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HERBAL CARE FOR WOMEN: A GUIDE TO PHYTOTHERAPEUTIC AGENTS IN GYNAECOLOGY AND REPRODUCTIVE HEALTH

CHAPTER 6: HERBS IN PREGNANCY, LACTATION AND POSTPARTUM CARE

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1. Introduction

Herbal medicine products, such as herbs, herbal preparations, and finished herbal products, contain parts of plants and other plant material believed to have therapeutic value. Approximately 80% of the world's population relies on a range of traditional medicine, including medicinal plants, for the diagnosis, prevention, and treatment of diseases, and to enhance their overall health [1]. Herbal medicinal products are products that have been used for centuries in Asia, Africa, and Latin American countries, but have come under the spotlight in the Western world only in recent decades. Although efficacy and safety information are lacking, herbal medicinal products are being used and are being used more in North America and Europe [2,3]. The use of medicinal plants for health care has been practised for centuries in all parts of the world. Medicines from plants have a long tradition of medical uses in India, and they have been used to cure different diseases/ailments from ancient times. The Indian subcontinent is rich in biodiversity as well as in the indigenous traditional knowledge system. In India, there is a large number of species of vascular plants, more than 45000 species. In the





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folk medicine system of India, about 5,000 species with some 25,000 formulations are used for the treatment of various ailments, while in tribal medicine, more than 8,000 plant species with some 1,75,000 specific preparations or applications are used [4,5]. Despite the development of modern healthcare infrastructure, government reports, and ethnographic studies show that traditional medicine remains as important in the health-seeking behaviour of rural people [6,7]. Frequently, patients use both traditional and biomedical treatment, and switch between them within their illness, depending on its nature, perceived cause, and access to treatment. This pattern is an example of the continued vitality of traditional medicine and its capacity to stay current with shifts in social and economic climates [6,8]. Women have been identified as the major users of herbal medicinal products, both for the maintenance of health and the treatment of disease. During pregnancy, many physiologic changes occur and cause abnormal symptoms, including nausea and vomiting, heartburn, and constipation [3]. These disorders are treated with herbal medicines by many women around the world as the main methods or in conjunction with other traditional medical treatments. The diseases are frequent among pregnant women, and the women turn to self-medication, such as using herbal medicine [9]. Herbal medicine has remedies for almost all diseases or disorders. However, given the child birth it is one of the greatest times in the life of the woman. During pregnancy, childbirth and the postpartum period, women undergo different health risks which may lead to substantial mortalities, especially in remote and distant regions of developing countries. Major factors which are responsible to death are postpartum hemorrhage, anemia and infections. To prevent these situations, the majority of people prefer to use traditional medicine plants or formulations. Traditionally, people have a precious knowledge of herbs which are related to childbirth, pregnancy and the postnatal period. Generally, medicinal plants are used to treat anemia, as a tonic, to facilitate delivery, to reduce postpartum hemorrhage, reduce pain during childbirth, restore stamina and to heal wounds. Pregnancy using plants to improve health and for inducing labour is common throughout the world. Herbal medicine use among pregnant women varies from 7% to 55% in various geographical, social and cultural contexts and ethnic groups. Herbal medicine has been





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used as a crucial part of maternal [10,11]health care for thousands of years and is still utilised all over the developing and developed world. Many women opt for herbal medicines during the period of gestation, lactation and post-partum, as these are considered natural and culturally acceptable, inexpensive and easily available. Medicinal plants are used in traditional medical systems like Ayurveda, Traditional Chinese Medicine, and indigenous medicine to treat common ailments faced by mothers, such as nausea, gastrointestinal issues, weakness, anemia, reduced lactation, or delayed recovery after childbirth [12–14]. Use of medicinal plants in maternal care has been recorded since antiquity. Some herbs, such as ginger (*Zingiber officinale*), fenugreek (*Trigonella foenum-graecum*), fennel (*Foeniculum vulgare*), turmeric (*Curcuma longa*), and garlic (*Allium sativum*) have been traditionally used to treat the symptoms of pregnancy, to support lactation, and to aid in the recovery process after delivery. They have a variety of therapeutic properties that seem to be due to various phytochemicals with anti-inflammatory, antioxidant, digestive, and galactagogue properties [15–17].

Herbal medicines are of great pharmacological significance because of their content in bioactive phytochemicals, including flavonoids, alkaloids, terpenoids, polyphenols and saponins that have antioxidant, anti-inflammatory, antimicrobial, digestive and immunomodulatory properties. These properties could have a beneficial effect on maternal health and aid in the physiological changes that occur in pregnancy and postpartum recovery [14,18,19]. Furthermore, many herbal treatments are also compatible with holistic treatments that concentrate on nutrition, lifestyle, and preventive care, as well as treating the symptoms. Although there can be benefits to using herbal medicines during maternal care, they must be used wisely. Many botanicals have not been sufficiently tested in pregnant or nursing women, and some herbs can have a uterotonic effect, fetal toxicity or interactions with conventional drugs. The clinical use of these is further complicated by variability in plant species, dosage, preparation methods and product quality [20,21]. Thus, the need for evidence-based assessment, standardisation, and professional guidance is warranted to ensure that the integration of herbal medicine into maternal health care is safe and effective. In general, herbal





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medicines could be considered as an important complementary treatment for maternal health in an appropriate manner if there is scientific evidence for their use. Future studies on efficacy, safety, quality control and clinical outcomes will further optimise its therapeutic effects and ensure the health of the mother and child.

Historical and Traditional Perspectives

Herbs have been part of maternal healthcare since ancient times. Medicinal plants have been heavily used for support to women throughout pregnancy, childbirth, lactation and the postpartum period in ancient cultures. Plant medicines were already used by traditional healers and midwives to ease discomfort during pregnancy, aid birth, boost milk supply and heal the newborn. These remedies were handed down from generations and are a part of many traditional medical systems. In the Ayurvedic system of medicine, one of the oldest medical systems in the world, maternal care is mentioned in Ayurveda as Garbhini Paricharya (antenatal care) and Sutika Paricharya (postnatal care). In classical Ayurvedic medicine, the diet and medicines are suggested to promote the health of the mother, nourishment of the fetus, digestion and rejuvenation after birth [22,23].

Likewise, the Traditional Chinese Medicine (TCM) has a long history of applying herbal medicine to balance the energy, strengthen blood, eliminate miscarriage, aid in labour, and recovery after delivery. Personalised herbal prescriptions are widely prescribed, reflecting a holistic approach to maternal well-being, and focusing on each patient's constitution and clinical profile [24,25]. Indigenous communities around the world have also accumulated a significant ethnobotanical expertise on the issues of maternal health, especially in Africa, the Middle East, Europe, and the Americas. Ethnobotanical knowledge of maternal health is also widely found among indigenous communities throughout Africa, the Middle East, Europe, and the Americas [10]. Others like ginger (*Zingiber officinale*), raspberry leaf (*Rubus idaeus*), fennel (*Foeniculum vulgare*) and fenugreek (*Trigonella foenum-graecum*) are used for a variety of reasons in traditional medicine, and have been part of it for many years. Many of these





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treatments are still practised today, and are still popular in the region due to their cultural importance and availability. Today, some traditional medicinal uses of plants have been authenticated by modern scientific research and their bioactive components have been determined and documented for their pharmacological attributes. But history does not necessarily mean safety and efficacy, especially when pregnant and breastfeeding. Thus, the approach of incorporating traditional knowledge coupled with thorough clinical assessment and quality assurance in the use of herbal medicines in maternal health is crucial [3,26,27].

2. Physiological Changes During Pregnancy, Lactation, and Postpartum Period

In pregnancy a woman's body changes most dramatically in terms of anatomical and physiological adaptations to support the fetus in development and to prepare for labour and delivery [28]. These systemic changes occur in most women with uncomplicated pregnancy and are reversible with little long-term consequence at the end of pregnancy. There are developmental changes during pregnancy, lactation and the postpartum period that are complex and serve to maintain both mother and infant health and survival. These changes are coordinated alterations in the endocrine, cardiovascular, respiratory, renal, gastrointestinal, metabolic and reproductive systems which allow for fetal development, delivery, milk production, and recovery. As the pregnancy progresses, there are major changes in both structure and function related to increased hormone levels like Estrogen, progesterone, human chorionic gonadotropin (hCG), relaxin, and prolactin. The blood volume, cardiac output, respiratory and renal function are increased to meet the metabolic demands of the developing fetus, and to improve oxygen transport and the elimination of waste products. At the same time gastrointestinal motility and metabolism are altered, leading to common symptoms of nausea, vomiting, constipation or alteration of glucose homeostasis [29–31].

After delivery, the body is in the lactational stage. The drop in placental hormones allows milk to be produced by the mother's body via the action of prolactin, and oxytocin is a hormone that





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helps milk to be ejected during breastfeeding. Breast milk is a dynamic product that changes from colostrum to mature milk, which contains nutrients, immunological components, enzymes and bioactive substances that are critical for supporting neonatal growth and immune protection. During lactation, the mother needs to supply her baby with energy and nutrients, and she has to expend additional energy and nutrients too, so proper nutrition and hydration are important [32–34]. The postpartum period is a time of gradual restoration of pregnancy-induced physiologic changes and the establishment of maternal homeostasis. Proper uterine involution, healing of reproductive tissues, adjustment of cardiovascular and renal function and adjustment of hormone levels take several weeks. Breastfeeding women still have prolonged secretion of prolactin and intermittent release of oxytocin that affects the endocrine system and promotes maternal recovery. Meanwhile, women can suffer from fatigue, mood swings, nutritional deficits, and musculoskeletal pain and discomfort, highlighting the need for thorough care and support after giving birth. Doctors, researchers, and other members of the health care community need to grasp these physiological changes [35,36]. It serves as a basis for evidence-based nutrition interventions as well as pharmacotherapy and judicious use of herbal drugs to achieve optimal maternal and neonatal outcomes and reduce potential adverse effects. Let's take a closer look at these physiological adaptations:

Haematological and Cardiovascular Changes

There are major changes in both the cardiovascular system and the hematologic system, which are interdependent. Maternal plasma volume rises gradually, with a 50% rise by 34 weeks gestation. Pregnant women naturally have a decrease in haemoglobin and haematocrit due to a greater increase in plasma compared to red cell mass. Concurrently, the body's requirement for iron increases two- to three-fold, and folate requirements increase 10- to 20-fold. To prepare for bleeding during delivery, pregnancy is associated with a physiological hypercoagulable state defined by an elevation of clotting factors (VIII, IX, X) and a decrease of natural anticoagulants, such as thrombomodulin. This changes the coagulation system so that it is more





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likely to clot, making the mother at risk for venous thrombosis. The hemodynamic of pregnancy include a rise in cardiac output of approximately 40%, with the major factor being a rise in stroke volume and a 25% to 30% decrease in systemic vascular resistance. During the third trimester, maternal position becomes important because lying in the supine position may compress the inferior vena cava, resulting in significant decrease of venous return (uteroplacental blood flow may be affected), cardiac output drops 25% [37–39].

Renal, Respiratory, and Gastrointestinal Adaptations

The kidneys, lungs and digestive organs are also remarkably affected by the developing fetus. Renal plasma flow and glomerular filtration rate (GFR) are elevated up to 85% and reducing normal serum levels of creatinine and urea. Physiological hydronephrosis occurs in more than 80% of pregnant women caused by physical enlargement of the kidneys and mechanical compression and hormonal changes of the urinary collecting system. Maintaining uteroplacental perfusion, body resets osmotic thresholds to retain additional sodium and water, thus producing a hypervolemic, hypo-osmolar state. Oxygen consumption rises by 20% to compensate for a 15% rise in metabolism for the mother's respiratory needs. Minute ventilation increases by 40-50% and this leads to deeper breathing (increased tidal volume), and a decrease in the carbon dioxide level leads to a normal, mild respiratory alkalosis. Nausea and vomiting are a common symptom of pregnancy experienced by up to 90% of women, believed to be a protective mechanism against teratogens and strongly associated with the peak of the pregnancy hormone human chorionic gonadotropin (hCG), which is found in the gastrointestinal tract. Symptoms of acid reflux are also more common as the uterus pushes the stomach up and as the levels of progesterone drop, the tone of the oesophageal sphincter also drop [40–42]. Leading to increased risk of gastro-pulmonary aspiration [43].

