. In a paper on abortifacients in southern Cameroon, for example, the authors state that practices in which plants are used to produce sterility, death, and low population growth should be prohibited (Noumi and Tchakonang, 2001). Similarly, several African societies

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