Endocrine, Metabolic, and Postpartum Reversals

Pregnancy is a diabetogenic state, with progressive insulin resistance that is greatest in the third trimester of gestation. This resistance and elevated levels of cholesterol and triglycerides in the





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mother enables them to prioritize fat for fuel, and to route critical glucose and amino acids to the developing fetus. Calcium absorption in the mother's gut increases in order to supply the fetal skeleton requirements, but no change in physiologically active ionized calcium levels. After delivery, the body begins to undergo very rapid physiological changes. When the vena cava is compressed and heart contractions are strong, blood is immediately returned to the systemic circulation, which increases cardiac output by 60-80%, followed by a rapid return to pre-labor levels. After birth, the placenta ceases to secrete the hormones that cause insulin resistance in the mother, and she becomes insulin sensitive; concurrently, the mother is losing excess fluid through a huge surge in atrial natriuretic peptides (ANPs). But the increased risk for venous thrombosis remains for 12 weeks post-partum at least. Lastly, a large number of prolactin-producing cells in the enlarged pituitary gland results in a ten-fold increase in serum prolactin to promote milk production and lactation in the newborn. During pregnancy and lactation, maternal bone mass is lost due to the physiological demands of these conditions, and this is normalized over time [44–46].

Pregnancy-Related Changes

During pregnancy there are significant physiological, hormonal, metabolic and anatomical changes that allow the mother to carry a baby safely and prepare herself for giving birth and raising a child. Level of hormones (human chorionic gonadotropin [hCG], progesterone, estrogen, prolactin, relaxin) rises significantly, causing effects on almost all organ systems. Progesterone and smooth muscle relaxation, estrogen and uterine growth and increased uteroplacental blood flow and mammary gland development. The cardiovascular changes are due to increased plasma volume by about 40-50%, increased cardiac output, and decreased systemic vascular resistance to meet the metabolic needs of the expanding fetus. Increased tidal volume and oxygen consumption are the changes that occur with respiration, while renal blood flow and glomerular filtration rate also increase significantly. Hormonal effects lead to a slowing of gastrointestinal motility, sometimes causing nausea, vomiting, constipation, and





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gastroesophageal reflux. Metabolic changes include insulin resistance, changes in lipid metabolism, and greater nutrient storage to nourish the foetus. Although necessary for a successful pregnancy, these physiological changes can also make women more susceptible to discomfort and medical complications and thus the need for suitable nutritional, pharmacological and supportive interventions [30,47].

Lactational Adaptations

Mammogenesis (lactation) is a complex physiological process which is governed mainly by two hormones, namely prolactin and oxytocin. After the placenta is expelled, the level of progesterone and estrogen drops quickly, allowing lactogenesis II to be initiated by prolactin. Prolactin acts on the mammary alveolar cells to stimulate milk production and oxytocin acts on the myoepithelial cells to cause milk ejection, upon suckling, by the infants. The composition of breast milk varies throughout, from colostrum, transitional milk and mature milk. Colostrum contains high concentrations of immunoglobulins, growth factors, leukocytes and antimicrobial proteins, which serve to passively immunize the neonate and to stimulate maturation of the neonatal gut. The mature breast milk provides carbohydrates, proteins, fats, vitamins, minerals, enzymes, hormones and bioactive compounds which are essential for the infant's optimal growth and development. Another important change in maternal metabolism during lactation is the increased expenditure of energy and mobilization of fat stores, and the higher nutritional needs. Therefore, adequate hydration and balanced diet is critical to maintain milk production and maternal health [48,49].

Postpartum Recovery

The postpartum period lasts about six weeks after a woman has given birth, and her body slowly reverts back to its normal pre-pregnancy state. Uterine involution involves a coordinated myometrial contraction and tissue remodeling, which decrease uterine size and regulate postpartum bleeding. Hormonal changes such as reduction in the levels of oestrogen and progesterone as well as the continued release of prolactin in breast-feeding mothers affect the





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physical and emotional recovery. During this time, the cardiovascular parameters, plasma volume, renal function, and metabolic function gradually normalize. Postpartum recovery of the reproductive tract, of perineal and cesarean wounds, and of the function of the pelvic floor are important aspects of healing. Women also can have symptoms of fatigue, mental health issues, musculoskeletal pain, and nutritional deficits that need clinical attention and supportive care. Breastfeeding also affects postpartum physiology by stimulating the release of oxytocin which hastens uterine involution and could decrease the risk of postpartum hemorrhage. At the same time, good nutrition, psychological care, prevention of infections and timely management of postpartum complications are all essential to successful maternal recovery. To support recovery and lactation, traditional herbal treatments are commonly used in this stage, but their safety and effectiveness require further evidence-based studies [50,51]. Furthermore, public health discourse must expand to emphasize the holistic benefits of breastfeeding for maternal health, rather than focusing solely on infant nutritional outcomes [52].

3. Safety Considerations of Herbal Medicines

Many herbal medicines are viewed as "natural," and therefore safe, remedies as opposed to pharmaceuticals, but have complex biochemical profiles which create unique safety concerns. Due to limited stringent and standardized testing procedures used for herbal products compared with prescription drugs, several clinical and pharmacological factors must be understood for the safe use of these products [53,54]. Herbal medicines are commonly consumed during pregnancy and breastfeeding and the postpartum period, because they are traditionally accepted and considered natural remedies. But it is not always correct to believe that "natural" is "safe." Medicinal plants contain biological constituents that have pharmacological activity that can have a great effect on both mother and developing fetus or nursing infant [55]. The safety and therapeutic effectiveness of herbal products may also be affected by differences in the species, growing conditions, harvesting practices, processing methods and quality of the formulations. Thus, it is important to study herbal medicines carefully prior to their use in maternal health





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care. Herbal medicines during pregnancy are complicated pharmacologically. Pharmacological evaluation must be rigorous, since the body's reaction to complex phytochemical mixtures changes during pregnancy [56].

Pharmacokinetic and Pharmacodynamic alterations

As the body changes during pregnancy, the pharmacokinetics and pharmacodynamics of substances ingested by the mother are also altered systematically to support the developing fetus, including for herbal medicines. The process by which active ingredients are absorbed, distributed, metabolized and excreted by the body is referred to as pharmacokinetics and the manner in which they produce biological activity in the tissues of the body is known as pharmacodynamics [57,58]. Complex botanical mixtures have highly variable safety and efficacy profiles because they significantly alter the normal baseline physiology used to predict the behavior of a drug during gestation. Oral administration of herbal medicines is greatly affected by maternal gastrointestinal changes. Nausea and vomiting are too common during pregnancy, occurring in 50% to 90% of pregnant women, making it difficult to take and digest the oral doses of herbal medicine. Also, the mechanical and hormonal changes like the stomach being displaced upward by the expanding uterus and a decrease in oesophageal sphincter tone disrupts normal gastrointestinal motility. The alterations can extend the time it takes for the stomach to empty, causing the active phytochemicals in herbal extracts to reach the small intestine in a delayed or inconsistent fashion and thereby delaying or disrupting their action [59,60]. Furthermore, the lack of rigorous regulation and standardized dosing for herbal supplements often leads to unpredictable systemic exposure, which can result in severe complications or unforeseen interactions with prescribed medications [61,62].

The distribution of these active phytochemicals is greatly altered after being absorbed in response to changes in water metabolism of the mother. The extracellular volume rises 30- 50% during pregnancy, while plasma volume rises by more than 50% by the late third trimester. This huge fluid expansion results in hypervolemic state, which expands volume of distribution of





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hydrophilic (water-soluble) botanical compounds [63]. Moreover, this fluid retention leads to physiological haemodilution, thereby decreasing the amount of serum albumin in circulation. Many herbal compounds are highly protein-bound, and the drop in albumin will lead to lower protein binding of these compounds and to potentially elevated levels of free, active compound in the maternal/fetal blood, and thus to an unexpectedly high maternal/fetal toxicity risk [28,64,65]. Herbal medicines are metabolised mainly in the liver and the metabolism is also influenced by complex fluctuations in the hormonal balance of pregnancy. The activity of multiple hepatic cytochrome P450 (CYP) enzymes is dramatically affected by the increased levels of hormones, including progesterone, Estrogen, and placental growth factors. There are certain metabolic pathways that are very highly enhanced and these lead to increased rates of breakdown and elimination of some of the botanicals. On the other hand, high concentrations of steroid hormones in the blood can competitively inhibit other enzymatic pathways, causing potentially high levels of active herbal metabolites in the mother's blood stream [66,67]. These altered metabolic processes, coupled with a lack of standardised clinical data on nephrotoxicity and teratogenicity, underscore the significant risks posed by the indiscriminate use of these products during gestation [68].

Herbal metabolites are excreted renally and experience one of the greatest physiological changes during gestation. Renal plasma flow rises by 40-65% at the time of pregnancy due to a dramatic reduction in systemic vascular resistance and hormones such as relaxin. As a result, the glomerular filtration rate (GFR) rises by 50-85%. This hyperfiltration causes the elimination of the water-soluble constituents of an herbal medicine and their metabolites from the maternal circulation to be more rapid than normal [69,70]. In some botanical medicines, this fast clearance might make standard doses ineffective, whereas increasing doses might pay no additional benefits with a greater risk of giving the fetus excessive exposure to the toxic plants. In addition to the way that the body takes in and eliminates these natural chemicals, pharmacodynamic changes mean that the tissues of the mother will respond differently to these chemicals. An example of this is the presence of systemic vasodilation and a 40% elevation of





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cardiac output in the maternal cardiovascular system in compensation for the lowered vascular resistance. This altered baseline could cause excessive and/or reduced heart and blood pressure reaction to vasoactive alkaloids in herbal medicines. Likewise, during the gestation period the pregnant uterus acquires a greater sensitivity to oxytocic, uterotonic agents. If a botanical extract is known to contract minor smooth muscle in a non-pregnant woman, it could provoke severe and premature uterine contraction in a pregnant woman because of receptor up-regulation [71,72]. Finally, the 'dynamic' and 'kinetic' changes that are seen at this intersection make the use of unstandardized herbal medicines extremely dynamic. Concurrently, there is an increase in distribution volume plus a change in hepatic metabolism and enhanced renal clearance, making it almost impossible to predict maternal blood concentrations without careful clinical studies. Together with these significant changes to the physiology, and a heightened susceptibility to the effects of phytochemicals on placenta and foetus, these are important reasons why healthcare professionals strongly recommend the unscreened use of botanical drugs during pregnancy [68,73].

Maternal and Fetal Safety

Maternal/fetal safety during pregnancy is considered a fine balance of biology that is tightly regulated. There are great anatomical and physiological changes in the mother's body that are specifically to help the developing fetus and prepare for childbirth. Safety requires the protection of this complex homeostasis from internal disorder to external disturbances, including unverified drugs and herbs. When treating a pregnant patient, you are actually treating two different people with two different physiologies, different base states. Safety is closely related to maternal perspective, in which they have to deal with the overwhelming cardiovascular and haematological strain of gestation. The body becomes hypercoagulable to prepare for delivery bleeding with an increase in clotting factors and a decrease in natural anticoagulants [74,75]. This protects against bleeding, but also tips the balance towards clotting and makes the mother very prone to venous thrombosis for the entire pregnancy and for at least 12 weeks after the birth. Moreover, pregnant women are more vulnerable than others to the





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development of pulmonary edema due to the relatively 30% decrease in the colloid osmotic pressure gradient, which can be exacerbated by the rise of pre-load of the circulatory system or changes in its capillary permeability (due to disease or toxicity) [76,77].

The health of the fetus is always dependent upon the integrity and selective permeability of the placenta. The placenta is beautifully engineered to transport oxygen, glucose, and amino acids to the developing baby, but block the passage of bigger maternal lipids. But this barrier is not impervious to all foreign substances. Many external substances can easily enter the fetal circulation; these are low-molecular-weight phytochemicals, environmental contaminants and, especially when herbal products are not standardized, heavy metals. The developing fetus does not have a well-developed liver and kidney to effectively metabolize and excrete these foreign substances resulting in a great risk of toxicity, growth restriction and teratogenicity [61,78,79]. Another important issue concerning the safety of the fetus is ensuring the maintenance of uteroplacental perfusion that is totally dependent on the maternal hemodynamic. For example, during late pregnancy, a gravid uterus laying on the inferior vena cava can result in a 25% decrease in the cardiac output of the mother. This diminished cardiac output directly affects the amount of blood flowing to the uterus and placenta, and may result in an inadequate supply of oxygen to the fetus [39,80]. So, anything external, a botanical extract or medication, that causes serious maternal hypotension or impairs blood flow is a big life-threatening danger for the baby. Also, metabolic and endocrine stability is of utmost importance to safeguard both patients. There is a natural rise in insulin resistance that happens during pregnancy, reaching its peak in the third trimester, which can be referred to as a “diabetogenic” state. This deliberate metabolic change is necessary to allow enough glucose to cross the placenta to supply the rapidly growing fetus and the mother to use the fat as her energy source. The introduction of unregulated substances can easily upset this delicate hormonal balance and trigger a critical low blood sugar for the mother, and/or an aggravation of the gestational diabetes and its secondary fetal risks such as large birth weight [81–83]. Ultimately, the reliance on unregulated herbal remedies is compounded by the systematic exclusion of pregnant women from formal





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clinical drug trials, leaving critical knowledge gaps regarding the transplacental transfer and toxicological profiles of these substances [84,85].

In the end, the health of the mother and her baby is what matters, and can only be ensured by careful medical care to avoid distressing consequences. The mother's organs are already full capacity; the glomerular filtration rate rises by up to 85% and the liver is filtering through a far greater volume. Introducing the non-standard and potentially harmful drug effects of unproven herbal remedies or environmental contaminants can quickly overpower these key systems. During pregnancy, medically managing the hypervolemic, hypercoagulable and altered metabolic states means any therapeutic action has to be carefully considered to avoid causing unnecessary harm to the mother and to the very vulnerable fetus [47,86].

Herb–Drug Interactions

Herb-drug interactions are the changes in the pharmacokinetics and/or pharmacodynamics of conventional pharmaceutical drugs that are caused by the active phytochemicals in the botanical medicines. This risk is increased manyfold during pregnancy as the mother's body undergoes tremendous changes [87,88]. The absorption and distribution of herbs and drugs are already very variable due to massive fluid expansion, haemodilution and changes in gastrointestinal motility that occur in the mother. If the above-mentioned multi-component herbal extracts are added to the above-mentioned dynamic or shifting environment in conjunction with allopathic drugs, the possibility of unexpected and hazardous interactions is greatly magnified, potentially causing either drug toxicity or therapeutic failure. Hepatic metabolism (through the cytochrome P450 enzyme system) is the most common and clinically relevant mechanism of herb-drug interaction [88,89]. Many herbs, such as in herbal medicines, contain phytochemicals that are powerful inducers or inhibitors of these particular metabolic pathways. An herbal extract that inhibits an enzyme used to metabolize a prescribed drug can cause the drug to quickly build up to harmful levels in the mother's bloodstream. On the other hand, an herb that stimulates the enzymes will cause the concurrent drug to be metabolized and





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excreted too rapidly, reducing the level to subtherapeutic status. When the mother's body has already undergone significant changes as she grows a baby, and is also flooded with hormones, this extra enzymatic interference can make it very difficult to control the mother's situation. In addition to the hepatic metabolism phase, interactions between herbs and drugs can also have an adverse effect on the absorption and excretion phases of regular pharmacotherapy [90]. In the gastrointestinal tract, some herbal components, like mucilage's or extracts rich in tannin can physically bind to pharmaceutical drugs, preventing their absorption and eliminating them from the body without being used. However, interactions at the renal level become very sensitive because of the hyperfiltration state of the mother, which is a 50- 85% rise of the GFR [91]. Herbal medicines can also change the pH of urine, or compete with the conventional medicine for the same active renal transport channels, so that the excretion of the conventional medicine is blocked or accelerated. This dynamic can render the safe management of typical treatments very difficult to come by, as the risk of toxicity or elimination is always present [92].

Lastly, pharmacodynamic herb-drug interactions are those in which the herbal medicine and the pharmaceutical drug both have an effect on the same biological target and the effects are synergistic or antagonistic in nature, even at a perfectly stable blood level. For instance, a woman pregnant who is already on a standard anticoagulant or blood thinner may be at a high risk of excessive bleeding if she also takes an herbal medicine that has antiplatelet effects. This is particularly an important safety concern because pregnancy causes the coagulation system to become hypercoagulable, as it naturally should be, for the mother to prepare for bleeding after birth [93]. The other is antagonistic interactions, in which an herb has an adverse effect on an important drug that was being used for other purposes. However, the process of mapping these interactions at the receptor level is extremely challenging, as raw extracts of herbs contain hundreds of different constituents that are not standardized, posing a significant safety risk for the mother and developing fetus if used concurrently [79,94].





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Regulatory and Quality Concerns

The world's regulatory system for herbal medicines is a great danger to maternal and foetal safety. Many herbal products are deemed as dietary supplements or traditional medicines, as opposed to pharmaceuticals which are strictly tested before entering the market to ensure absolute safety and efficacy. In essence, it is a classification that circumvents the critical scrutiny and approval of regulatory authorities such as the FDA or EMA. As a result, many botanical products are being marketed without any specific clinical research to determine their safety for human consumption during pregnancy, and the risk is virtually borne solely by the pregnant woman and her health practitioner [95,96]. One of the main quality issues associated with botanical-based medicines is the lack of phytochemical standardization. Herbal medicines are made from living biological organisms and the amount of active secondary metabolites in the raw product changes greatly depending on the environment, such as soil type, climate, altitude, and season of the year. Additionally, different manufacturing techniques like aqueous and ethanol extraction will create completely different chemical makeup from the same plant. If the chemical standardisation is not required and the product's quality is not evaluated, the next batch of an herbal extract could be completely subtherapeutic, and the next batch could contain levels of powerful chemicals so high that it would be impossible to know the dosage [53,97].

Contamination and intentional adulteration are some of the worst possible quality control failures in the unregulated botanical industry. With poor agricultural practices or lax manufacturing oversight, raw herbal materials often become contaminated with heavy metals, agricultural pesticides, or pathogenic microbes. Even worse is the illicit practice of economic adulteration, where unscrupulous manufacturers secretly spike herbal products with undeclared synthetic pharmaceuticals (like corticosteroids, NSAIDs, or synthetic hormones) to artificially boost the product's efficacy. Exposing a developing fetus to these unverified and undisclosed toxic agents can lead to catastrophic teratogenic outcomes. Misidentification and species





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substitution further compound the dangers of these unregulated products in a highly complex global supply chain [98]. It is not uncommon for rare or expensive medicinal plants to be fraudulently or accidentally replaced with cheaper, visually similar species (eg, a notorious pharmacological example is the accidental substitution of safe botanical ingredients with *Aristolochia speciosa*, containing aristolochic acid a potent, irreversible nephrotoxin and carcinogen). For a pregnant woman, whose renal system is already under immense physiological stress and operating at a state of hyperfiltration, exposure to such misidentified toxic botanicals could trigger sudden maternal organ failure. Finally, the lack of robust mandatory pharmacovigilance for herbal supplements creates a dangerous blind spot in maternal healthcare. When adverse reactions or fetal anomalies occur, there is rarely a formal legal mechanism requiring manufacturers to track, investigate, or report these events to federal regulatory agencies. To combat this regulatory vacuum, international organizations like WHO advocate for the strict implementation of Good Agricultural and Collection Practices (GACP), Good Manufacturing Practices (GMP), and standardized post-marketing surveillance. Ultimately, while herbal medicines offer potential therapeutic benefits in maternal healthcare, their use must be guided by scientific evidence, standardized manufacturing, and clinical supervision to protect both mothers and infant [21,53,56,99].

4. Herbs Commonly Used During Pregnancy

Use of herbal medicines while pregnant is common and varies greatly by geographic, cultural and socioeconomic characteristics. Along with other common discomforts of pregnancy, nausea, indigestion and sleep disturbances are expected to occur and many expectant mothers respond to these conditions with the use of botanical remedies as alternatives to pharmaceutical drugs that are claimed to be "natural". The assumption that "natural" is "safe" can mean that many women will use natural remedies without the advice or knowledge of their health care professional. Due to the extent of physiological changes during pregnancy, however, complex herbal mixtures are unpredictable in terms of safety and efficacy. Some herbs have been found





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to be beneficial for therapeutic purposes and relatively safe to use if used properly, whereas some contain strong pharmacological properties that can pass the placental barrier, stimulants of uterine contraction, and hazardous herb-drug interactions. Hence, it is important to thoroughly and scientifically assess the herbs that are commonly used [56,100]. The use and safety of certain herbs used during pregnancy are described in the succeeding sections, based on their main therapeutic uses. **Table 1** represents the medicinal plants being traditionally used during pregnancy in India, which have been systematically arranged according to the botanical name, botanical family, Sanskrit and Hindi name, plant habit and used part of the plant. Moreover, it explains the conventional ways of making, how to use it to treat different pregnancy complications.

**Table 1. Functional Classification of Medicinal Plants Traditionally
Used During Pregnancy**

Functional Category	Botanical Name	Sanskrit/Hindi Name	Plant Part Used	Traditional Preparation	Traditional Use	Ref. No.
Maternal tonic and nutritional support	<i>Abutilon indicum</i>	Atibala / Kanghi	Root	Root preparation	General tonic	[5]
	<i>Aesculus indica</i>	Pangar	Fruit	Cooked fruit	Maternal tonic	[101]
	<i>Ananas comosus</i>	Ananas	Fruit	Fresh fruit	Uterine tonic	[102]
	<i>Berberis lycium</i>	Daruharidra / Kasmal	Bark	Decoction	General tonic	[101]
	<i>Chenopodium album</i>	Bathua (Bethu sag)	Leaves	Decoction	Nutritional tonic	[101]
	<i>Costus speciosus</i>	Kebuka / Keu	Rhizome	Powder	General tonic	[103]
	<i>Symplocos racemosa</i>	Lodhra / Lodh	Bark	Powder	Pregnancy tonic	[104]





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	<i>Taraxacum officinale</i>	Dulal	Leaves	Cooked leaves	Maternal tonic	[101], [105]
	<i>Zingiber officinale</i>	Aardraka / Adrak	Rhizome	Powder	General tonic	[105]
Management of nausea and vomiting	<i>Aegle marmelos</i>	Bilva / Bel	Root	Decoction	Vomiting	[106]
	<i>Ajuga bracteosa</i>	Nilkanthi	Whole plant	Infusion	Vomiting	[101]
	<i>Citrus medica</i>	Baranimbu	Fruit	Juice	Vomiting	[106]
	<i>Fumaria indica</i>	Araka / Pitpapra	Leaves	Decoction	Vomiting	[101]
	<i>Mentha arvensis</i>	Pudina	Leaves	Infusion	Vomiting	[101]
	<i>Nepeta cataria</i>	Catmint	Leaves	Cooked leaves	Vomiting	[101]
	<i>Oxalis corniculata</i>	Amlika / Amrulsak	Leaves	Fresh leaves	Vomiting	[101]
	<i>Prunus persica</i>	Shaftalu	Leaves	Infusion	Vomiting	[101]
	<i>Swertia petiolata</i>	Pahadi Kirata	Leaves	Juice	Vomiting	[101]
	<i>Zingiber officinale</i>	Aardraka / Adrak	Rhizome	Fresh juice	Morning sickness	[106]
Management of anemia	<i>Diospyros melanoxylon</i>	Dirghapatrika	Bark	Juice	Anemia	[106]
	<i>Emblica officinalis</i>	Adiphala / Amla	Fruit	Fresh fruit	Anemia	[5]





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	<i>Heliotropium indicum</i>	Bhurundi / Hattajuri	Root	Decoction	Anemia	[5]
	<i>Rubia cordifolia</i>	Manjistha / Manjith	Whole plant	Decoction	Anemia	[5]
Management of abdominal discomfort	<i>Bacopa monnieri</i>	Nirabrahmi / Brahmi	Whole plant	Juice	Abdominal pain	[107]
	<i>Benincasa hispida</i>	Kushmanda / Petha	Fruit	Juice	Flatulence	[107]
	<i>Ocimum gratissimum</i>	Vridhdha Tulsi / Bantulsi	Leaves	Decoction	Abdominal pain	[5]
	<i>Plumbago zeylanica</i>	Chitraka / Chitrak	Root	Infusion	Abdominal pain	[5]
	<i>Ficus hispida</i>	Kakadumbura / Daduri	Fruit	Boiled fruit	Abdominal pain	[5]
	<i>Schleichera oleosa</i>	Kusum	Bark	Medicated bath	Abdominal pain	[5]
	<i>Ziziphus mauritiana</i>	Ajapriya / Ber	Stem bark	Paste	Abdominal pain	[106]
	<i>Ziziphus oenoplia</i>	Srigalakoli / Makai	Bark	Paste with honey	Abdominal pain	[5]
Management of back pain	<i>Cissampelos pareira</i> var. <i>hirsuta</i>	Ambashtha / Akanadi	Leaves	Leaf paste	Back pain	[106]
	<i>Trigonella foenum-graecum</i>	Methika / Methi	Seeds	Boiled with milk	Back pain	[5]
	<i>Zingiber officinale</i>	Aardraka / Adrak	Rhizome	Ghee with sugar	Back pain	[5]
Prevention of miscarriage	<i>Rubus niveus</i>	Kalahinsalu	Leaves	Leaf infusion	Prevent miscarriage	[101]
	<i>Verbena officinalis</i>	Karaita	Whole plant	Decoction	Prevent miscarriage	[101]





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	<i>Viburnum opulus</i>	Eri	Plant (NS)	Powder	Prevent miscarriage	[105]
	<i>Vitis vinifera</i>	Draksha / Angur	Leaves	Decoction	Prevent miscarriage	[101]
Hemorrhage control	<i>Evolvulus alsinoides</i>	Vishnugandhi / Shyamakranta	Flowers	Honey pills	Hemorrhage	[5]
	<i>Solanum indicum</i>	Brihati (Virihati) / Barhanta	Fruit	Fruit paste	Hemorrhage	[5]
	<i>Wedelia chinensis</i>	Bhringaraja / Bhanra	Whole plant	Decoction	Uterine hemorrhage	[5]
Facilitation of labour (Late Pregnancy)	<i>Aerva lanata</i>	Astmabayota / Chaya	Whole plant	Decoction with milk	Facilitate delivery	[107]
	<i>Mollugo pentaphylla</i>	Pitagohan	Whole plant	Decoction	Facilitate delivery	[107]
	<i>Sida alnifolia</i>	Bhiunli	Whole plant	Paste with milk	Facilitate delivery	[107]
Respiratory discomfort	<i>Viola odorata</i>	Nilapushpa / Banafshah	Flowers	Decoction	Breathlessness	[101]

4.1 Management of Nausea and Vomiting

Nausea and vomiting, or "morning sickness," is a common symptom of pregnancy especially in the first trimester. Ginger (*Zingiber officinale*) is the most widely researched on the list of herbal remedies and there has been evidence that it can help decrease nausea and vomiting in various randomized clinical trials and systematic reviews. The active ingredients (gingerols and shogaols) are thought to stimulate gastric motility and have antiemetic properties, and, when taken at the recommended dose, appear to have little risk to the fetus. There are other herbs which are used to alleviate nausea, including peppermint (*Mentha × piperita*) and lemon preparations, but there is not the same amount of proof for these herbs. Unproven herbal medications should be avoided by pregnant women, especially those that may have uterotonic or toxic properties [108].





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- **Ginger (*Zingiber officinale* Roscoe):**

Ginger is a perennial herb of the *Zingiberaceae* family, which is one of the most culturally important and widely used therapeutic rhizome in traditional food and indigenous maternal care around the world. In traditional Indian medicine (Ayurveda) and African traditional medicine, ginger is traditionally classified as a warming tonic, an anti-emetic and a digestive stimulant. In many parts of the world, including sub-Saharan Africa and the Indian subcontinent, pregnant women often use raw ginger, ginger teas or herbal ginger decoctions as a first line, self-administered treatment for early gestation discomforts. It is mainly used in the first trimester to relieve morning sickness and very high levels of vomiting, such as hyperemesis gravidarum, but also is used in traditional obstetric treatments for maternal complications such as prenatal back pain, respiratory inflammation and postpartum fatigue [109,110].

Botanical and Common Names:

Zingiber officinale

Zingiberis rhizome

Hindi: Adrak

Sanskrit: Aardraka

Indonesian: Jahe

Zingiber

Jamaica ginger or African ginger

(based on geographic origin)



Organoleptic properties:

Color: pale yellowish-brown

Odor: Aromatic

Taste: Strongly pungent, spicy, and warming

Texture: Fibrous

Figure: 1 Ginger (*Zingiber officinale* Roscoe)

Phytochemical Composition and Molecular Mechanisms of Action

Zingiber officinale shows a wide range of therapeutic potential in the peri-natal period, reflecting a complex matrix of active lipophilic secondary metabolites, among which the non-





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volatile pungent phenylpropanoid derivatives, namely gingerols (6-gingerol) and the thermal degradation products called Shogaols (6-shogaol) stand out. The antiemetic action of these bioactive compounds is mainly due to their pharmacodynamically potent actions as antagonists of peripheral serotonin (5-HT₃) and cholinergic receptors in the enteric nervous system (ENS) of the gastrointestinal tract [111,112]. The receptor modulation enhances gastric motility, speeds gastric emptying and reduces gastrointestinal transit time, resulting in a normalization of hypermotility and inhibition of the physiological stimulus for nausea. Ginger has extensive systemic anti-inflammatory and antioxidant effects, in addition to its gastrointestinal effects. Gingerols and shogaols inhibit the activity of cyclooxygenase-2 (COX-2) and the production of pro-inflammatory cytokines (tumor necrosis factor alpha (TNF- α) and Interleukin-6 (IL-6) are the key inflammatory cascades that are down regulated by the structural components of gingerols and shogaols. Moreover, *Zingiber officinale* has a high pharmacological potential to prevent systemic oxidative stress and to enhance maternal endothelial function, directly targeting pathways that are often altered in diseases such as preeclampsia and gestational hypertension [113].

In clinical and regulatory terms, represents one of the few maternal herbs that have been traditionally used and have been backed by comprehensive, randomized controlled trials (RCT) and systematic meta-analyses. Several high-quality human trials have been combined into a systematic review, which found that an average of 1 gram of dried ginger root daily can help significantly decrease the intensity and occurrence of pregnancy-induced nausea when compared to placebo. Other studies confirm that there is no significant clinical correlation between doses of 500mg–1000mg (up to 1500mg) of dried rhizome, taken daily in a 4-day course, and reductions in birth weight, or other congenital malformations. However, the fact that it is a relatively safe herb means it poses special obstetric cautions when administered as medicine in large doses. Ginger can be potentially toxic to fetuses and mothers if taken in amounts in excess of 1000-1500mg/day. Shogaols and gingerols have intrinsic antiplatelet properties, which can severely impair maternal haemostasis and increase the risk of





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spontaneous haemorrhaging or bleeding complications if consumed near the time of labour or right before surgical delivery such as caesarean section. Also, there are preclinical rodent models that suggest that high and non-standardized doses may cause low grade, unwanted myometrial contractions. Thus, although low dose *Zingiber officinale* is clinically validated, a non-pharmacological adjunct for gestational emesis, care needs to be taken in its implementation with qualified medical supervision to prevent gastric irritation, severe heartburn and accidental abortifacient response [15,109,114,115].

- **Peppermint (*Mentha piperita*):**

Peppermint (*Mentha piperita* L.) is a perennial herb of the Lamiaceae family, which is well known as a medicinal plant in the region, with local names like Pudina in the Indian subcontinent. Culturally, it is used in different parts of the world including the Middle East, sub-Saharan Africa, and India as a major natural remedy for common discomforts of pregnancy. Peppermint is traditionally used as a mild tea infusion of the leaves or by oil extracts, and is highly recommended for pregnant women to treat gastrointestinal problems, such as nausea, vomiting, flatulence, indigestion, and irritable bowel syndrome (IBS). Peppermint leaf infusions have also been reported to be used for inducing labor in some traditional Indian folk medicine. People often use peppermint leaves and mild teas to stop feelings of nausea and morning sickness. Generally considered safe as a dietary supplement in moderate concentrations, essential oils and other highly concentrated products should not be used during pregnancy because they may have negative gastrointestinal effects. In addition, too much peppermint should be avoided in early pregnancy as it can have an emmenagogue (menstruation stimulating) effect [13,116].





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Botanical and Common

Names:

Mentha piperita

Peppermint,

Mint,

Pudina (Hindi)



Organoleptic properties :

Color: Green to dark brownish-green

Odor: Strong, penetrating, and highly aromatic (menthol-like)

Taste: Pungent and spicy initially, followed by a prominent and distinct cooling sensation and warming

Texture: Papery, brittle, and slightly hairy

Figure: 2 Peppermint (*Mentha piperita*)

Pharmacological Applications and Clinical Efficacy

The main use of *Mentha piperita* in pregnancy is gastrointestinal. The clinical trials showed that peppermint and concentrated essential oil from peppermint is effective in relieving the spasms and discomfort of irritable bowel syndrome (IBS) symptoms. Pregnant women often find relief from severe bloating and stomach pain by using peppermint during their third trimester when their digestive system is often affected by hormonal changes and their stomachs tend to get bigger. The safety of *Mentha piperita* will be greatly variable depending on the dosage and the form of administration. Peppermint leaves and oils are considered safe when consumed in small quantities as part of a normal diet, or as a mild herb tea. Generally, the herb is categorized under a "safe with caution" classification, which is considered to have a low to moderate risk of causing pregnant women problems. Its application isn't without risks, however. Peppermint has mild to moderate side effects that have been reported such as heartburn, dry mouth, belching, dizziness, headache, and skin rashes [117,118].





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4.2 Herbs for Digestive Health

Many people experience gastrointestinal symptoms like bloating, constipation, heartburn, and indigestion during pregnancy. There are some medicinal plants which have been used traditionally to enhance digestive function and alleviate gastrointestinal discomfort. Fennel (*Foeniculum vulgare*) has carminative and antispasmodic properties which could help reduce bloating and abdominal pain; peppermint (*Mentha piperita*) can help relieve dyspepsia and abdominal spasms. For constipation, dietary fibre supplements and adequate hydration have been emphasized as first line treatments and stimulant herbal laxatives, like senna, should be used only under medical supervision as they could lead to an electrolyte imbalance or stimulation of the uterus at high doses. Many digestive herbs are not well established for their safety during pregnancy, and thus should be used with care in practice [116,119].

Chamomile (*Matricaria chamomilla* / *Chamaemelum nobile*):

It is one of the most popular herbal teas in the world; it is commonly made from dried flowers. Chamomile is popular in maternal ethnomedicine as it is free of caffeine and thought of as a gentle and soothing remedy. It is commonly used by pregnant women to help reduce gastrointestinal irritation, as a digestive aid and to help ease symptoms of morning sickness. In addition to its gastrointestinal applications, it is used very much in the first and third trimesters as a relaxing agent to relieve anxiety, insomnia, and joint pain. These were commonly used for their digestive properties and to calm gastrointestinal irritation, flatulence and bloating. Since it's caffeine-free, it is generally believed to be safer to drink than tea. Too much, however, is a very bad thing, and chamomile has blood stimulating properties that may lead to uterine contractions, premature labor, or miscarriage in high doses [73,120,121].





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Botanical and Common

Names:

Matricaria chamomilla L.,

Chamaemelum nobile,

Chamomile,

German chamomile, Roman chamomile.



Organoleptic properties :

Color: Yellowish-green (center disc florets) with white (ray florets)

Odor: Aromatic, sweet,

Taste: Slightly bitter

Texture: Fragile, brittle dried flower heads

Figure: 3 Chamomile (*Matricaria chamomilla*)

Pharmacological Applications and Clinical Efficacy

Chamomile is used for its mild sedative and antispasmodic action to treat smooth muscle spasm in the gastrointestinal tract. The use of this herb is not limited to prenatal use and clinical trials have also looked at this herb's effectiveness in postpartum care. Inhalation of chamomile essential oil was found to be effective in reducing the intensity of postoperative pain after cesarean delivery in women who gave birth for the first time, which indicates the potential of chamomile essential oil as a nonpharmacologic postoperative pain reliever during recovery from cesarean delivery. While Chamomile is a popular calming tea, it has a "moderate" risk for pregnancy and should be taken with caution. Occasional use of alcohol is acceptable, but frequent or heavy is very risky with a pharmacological point of view. Chamomile can stimulate blood flow and uterine contractions, causing early labor or miscarriage. Clinically there are reported associations of chamomile use in pregnancy with adverse neonatal outcomes, such as low birth weight, and preterm delivery, and literature searches have confirmed this. Also, it can cause allergic reactions in susceptible persons and may increase the action of CNS (central nervous system) depressants and cause CNS depression or hypotension when taken with some drugs. Other negative side effects noted by users include breast tenderness and engorgement during the postpartum and lactating period. As a result, healthcare practitioners recommend





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caution in its use during pregnancy [122–125]. Specifically, evidence suggests that the hydro-alcoholic extract of *Matricaria chamomilla* possesses both spasmodic and spasmolytic properties, which may heighten the risk of spontaneous miscarriage or premature parturition if consumed in higher concentration ranges [126,127].

● Fennel (*Foeniculum vulgare*)

Fennel (*Foeniculum vulgare*) is a member of the *Apiaceae* family, an aromatic herbaceous plant. It is well known for its culinary and medicinal uses throughout the world. In maternal ethnomedicine, it's often used by women from various global communities: for example, research shows that the herb is one of the most commonly consumed herbs among pregnant women in Australia, Norway, and in Tuscany. It has a significant role in the indigenous postnatal care in the Indian subcontinent where it is popularly called Madhurica or Saunf [128,129].

Botanical and Common

Names:

Foeniculum vulgare Mill.

Fennel,

Madhurica,

Saunf



Organoleptic properties :

Color: Greenish-yellow to pale yellowish-brown

Odor: Aromatic, sweet,

Taste: Sweet slightly camphoraceous

Texture: Small, oval, ribbed, and slightly curved dry seeds

Figure: 4 Fennel (*Foeniculum vulgare*)

Pharmacological Applications and Clinical Efficacy

Foeniculum vulgare is mainly recommended in perinatal care in the postpartum stage, but not in active gestation. The plant has been extensively used in traditional medicine for the recovery of mothers, primarily for its galactagogue activity. It's given regularly to breastfeeding mothers





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to help stimulate and encourage breast milk production so the baby can get all the milk it needs. The worldwide use of fennel, its cultural acceptance and its use as food indicates that it may be used safely in the clinic, but that standard clinical precautions should be observed. The literature review available for the region has identified its main therapeutic use as promoting postpartum lactation, not as a supplement during pregnancy. Like many herbal products, pregnant and nursing mothers are advised to take it in the usual dosage, because the concentrated extracts or unstandardized herbal medicines may have unknown effects due to variable amounts of phytochemicals. Proper screening of its use should be done by healthcare providers to avoid interfering with traditional postpartum recovery or lactation plans [61,130,131].

4.3 Herbs for Stress and Sleep Support

Relative common psychological stress, anxiety, and sleep disturbances can not only be experienced by pregnant women, but can also negatively impact upon maternal and fetal outcomes. Some herbs have been used traditionally for their calming and sedative effects. Chamomile (*Matricaria chamomilla*), lavender (*Lavandula angustifolia*), Valerian (*Valeriana officinalis*) and lemon balm (*Melissa officinalis*) have been studied for mild anxiety and sleep disturbances in the general population, but there is a lack of specific research in pregnant women. Although popular as an adaptogenic herb in traditional medicine, the safety of these herbs during pregnancy has not been established and some reports indicate that ashwagandha (*somnifera*) may have uterine stimulant activity. Non-pharmacological treatment such as sleep hygiene, relaxation technique, psychological counselling etc. should be considered as the first line treatment unless herbal therapy is advised by medical advice and evidence-based guidelines [132–134].

- **Lavender (*Lavandula angustifolia*):**

Lavender (*Lavandula angustifolia*), also known as true lavender or English lavender, is a popular scented herb that is used for its medicinal and fragrance benefits worldwide.





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Throughout pregnancy, women often turn to traditional remedies or natural remedies to help alleviate the physical and emotional pressures of pregnancy. During pregnancy, lavender is used as a natural calming agent that helps to relax and ease tension, as well as to sleep. It is usually used as a light herb tea or as a light oil fragrance in aromatherapy. Lavender has been used to soothe anxiety, ease tension and induce sleep. It is also used to treat mild headaches. It is thought to be safe if inhaled or taken moderately as a mild tea, but not when taken in large quantities of highly concentrated essential oils [135,136]. Clinical trials have demonstrated that lavender-based preparations can effectively mitigate stress and anxiety during gestation, with some studies indicating that lavender cream serves as a viable non-pharmacological intervention for these symptoms [137].

Botanical and Common Names:

Lavandula angustifolia

True lavender,

English lavender



Organoleptic properties :

Color: Purplish-blue to grayish-blue

Odor: Floral, sweet, and soothing.

Taste: Slightly bitter and camphoraceous

Texture: Small, tubular, and brittle dried flowers

Figure: 5 Lavender (*Lavandula angustifolia*)

Pharmacological Applications and Clinical Efficacy

Lavender's main use in pregnancy is for its sedative neuropharmacological properties. *Lavandula angustifolia* is well known for its ability to promote sleep and relieve anxiety, and is thought to help reduce the anxiety that often occurs during gestation, as well as sleep disturbances. Lavender also helps to reduce sleep disorders and emotional stress, and has been





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shown to be an effective therapeutic treatment for mild headaches and for reducing light to moderate physical tension. When used judiciously, lavender has an extremely positive safety profile in terms of maternal and fetal safety. The lavender plant is thought to be safe for pregnant women when used in aromatherapy for inhalation (as part of an ambient atmosphere) and in a mild tea. But there are important dosage and formulation safety considerations. The main contraindication for lavender while pregnant is the use of very strong concentrated essential oils of lavender. These highly concentrated oils should not be used in large amounts or ingested directly by pregnant women, as they may be toxic or cause unpredictable pharmacological effects [138,139].

- **Valerian (*Valeriana officinalis*):** Valerian root is traditionally used as a mild sedative to relieve stress, anxiety and sleep disorders. There is very little information about safety of its use during pregnancy, although it is popular. Some animal studies have indicated that valerian use in pregnancy may decrease zinc levels in the fetus's brain and so it is strongly recommended that pregnant women use it very sparingly and only with a doctors' prescription [84,140].

4.4 Evidence-Based Evaluation

While herbal remedies are popular and well accepted in many cultures, systematic evidence-based testing and evaluation of these herbs shows that there are definite gaps in clinical evidence of their safety and efficacy in pregnancy. Many herbal products are marketed as dietary products and some do not require pre-market clinical trials; their dosages and quality control are poorly defined. The lack of strict regulations raises the likelihood of contamination with heavy metals or pesticides, or addition of undeclared pharmaceuticals. Additionally, extracts from whole herbs may contain several bioactive phytochemicals that may cause a wide range of non-anticipated side-effects, from mild gastrointestinal disturbances to serious effects such as teratogenicity, fetal distress or spontaneous abortion. Herbs that are used in combination with conventional medicines are also likely to cause herb-drug interactions,





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causing unexpected changes in the metabolism of a drug that may result in toxicity or inactivity. As a result, it is recommended to have strong pharmacovigilance and it is important to note that herbal medicines must be used only in pregnancy when overseen by qualified health care professionals [53,141].

5. Herbs for Labor Preparation and Childbirth

The application of herbal medicines for labor preparation and childbirth has been reported in various traditional medical systems such as Ayurveda, Traditional Chinese Medicine (TCM) and indigenous medicine systems. These herbs are frequently used to increase uterine tone, prepare the cervix, enhance uterine efficiency, reduce labour time and promote a smooth delivery. But, since labour is a complex physiological process, the use of an herbal remedy should be taken into account as safe for mother and child. As women near term, many resort to using botanicals as a contraceptive to induce labor, reduce the length of childbirth and control the intense pain of contractions. Many women use botanicals as a contraceptive towards the end of their pregnancies when they plan on inducing labor, shorten the duration of childbirth and control the pain of the contractions [142,143]. These herbs are especially common in areas such as sub-Saharan Africa and India where they are an accepted part of culture, readily available, and also seen as offering a safer, more "natural" birth experience than traditional medical methods. Although synthetic oxytocics are much used in modern obstetrics to aid in labour, traditional midwifery has relied on indigenous herbs with a reputed uterotonic action, which are frequently taken as oral teas, powders or decoctions by the women at the end of pregnancy or at the birth itself. But there are pharmacological implications and risks associated with the use of botanicals to induce labor. Due to their ability to stimulate the smooth muscle of the uterus (myometrium), they can cause dangerous hyperstimulation if not used under the supervision of a healthcare professional [10,142,144]. Therefore, it is important to assess their traditional applications in conjunction with their mechanism of action and clinical safety profile in order to safeguard maternal and infant health. Cartelized the medicinal plants used





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specifically in childbirth in various regions systematically in **Table no 2**. This provides a description of each species in botanical names and families, local Sanskrit and Hindi names, and plant form and the particular part of the plant used. In addition, the table offers traditional information on how the food is prepared, how it's consumed, the amount, and exactly what the medicine was intended to be used for to deal with any complications and the labor and delivery process.

**Table 2. Functional Classification of Medicinal Plants Traditionally
Used During Childbirth**

Functional Category	Botanical Name	Sanskrit/Hindi Name	Plant Part Used	Traditional Preparation	Traditional Use	Ref. No.
Facilitation of normal delivery	<i>Achyranthes aspera</i>	Chirchitaa / Latjira	Root	Powder or fresh root tied to right thumb	Facilitate delivery	[101], [102], [103]
	<i>Aerva lanata</i>	Astmabayota / Chalya	Whole plant	Whole plant preparation	Facilitate delivery	[5]
	<i>Abrus pulchellus</i>	Gunja / Gunchi	Seeds	Seed paste with milk	Facilitate delivery	[5]
	<i>Acacia catechu</i>	Khadira / Khair	Bark	Traditional preparation	Facilitate delivery	[5]
	<i>Aloe vera</i>	Grihkanyaa / Ghee Kanwar	Leaves	Leaf pulp	Facilitate delivery	[101]
	<i>Asparagus racemosus</i>	Shatmuli / Shatawar	Leaves	Leaf juice	Facilitate delivery	[5]
	<i>Boerhaavia diffusa</i>	Punarnava / Sant	Root	Root paste	Facilitate delivery	[5]
	<i>Bombax ceiba</i>	Salmali / Semul	Stem bark	Traditional preparation	Facilitate delivery	[5]
	<i>Butea monosperma</i>	Palasha / Palas	Bark, gum	Infusion	Facilitate delivery	[5]





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	<i>Cassia tora</i>	Dadamari / Chakunda	Whole plant	Young seedlings chewed	Facilitate delivery	[5]
	<i>Citrullus colocynthis</i>	Mahendravaruni / Indrayan	Fruit, Root	Fruit juice or root paste	Facilitate delivery	[5]
	<i>Clinopodium umbrosum</i>	—	Whole plant	Infusion	Facilitate delivery	[101]
	<i>Clitoria ternatea</i>	Aparajita	Root	Traditional use	Facilitate delivery	[5]
	<i>Cyathula prostrata</i>	—	Whole plant	External paste	Facilitate delivery	[5]
	<i>Dillenia pentagyna</i>	Aggai	Gum	Gum dissolved in water	Facilitate delivery	[5]
	<i>Eleusine indica</i>	Mandla	Leaves	Leaf juice	Facilitate delivery	[101]
	<i>Gloriosa superba</i>	Langli / Karihari	Rhizome	Traditional use	Facilitate delivery	[5]
	<i>Linum usitatissimum</i>	Atasi / Alsi	Seeds	Seed powder	Facilitate delivery	[101]
	<i>Malus domestica</i>	Banmahal	Fruit	Fresh fruit	Facilitate delivery	[101]
	<i>Nasturtium officinale</i>	Piriyahalim	Leaves	Leaf decoction	Facilitate delivery	[101]
	<i>Plantago lanceolata</i>	Baltanga	Leaves	Cooked leaves	Facilitate delivery	[101]
	<i>Polypleurum stylosum</i>	—	Whole plant	External paste	Facilitate delivery & pain relief	[5]
	<i>Punica granatum</i>	Dadima / Anar	Seeds	Seeds with honey and ghee	Facilitate delivery	[5]
	<i>Rauvolfia</i>	Sarpagandha	Root	Decoction	Facilitate	[102]





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	<i>serpentina</i>				delivery	
	<i>Rubia cordifolia</i>	Manjistha / Manjith	Root	External abdominal massage	Facilitate delivery	[5]
	<i>Sida acuta</i>	Bala / Bariara	Root	Root paste	Facilitate delivery	[5]
	<i>Viburnum prunifolium</i>	Eri	Plant (NS)	Powder	Facilitate delivery	[5]
Management of labour pain	<i>Acacia pennata</i>	Aila	Leaves	Decoction	Labour pain	[5]
	<i>Achyranthes aspera</i>	Chirchitaa / Latjira	Root	Infusion	Labour pain	[5]
	<i>Aloe vera</i>	Grihkanyaa / Ghee Kanwar	Leaves	Leaf juice	Labour pain	[5]
	<i>Amaranthus caudatus</i>	Ramdana	Seeds	Cooked seeds	Labour pain	[101]
	<i>Amaranthus viridis</i>	Tanduliya	Seeds	Cooked seeds	Labour pain	[101]
	<i>Artemisia absinthium</i>	Indhana	Whole plant	Infusion	Labour pain	[101]
	<i>Cannabis sativa</i>	Bhanga / Bhang	Leaves	Leaf infusion	Labour pain	[101]
	<i>Chenopodium botrys</i>	Bethu Sag	Whole plant	Decoction	Labour pain	[101]
	<i>Elettaria cardamomum</i>	Upakunchika / Choti Elaichi	Fruit	Milk formulation	Labour pain	[5]
	<i>Geranium wallichianum</i>	Laljhari	Root	Decoction	Labour pain	[101]
	<i>Glycyrrhiza glabra</i>	Madhuka / Mulethi	Seeds	Seed paste	Labour pain	[101]
	<i>Lepidium sativum</i>	Chandrashura / Halim	Seeds	Decoction	Labour pain	[101]
	<i>Ocimum</i>	Munjariki /	Leaves	Infusion	Labour pain	[101]





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	<i>basilicum</i>	Babui Tulsi				
	<i>Rumex nepalensis</i>	Kulii	Leaves	Cooked leaves	Labour pain	[101]
	<i>Trachyspermum ammi</i>	Ajmoda / Ajwain	Seeds	Herbal decoction	Labour pain	[5]
Induction of labour	<i>Bidens pilosa</i>	Samara	Leaves	Decoction	Induce labour	[101]
	<i>Calotropis gigantea</i>	Arka / Aak	Latex	Latex with coconut oil	Induce labour	[5]
	<i>Cydonia oblonga</i>	Amriphala / Bihi	Seeds	Seed infusion	Induce labour	[101]
	<i>Dactylorhiza hatagirea</i>	Hatta Hadad	Tuber	Powder	Induce labour	[101]
	<i>Gloriosa superba</i>	Langli / Karihari	Root	External paste	Induce labour	[107]
	<i>Mentha piperita</i>	Pudina	Leaves	Infusion	Induce labour	[5]
	<i>Physalis alkekengi</i>	Tulatipati	Seeds	Powder	Induce labour	[5]
	<i>Rauvolfia serpentina</i>	Sarpagandha	Root	Decoction	Induce labour	[5]
	<i>Sisymbrium irio</i>	—	Seeds	Decoction	Induce labour	[101]
	<i>Tagetes minuta</i>	Ganduga / Genda	Leaves	Leaf juice	Induce labour	[101]
	<i>Trapa natans</i>	Shringata / Singhara	Fruit	Cooked fruit	Induce labour	[101]
	<i>Urtica dioica</i>	Bichubuti	Leaves	Cooked leaves	Induce labour	[101]
Placental expulsion	<i>Argyrea nervosa</i>	Samudrapalaka	Leaves	Leaves applied on earlobes	Placenta removal	[5]
	<i>Moringa oleifera</i>	Shobhanjana / Munga	Root, Leaves	Root paste	Placenta removal	[107]





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	<i>Podophyllum hexandrum</i>	Bakrachimaka	Whole plant	Decoction	Placenta removal	[101]
Management of hemorrhage	<i>Boerhaavia diffusa</i>	Punarnava / Sant	Leaves	Leaf juice	Hemorrhage	[5]
	<i>Bombax ceiba</i>	Salmali / Semul	Root bark	Traditional preparation	Hemorrhage	[5]
	<i>Clitoria ternatea</i>	Aparajita	Flowers	Traditional preparation	Hemorrhage	[5]
Management of abdominal pain	<i>Abrus precatorius</i>	Gunja / Gunchi	Seeds	Seeds with jaggery	Abdominal pain	[5]
	<i>Cardiospermum halicacabum</i>	Karnasphota / Kanphuti	Leaves	Decoction	Abdominal pain	[5]
Management of preeclampsia	<i>Veratrum nigrum</i>	—	Root	Traditional preparation	Preeclampsia	[5]

5.1 Traditional Uterine Tonics

A number of plants are traditionally used in African ethnomedicine to help speed up the delivery process and increase the contractions. They are African spider plant (*Cleome gynandra*), *Cissampelos mucronata* and vine species known locally as Mwanamphopo (*Cissus* species and *Ampelocissus* species). In traditional Indian medicine, many different plants are used at the time of childbirth. Plants such as *Achyranthes aspera* and *Boerhaavia diffusa* are used as paste or infusion for the ease of delivery and to control labour pains. A group of medicinal plants have traditionally been considered as uterine tonics and prepared in late pregnancy to prepare the mother for childbirth. Red raspberry leaf (*Rubus idaeus*) is one of the most popular herbs and it's also thought to tone the uterine muscles, aid coordination of contractions and help minimize labor problems. Herbs like Shatavari (*Asparagus racemosus*) are also recommended in Ayurvedic medicine for the general health of women and the reproductive system, but are not necessarily prescribed for the induction of labor. Blue cohosh





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(*Caulophyllum thalictroides*), black cohosh (*Actaea racemosa*), and castor oil (*Ricinus communis*) have been used in the past for inducing labor. Such agents, however, have been linked to significant maternal and fetal complications, and are typically not recommended for general obstetric use unless there is close medical monitoring [145,146].

Red Raspberry Leaf (*Rubus idaeus*): It is a well-known herb extensively used in the world as a maternal herbal medicine, usually taken as an herbal tea or as a capsule. It is also rich in minerals, and regarded as an old Chinese uterine tonic. It has always been used by expectant mothers and midwives as a traditional medicine for morning sickness, painful menstruation, prevention of miscarriage, promotion of childbirth and lactation. It has been used for its obstetrical properties as an astringent, and for the treatment of maternal diarrhea. It is regionally recognized in the Indian subcontinent and is used for lactation in the postpartum period and as a tonic. This is an internationally renowned herb that is rich in minerals and a tonic for the uterus. It is a legend in the use of making work more efficient, helps childbirth and prevents complications at the end of pregnancy [73,147].

Botanical and Common

Names:

Rubus idaeus L.

Red raspberry leaf, Garden raspberry leaf, Hindalu,

Adher



Organoleptic properties :

Color: Pale green to slightly silvery-grey

Odor: Faint, pleasantly herbal, and tea-like

Taste: Astringent, slightly bitter, and reminiscent of mild black tea

Texture: Crinkled, delicate, and slightly hairy (pubescent) dried leaves

Figure 6 Red Raspberry Leaf (*Rubus idaeus*)

Pharmacological Applications and Clinical Efficacy





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The main clinical and historical uses of red raspberry leaf are for quick, effective labor and for reduction of bleeding in childbirth. A study of 192 women at 32 weeks gestation found that taking 1.2 g of raspberry-leaf tablets twice a day was effective in reducing the second stage of labour without any side effects. In this study, it was also found that medical interventions (C-section or assisted deliveries) were less required for raspberry leaf users. But modern clinical data is still conflicting [148]. In recent year 2024, a prospective observational study was conducted that showed that the evidence for efficacy for inducing labor or ripening the cervix was inconclusive, and caution should be used, until further, rigorous research into its effectiveness is conducted. The safety of *Rubus idaeus* in pregnancy is said to be controversial with moderate to high risk depending on the stage of administration. The fruit of the red raspberry is safe to eat during pregnancy but the use of the leaf for medicinal purposes should be taken very seriously. The leaf is a uterine tonic and can also cause uterine contractions, so pregnant women are strongly advised to avoid using it completely in the initial three months to reduce the chance of miscarriage. Further, it has been traditionally believed to have a positive influence on the process of labour, but there are some clinical reports of negative effects after the use of this product such as maternal hypoglycaemia, and even an increase in the rate of cesarean section deliveries in comparison with non-users. As a result, healthcare experts advise pregnant women to seek advice from their doctors prior to using red raspberry leaf to prepare for childbirth [72,119].

5.2 Mechanisms of Action

There are several potential mechanisms by which the herbs in uterine tonics can affect labor, depending on the herbs' phytochemical content. Alkaloids, flavonoids, glycosides, or volatile oils exist in some herbs that can influence smooth muscle contractility, prostaglandin synthesis, calcium signaling, or hormonal pathways that impact uterine activity. For instance, some compounds found in raspberry leaf can be used to control the tone of the uterine muscles and increase the coordination of contractions, but the exact mechanisms of action are still not fully





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understood. Some herbs have been used in traditional medicine to induce labor may also trigger the release of prostaglandins and/or may directly stimulate the contractions of myometrial tissue, encourage the dilation of the cervix and stimulate uterine activity. These effects can be beneficial in theory for labor but can also cause, with excessive stimulation, fetal hypoxia, postpartum complications or uterine rupture in susceptible women [149–151]. Therefore, it is important that the results of mech't be blindly translated to clinical use without sufficient clinical evidence.

- **Prostaglandin Receptor Activation:** Castor oil (*Ricinus communis*) is used for induction of labor, and is thought to primarily act by stimulating the prostaglandin EP3 receptor. This activation results directly in both laxation and uterine contractions [152,153].
- **Hormonal Stimulation:** Some plants are said to affect the hormones of labor in the body. For instance, pregnant women are believed to release oxytocin when using Clary sage (*Salvia officinale*) essential oil. This can help to enhance the effectiveness of the horizontal contractions of the uterine muscles that are required to help the baby descend down the birth canal to help the cervix expand [150,154].
- **Direct Myometrial Stimulation:** A number of the traditional herbs used contain high levels of potent phytochemicals like alkaloids and steroidal saponins that have strong uterotonic properties and act directly on the myometrium [145].

5.3 Clinical Evidence and Safety

There is current limited and inconsistent evidence to support routine use of herbal medicines for labour preparation. There are some observational studies and small clinical trials that suggest that preparations made from raspberry leaf may have a mild effect on reducing obstetric interventions and/or length of the second stage of labor, but the evidence is too limited from systematic reviews to prove that any such effects are proven. On the other hand, herbs like blue cohosh have been associated with cardiac complications in newborns, fetal distress and adverse events in mothers in individual case reports. Likewise, castor oil can cause gastrointestinal





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distress, dehydration and unpredictable uterine contractions when used to induce labor. Due to the variety of formulations found among herbal remedies and the lack of quality safety information, professional organizations recommend that herbal products be avoided during pregnancy without professional supervision. The healthcare provider should advise pregnant women about the uncertain benefits and risk of using herbs for labor and promote evidence based obstetric care. Randomized controlled trials, pharmacological studies and post-marketing surveillance are required to further establish the efficacy, optimal dosage and safety of these botanical treatments [147,155,156].

The traditional usage of these herbs is supported by some clinical observations. One systematic review determined that women who consumed castor oil were much more likely to deliver within 24 hours as compared to women who did not consume castor oil. Likewise, research on red raspberry leaf suggests it could be effective for reducing the length of the second stage of labor and decrease the likelihood of assisted births, such as C-section or forceps. Although effective, these herbs used for inducing labor are not without risk so it is necessary to be very careful. Oxytocic herbs used to induce labour often led to strong, prolonged uterine contractions which do not always fit in with the way the cervix is naturally dilating. This is a very bad combination of the intensity of contraction and readiness of the cervix, which greatly raises the risk of complications such as fetal distress, postpartum hemorrhage, and a greater risk of emergency cesarean section. In addition, some herbal products, such as castor oil have been specifically associated with fatal uterine rupture due to overstimulation of the uterus. So, medical practitioners do not recommend the use of these herbs without supervision during childbirth [142,156,157].

6. Galactagogues: Herbs Supporting Lactation

Breastfeeding is the preferred way to feed infants and has been recognised as a perfect form of infant nutrition due to the provision of essential nutrients, immunological protection and bioactive compounds that are vital for neonatal growth and development. But for some





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mothers, there is a lack of milk supply because of certain physiological, hormonal, psychological and medical reasons. In such cases, medication called galactagogues can act as stimulants or boosters for milk production. Galactagogues have been used for centuries in traditional medicine like Traditional Chinese Medicine, Ayurveda and folk medicine. Several medicinal plants have been claimed to stimulate lactation, but scientific data regarding their efficacy and safety are very variable and need further scientific evaluation in the clinical setting [158–160].

6.1 Concept of Galactagogues

Galactagogues are natural or man-made substances that encourage the start, maintenance or stimulation of breast milk production. The mechanism of action of herbal galactagogues is thought to occur through several pathways: stimulation of prolactin secretion, modulation of estrogenic activity, improvement of maternal nutrition, enhancement of the function of the mammary gland, and reduction of stress-induced inhibition of lactation. However, proper infant attachment, frequent removal of milk, maternal hydration, nutrition and psychological status are other factors involved in successful breastfeeding. Thus, herbal remedies should be used in conjunction with the accepted breastfeeding support measures [130,160,161].

Fenugreek (*Trigonella foenum-graecum*)

Fenugreek is one of the most popular herbal galactagogues around the globe. The seeds are rich in steroidal saponins (such as diosgenin), alkaloids, flavonoids and mucilage, all of which are thought to have an endocrine and metabolic effect on milk production. There are some clinical trials reporting small amounts of breast milk production among women who are breastfeeding following fenugreek preparations, but results and study quality are variable. Besides its lactogenic activity, fenugreek has antioxidant, antidiabetic and anti-inflammatory properties. Side effects usually occur on the gastrointestinal tract, resulting in diarrhea, and a





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peculiar body odour reminiscent of maple syrup, are usually mild. Use with caution in women who have a legume allergy and/or who are receiving hypoglycemic and anticoagulant drugs, as there may be an interaction between the herbs and the drugs [162–164].

Botanical and Common

Names:

Trigonella foenum-graecum L.

Fenugreek,

Greek hay,

Greek clover,

Methika, Methi.



Organoleptic properties :

Color: Golden to yellowish-brown.

Odor: Sweet, and reminiscent of maple syrup

Taste: Aromatic, slightly bitter, and mucilaginous.

Texture: Aromatic, slightly bitter, and mucilaginous.

Figure 7 Fenugreek (*Trigonella foenum-graecum*)

● **Fennel (*Foeniculum vulgare*)**

The use of fennel for stimulating lactation and for reducing infantile colic is traditional. It contains significant amounts of anethole and estragole, phytochemicals with a phytoestrogenic and antispasmodic effect which can promote milk production and help the mother's digestion. Studies of fennel on milk production and weight gain of infants are small and inconclusive, and additional RCTs are required. Although it is widely used in traditional medicine, its use in excessive amounts is not recommended as it may contain biologically active components whose long-term effects are not known [165].

● **Shatavari (*Asparagus racemosus*)**

Asparagus racemosus, an herbaceous climbing plant of the Liliaceae family, is one of the most revered plants of traditional medicine in the Indian subcontinent. Its Sanskrit name loosely translates as “she who possesses a hundred husbands” and it has long been a primary female reproductive tonic and rejuvenator. Parts of the plant are carefully used in the maternal indigenous medicine at specific phases of the perinatal process. Traditionally, the leaf juice is





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used for the benefit of the mother during birth and the tuberous roots are used extensively in the postpartum period for nourishment and recuperation for the mother. Shatavari is a well-known medicinal plant in Ayurvedic medicine and is considered to be a female reproductive tonic and rejuvenative (Rasayana). It is rich in saponins called shatavarins which are used traditionally for lactation, reproductive health, hormonal balance and for recovering after childbirth. Experimental research indicates that Shatavari can stimulate the production of prolactin and help with the functioning of the mammary glands, and preliminary clinical data show it may be beneficial to improve breast milk production. Shatavari also has antioxidant, immunomodulatory, adaptogenic, and gastroprotective properties, besides its galactagogue effect. But bigger, well-designed clinical trials are needed to determine the effective doses, efficacy, and long-term safety in breastfeeding mothers [166,167].

Botanical and Common Names:

Asparagus racemosus Willd,
Shatavari,
Shatmul,
Shatawar.



Organoleptic properties :

Color: Pale yellow to light brownish-white

Odor: Odorless or faintly earthy.

Taste: Sweet, mucilaginous, and slightly bitter.

Texture: Tuberous, cylindrical, and longitudinally wrinkled thick dried roots

Figure 8 Shatavari (*Asparagus racemosus*)

The greatest clinical use and most well documented of *Asparagus racemosus* in perinatal medicine is as a potent galactagogue during the postpartum period. The traditional therapeutic regimen consists of the crushing of tubers of the plant and twice-daily supplementation with 5–10 ml of fresh root juice for an extended period of three weeks after birth, which is necessary for stimulation of lactation and maintenance of a good breast milk supply for the newborn.





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Moreover, in the intra-partum phase (active childbirth) traditional midwives often give the juice of the leaves (usually 2 teaspoons per day) as a remedy to actively help with the delivery [168,169].

Other Lactation-Promoting Herbs

A number of other medicinal plants have also been used traditionally as galactagogues, but with little or no scientific substantiation. These may include blessed thistle (*Cnicus benedictus*), milk thistle (*Silybum marianum*), moringa (*Moringa oleifera*), goat's rue (*Galega officinalis*), anise (*Pimpinella anisum*), and cumin (*Cuminum cyminum*). In particular, moringa has been the focus of interest due to its high nutritional value and preliminary clinical results indicating enhanced milk production in mothers of premature infants. Although these herbs may have potential use, healthcare providers should critically assess the quality of the product, the dose, the potential for adverse effects, and herb–drug interactions prior to recommending the use of these herbs. The current international recommendations focus on breastfeeding counseling, the correct attachment of the baby to the breast, the nutrition of the mother, and the correction of the reasons that the mother doesn't have enough milk; herbal galactagogues may be used as a complementary therapy if these measures are suitable [159,170,171].

7. Herbs in Postpartum Care

The postpartum period, or puerperium, is a crucial period that immediately follows childbirth, and is generally considered to last for six weeks, while the mother's body recovers and adapts to the responsibilities of breastfeeding and caring for the infant. Fatigue, tissue healing, hormonal changes, nutritional losses and psychological stress are common symptoms for women. Herbal medicine has been a key part of many ancient medicine systems, such as Ayurveda, Traditional Chinese Medicine (TCM) and indigenous healing practices, and has been used to help speed up the healing process, boost vitality, strengthen immune function and promote emotional well-being [172–175]. But postpartum herbal may be used with scientific





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basis and precautions in mind, especially with breastfeeding mothers, because some bioactive components may pass into breast milk. **Table 3** gives detailed information about the traditional medicinal plants used for postpartum management and recovery of mother in India. It classifies each species into its botanical name and botanical family, local Sanskrit/ Hindi name, plant form and which part of the plant is utilized. Moreover, the traditional methods of preparation, administration and dosage are detailed as well as the exact therapeutic applications of these herbs including promotion of lactation, management of postpartum hemorrhage, and relief from abdominal pain during the postpartum period [176,177].

Table 3. Functional Classification of Medicinal Plants Traditionally Used for Postpartum Care

Functional Category	Botanical Name	Sanskrit/Hindi Name	Plant Part Used	Traditional Preparation	Traditional Use	Ref. No.
Enhancement of Lactation (Galactagogues)	<i>Asparagus racemosus</i>	Shatavari / Shatawar	Root	Root powder with milk	Improves breast milk production	[105]
	<i>Boerhaavia diffusa</i>	Punarnava	Root	Root decoction	Galactagogue	[102]
	<i>Cyclea arnotii</i>	Patha	Leaves	Fresh leaf paste with water	Enhances lactation	[5]
	<i>Daucus carota</i>	Shikhamula / Gajar	Root	Fresh root juice	Promotes lactation	[102]
	<i>Euphorbia heterophylla</i>	Dudhi	Leaves	Leaf decoction with milk	Enhances milk secretion	[5]
	<i>Euphorbia hirta</i>	Dudhi	Leaves	Fresh leaf decoction with milk	Galactagogue	[5] [107]





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<i>Ficus benghalensis</i>	Bahupada / Bargad	Seeds	Seed powder with milk	Increases breast milk	[5]
<i>Ficus hispida</i>	Kakadumbura / Daduri	Fruits	Boiled fruits	Galactagogue	[5]
<i>Foeniculum vulgare</i>	Madhurika / Saunf	Whole plant	Traditional preparation	Galactagogue	[105]
<i>Galega officinalis</i>	—	Whole plant	Traditional preparation	Galactagogue	[105]
<i>Hemidesmus indicus</i>	Anantamula / Anantmul	Root	Root paste	Lactation support	[5]
<i>Ipomoea digitata</i>	Bhumikushmanda / Bilalkand	Tuber	Tuber juice with milk	Improves milk secretion	[5]
<i>Lilium polyphyllum</i>	Kakoli	Whole plant	Given with <i>Ipomoea digitata</i>	Lactation	[5]
<i>Madhuca longifolia</i>	Mahua	Leaves	Leaf paste with coconut oil	Applied on breast	[5]
<i>Momordica charantia</i>	Karela	Leaves	Leaf paste with coconut oil	Topical galactagogue	[5]
<i>Moringa oleifera</i>	Shobhanjana / Munga	Leaves	Leaf curry	Improves lactation	[5]
<i>Mussaenda frondosa</i>	Shrivati / Bedina	Leaves	Leaf extract	Galactagogue	[5]
<i>Physalis minima</i>	Tankari / Tulati	Leaves	Leaf decoction	Lactation	[5]
<i>Pimpinella anisum</i>	Shatapushpa / Saunf	Whole plant	Traditional preparation	Galactagogue	[105]
<i>Ricinus</i>	Eranda / Arand	Leaves	Leaf poultice or	Stimulates	[5]





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	<i>communis</i>			juice	milk flow	
	<i>Rubus idaeus</i>	—	Whole plant	Traditional preparation	Lactation	[105]
	<i>Silybum marianum</i>	—	Whole plant	Traditional preparation	Galactagogue	[105]
	<i>Thespesia lampas</i>	Tundikera / Jangli Bhindi	Whole plant	Traditional preparation	Lactation	[5]
	<i>Trachyspermum ammi</i>	Ajmoda / Ajwain	Seeds	Seed powder	Lactation	[5]
	<i>Trigonella foenum-graecum</i>	Methika / Methi	Seeds	Traditional preparation	Lactation	[105]
	<i>Withania somnifera</i>	Ashwagandha / Ashwagandh	Seeds	Seed powder with milk	Lactation support	[5]
	<i>Zingiber officinale</i>	Aardraka / Adrak	Rhizome	Rhizome with jaggery and ghee	Improves lactation	[5]
Control of Postpartum Hemorrhage	<i>Mimosa pudica</i>	Lajja / Lajwanti	Leaves	Leaf paste	Controls hemorrhage	[5]
	<i>Terminalia arjuna</i>	Arjuna	Root, bark, leaves	Powder with honey	Controls postpartum bleeding	[5]
Uterine Contraction and Placental Expulsion	<i>Daucus carota</i>	Shikhamula / Gajar	Root	Traditional preparation	Uterine contraction	[5]
	<i>Meliosma simplicifolia</i>	Kanna	Bark	Tender bark eaten	Uterine contraction	[5]
	<i>Mimosa pudica</i>	Lajja / Lajwanti	Root	Root paste with honey	Uterine contraction	[5]





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	<i>Plumbago zeylanica</i>	Chitraka / Chitrak	Tuber	Tuber juice	Placental expulsion and uterine contraction	[5]
	<i>Polygonum chinense</i>	Ameta	Stem	Stem taken orally	Uterine contraction	[5]
	<i>Trachyspermum ammi</i>	Ajmoda / Ajwain	Rhizome	Polyherbal formulation	Uterine contraction	[5]
Postpartum Recovery and General Health	<i>Dillenia aurea</i>	Bharija / Chalta	Stem bark	Stem bark extract	Restores maternal health	[5]
	<i>Papaver somniferum</i>	Ahifen / Afim	Seeds	Seeds with milk, dates and ghee	Postpartum tonic	[5]
	<i>Pterocarpus marsupium</i>	Pitasara / Bijasal	Bark	Traditional preparation	General tonic	[5]
Uterine Cleansing	<i>Mollugo pentaphylla</i>	Khetpapra / Jharasi	Leaves	Leaf decoction	Cleanses uterus	[107]
Management of Postnatal Complications	<i>Tephrosia purpurea</i>	Sharpunkha / Dhamasia	Leaves	Leaf decoction with honey	Postnatal complications	[5]
Reduction of Postpartum Abdominal Fat	<i>Piper longum</i>	Pipali / Pipli	Fruit	Traditional preparation	Reduces abdominal fat	[5]
Management of Nipple Swelling	<i>Phytolacca acinosa</i>	Matazor	Root	Root paste in oil	Nipple swelling	[101]

7.1 Recovery and Healing

Traditionally, herbal medicine has been utilized to encourage wound healing, decrease swelling and help the uterus recover after giving birth. Turmeric (*Curcuma longa*) is also high in polyphenol curcumin, which has strong anti-inflammatory, antioxidant and wound-healing properties that can help heal tissues and decrease postpartum inflammation. In addition, the healing potential of a combination of calendula officinalis and aloe vera due to their





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antimicrobial activity and tissue regeneration effect has been studied in perineal wounds and cesarean sections. Shatavari (*Asparagus racemosus*) and Guduchi (*Tinospora cordifolia*) are used as rejuvenative herbs in Ayurvedic medicine to strengthen the body, enhance reproductive health and facilitate recovery after childbirth. However, there are few clinical trials that have been designed and conducted to prove their effectiveness and safety over a long period of time [53,178].

7.2 Management of Postpartum Fatigue

Fatigue after giving birth is a very frequent complaint caused by sleep deprivation, breastfeeding demands, hormonal changes, and the increased expenditure of energy. Some herbs are regarded as adaptogenic and restorative, that may help the body to become more durable and to reduce fatigue. Ashwagandha (*Withania somnifera*) is known to have adaptogenic and anti-stress effects and could be beneficial for energy metabolism and resilience of non-pregnant adults. Likewise, Shatavari is regarded as nourishing tonic which helps to restore vitality of the mother and recuperate from her labor. Certain botanicals like Moringa (*Moringa oleifera*) are rich in nutrients like vitamins, minerals, amino acids and antioxidants, which can help with post-partum nutritional deficiencies and general energy levels. But, one-by-one evaluation of the patient is important to confirm and correct the underlying cause of chronic fatigue, such as anaemia, thyroid problems or postpartum depression [179,180].

7.3 Emotional Well-being and Mood Support

Anxiety, mood swings or postpartum depression may be brought on by hormonal changes and psychosocial adaptation after birth. There are several medicinal plants which have been studied for anxiolytic and mood stabilizing effects. Chamomile (*Matricaria chamomilla*), lavender (*Lavandula angustifolia*) and lemon balm (*Melissa officinalis*) have been shown to have mild calming and sleep-promoting effects in general populations, though there are few studies specifically for postpartum women. Herbs that are adaptogenic (*Ashwagandha*) can potentially calm down the hypothalamus, pituitary, adrenal axis to alleviate stress, but their use should be





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approached with caution when breastfeeding, as there are not extensive studies to determine their safety for lactation. Good social support, counselling, stress management, and healthy sleep patterns, non-pharmacological approaches, are the primary and most important ones of postpartum mental health care [181,182].

7.4 Nutritional and Immune Support

The postpartum period is a time when adequate nutrition and immune functioning is needed to facilitate maternal recovery and successful breastfeeding. There are a number of medicinal plants that provide valuable micronutrients and bioactive compounds with antioxidant and immunomodulatory actions. Moringa (*Moringa oleifera*) is especially high in vitamins A and C, calcium, iron, potassium and essential amino acids, which make it a potential nutritional supplement for lactating mothers. Initial research also indicates that moringa could have beneficial effects on breast milk production and nutritional status of mothers. Some other herbs, such as turmeric (*Curcuma longa*), ginger (*Zingiber officinale*) and garlic (*Allium sativum*), could also be beneficial for immune support and general postpartum health due to their antioxidant, antimicrobial and anti-inflammatory properties. Use or overuse of concentrated herbal preparations should be avoided until more information is available about their safety during lactation [183,184].





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To recap, herbal remedies can offer supplemental assistance in a few areas relating to the postpartum period, fatigue, emotional wellness, and food intake. Their incorporation into maternal health care should be informed by high quality scientific evidence, standardized preparations and clinical guidance to the individual, in order to protect both mother and infant.

8. Ayurvedic and Traditional Herbal Approaches

Traditional systems of medicine have long recognized the importance of maternal health and have developed holistic approaches to support women during pregnancy, lactation, and the postpartum period. These systems emphasize maintaining physiological balance, improving nutrition, strengthening immunity, and preventing complications through the use of medicinal plants, dietary measures, and lifestyle modifications. Among the most influential traditions are Ayurveda, Traditional Chinese Medicine (TCM), and various indigenous and folk medical practices. While many of these approaches are rooted in centuries of empirical knowledge, modern scientific validation is essential to ensure their efficacy and safety in maternal healthcare [185,186].

8.1 Ayurvedic Perspective

In India, Ayurveda, the traditional medicine system, gives a detailed description for mother care before and after birth, known as Garbhini Paricharya (*antenatal care*) and Sutika Paricharya (*postnatal care*). The physiology of pregnancy is a delicate balance, and in Ayurveda, balanced nutrition, herbal support, and lifestyle practices are essential to keep the three doshas or forces (Vata, Pitta, Kapha) in balance to ensure the healthy development of the baby. In pregnancy, these herbs are traditionally used for their nourishing, immunomodulatory, and rejuvenating attributes, such as Shatavari (*Asparagus racemosus*), Guduchi (*Tinospora cordifolia*), and Amalaki (*Phyllanthus emblica*). Ashwagandha (*Withania somnifera*), turmeric





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(*Curcuma longa*), and Shatavari are used in the postpartum period for strength, lactation, digestion, and speed recovery. In Ayurveda, the right kind of diet plan, oil massage (Abhyanga), and herbal medicine decoction are also given special importance as a means to ensure the mother's health and the baby's health [187,188].

8.2 Traditional Chinese Medicine

Traditional Chinese Medicine (TCM) views care for mothers in the context of the balance of Qi, Blood, yin, and yang. Pregnancy is considered a time when life force must be maintained and nourishment provided to the baby, and postpartum is a time of energy loss that needs to be replenished and restored. Popular herbs in TCM use Dong Quai (*Angelica sinensis*) to nourish blood and help recover from childbirth, Ginger (*Zingiber officinale*) for digestive comfort and to boost circulation, and Astragalus (*Astragalus membranaceus*) to support immune function and vitality. Herbal prescriptions usually consist of a special and complex combination of herbs and are often individualized. Some of the pharmacological activities of TCM remedies have proven to be beneficial, yet the number of well-conducted clinical trials reporting their use during pregnancy is limited, and some herbs are contraindicated due to their possible uterotonic or embryotoxic effects [79,93,189].

8.3 Indigenous and Folk Practices

Mothering medicine was of interest for ethnobotanical knowledge, which is known in indigenous and folk medicine throughout the world. African, Latin American, and Southeast Asian communities use their native plants as medicines to treat pregnancy symptoms, ease delivery, encourage lactation, and heal the body after giving birth. Such practices may be well established in the past and based on cultural beliefs and have an important role in primary healthcare in resource-limited environments. These include the use of ginger (*Zingiber officinale*), fenugreek (*Trigonella foenum-graecum*), and fennel (*Foeniculum vulgare*) to help with nausea, support lactation and breast milk production, and moringa (*Moringa oleifera*) as a food supplement to maternal nutrition and breast milk production. Although some traditional





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treatments might have therapeutic properties, the different methods of preparation, dosage, and identification of the plants may impact the safety and efficacy of the traditional treatment. Hence, it is crucial to incorporate ethnomedicinal knowledge into pharmacological studies, quality control, and clinical validation to facilitate evidence-based maternal healthcare [27,190,191].

In summary, the Ayurvedic, Traditional Chinese, and indigenous herbal systems offer important perspectives on holistic maternal care. Interdisciplinary studies can provide further insights into the potential of traditional medicine and its efficacy, and support the integration of accepted traditional therapies into current obstetric and postnatal care.

9. Clinical Evidence and Pharmacological Insights

Due to the rising use of herbal medicines during pregnancy, lactation, and postpartum period, a large amount of research has been done on their phytochemical composition, pharmacological activities, and clinical efficacy. Biologically active compounds present in many medicinal plants may have beneficial effects on the maternal and neonatal health, such as antioxidant, anti-inflammatory, antimicrobial, endocrine-modulating, and immunomodulatory effects. The clinical evidence supporting the regular use of many herbal remedies, however, is not widely available, because of the variability of study design, the small number of patients in individual studies, and the absence of standardized formulations. Thus, a thorough knowledge of their phytochemistry, modes of action, and clinical evidence will be necessary for the evidence-based provision of maternal care [73,192,193].

9.1 Phytochemical Constituents

The medicinal plants in maternal care have a diverse range of secondary metabolites, and these are the sources of their therapeutic effects. These consist of alkaloids, flavonoids, terpenoids, phenolic acids, saponins, glycosides, tannins, and essential oils. Examples of plants used for medicinal purposes include ginger (*Zingiber officinale*), which is rich in gingerols and shogaols





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that have antiemetic and anti-inflammatory properties, and fenugreek (*Trigonella foenum-graecum*), which has steroidal saponins like diosgenin with a galactagogue activity. Fennel (*Foeniculum vulgare*) also has anethole and other volatile compounds that are said to have phytoestrogenic and antispasmodic properties, while Shatavari (*Asparagus racemosus*) has steroidal saponins (*shatavarins*) thought to have beneficial effects on reproductive health and lactation. The anti-inflammatory and antioxidant properties of polyphenolic compounds from turmeric (*Curcuma longa*) and flavonoids from many medicinal plants can help in postpartum recovery and tissue healing [73,131,194].

9.2 Mechanisms of Action

Herbal medicines have a wide range of pharmacological actions that can occur through a variety of mechanisms with several targets at the molecular level. Numerous botanicals have antioxidant activity through their ability to scavenge ROS and boost endogenous antioxidants to shield tissues from oxidative stress. Others act by inhibiting the enzymes in the inflammatory pathway called cyclooxygenase, nuclear factor-kappa B (NF- κ B), and pro-inflammatory cytokines. Some herbs affect the endocrine system and reproductive physiology. For example, the phytoestrogenic compounds found in fennel could interact with Estrogen receptors and play a role in supporting lactation, and the steroidal saponins from fenugreek and Shatavari are thought to increase prolactin production or improve mammary gland activity. Ginger has an antiemetic effect, which is related to its effects on gastrointestinal motility and serotonergic signaling, and acts as a nausea and vomiting inhibitor during pregnancy. Several medicinal plants also have antimicrobial, immunomodulatory, adaptogenic, and gastroprotective effects, which could aid the mother's healing and her general well-being. Herbal preparations with their multiple bioactive constituents exert therapeutic effects by synergistic interaction, rather than by a single pharmacological pathway [159,184,195].





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9.3 Human and Preclinical Studies

Many maternal health herbs have been found to have favourable pharmacological properties using in vitro systems and animal models, such as antioxidants, anti-inflammatories, uteroprotective, galactagogue, and wound healing. While these studies give valuable mechanistic insights, they cannot entirely predict efficacy and safety in man because of the differences in physiology, metabolism, and dosing. The human clinical evidence of herbal medicines is variable. Ginger (*Zingiber officinale*) appears to have the most supporting evidence for use in pregnancy-associated nausea and vomiting, with several randomized controlled trials and meta-analyses showing efficacy and safety, provided it is used appropriately. Some clinical studies indicate that fenugreek (*Trigonella foenum-graecum*) and Shatavari (*Asparagus racemosus*) may be beneficial as galactagogues, but more extensive, quality trials are required to confirm efficacy and determine the optimal dosing. However, only a few other herbs have been studied and have some evidence from observational studies or historical experience for their use during pregnancy and postpartum care. In addition, there are many concerns about product standardization, herb–drug interactions, contamination, and long-term safety that have impeded their clinical use. In view of the above, the medical professionals should consider and evaluate the available evidence, each patient's characteristics, and potential risks before recommending herbal therapies. Ongoing pharmacologic studies, well-designed randomized controlled trials, and comprehensive pharmacovigilance systems play a crucial role in the safe incorporation of herbal medicines in conventional maternal care [62,68,79].

10. Herbs to Avoid During Pregnancy and Lactation

A large proportion of herbal products can cause serious life-threatening problems to the mother and foetus, but several herbal medicines are used to treat minor discomforts of pregnancy. The perceived safety of natural products promotes the dangerous use of strong phytochemicals by self-administration. The fetus is therefore very susceptible to teratogenic effects and





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developmental disruptions and is also left vulnerable to toxicity due to the placental barrier being permeable to many of these active compounds. The most common hazards of contraindicated herbs are that they can be abortifacient, emmenagogue, or severely upset the maternal hormone and electrolyte balance. Eating these particular plants may result in very serious clinical results, ranging from miscarriage, premature labor, to serious maternal organ afflictions, and there is no strict regulation or standard dosage. The following herbs are known to have high pharmacological significance during pregnancy and are contraindicated during pregnancy and lactation. Healthcare providers strongly recommend that pregnant women and lactating women avoid the following herbs due to their high pharmacological significance during pregnancy [26,196,197].

Herbal medicines are generally thought of as safe due to their natural source, but there are some medicinal plants (**Table no. 4**) that may be of great concern in pregnancy and during lactation. Some herbs have the potential to negatively impact the mother or the unborn child or baby, or to harm breastfeeding infants, and are therefore known to have abortifacient, uterotonic, embryotoxic, fetotoxic, teratogenic, or toxic properties. Furthermore, their use in these vulnerable groups has been further complicated by the fact that there are no standardized formulations, differences in phytochemical content, and limited clinical safety data. In view of this, healthcare providers need to be aware of the benefits/risk of herbal products and avoid recommending non-indicated herbs during pregnancy and lactation.

Table 4. Medicinal Herbs Recommended to be Avoided During Pregnancy and Lactation Due to Potential Safety Concerns [198,199]

Botanical Name	Sanskrit/ Hindi Name	Major Phytoconstituents	Traditional Use	Potential Risk During Pregnancy /Lactation	Recommended Period to Avoid	Level of Evidence	Ref. No.
<i>Aloe vera</i>	Kumari / Ghritkumari	Anthraquinones (aloin, emodin)	Laxative, wound healing	May stimulate uterine contractions	Pregnancy (especially first	Moderate	[198,199]





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				and increase miscarriage risk when latex is ingested	trimester)		
<i>Ricinus communis</i>	Eranda / Arand	Ricinoleic acid	Constipation, labor induction	Potent uterine stimulant; premature labor	Pregnancy	High	[198,199]
<i>Carica papaya</i> (unripe)	Erandakarkati / Papita	Papain, chymopapain	Digestive aid	Latex may induce uterine contractions and fetal toxicity	Pregnancy	Moderate	[198,199]
<i>Artemisia absinthium</i>	Damanaka / Nagdona	Thujone	Digestive tonic	Neurotoxicity and uterine stimulation	Pregnancy & Lactation	Moderate	[198,199]
<i>Ruta graveolens</i>	Sataparna / Satyanashi (Rue)	Rutin, furanocoumarins	Emmenagogue	Abortifacient and embryotoxic effects	Pregnancy	High	[198,199]
<i>Peganum harmala</i>	Harmala / Harmal	Harmine, harmaline	Traditional analgesic	Strong uterotonic and abortifacient activity	Pregnancy	High	[198,199]
<i>Juniperus communis</i>	Hapusha	Terpenes	Urinary disorders	Uterine stimulant and renal irritation	Pregnancy	Moderate	[198,199]
<i>Gossypium herbaceum</i>	Karpasa / Kapas	Gossypol	Traditional gynecological uses	Embryotoxic and antifertility effects	Pregnancy	High	[198,199]
<i>Angelica sinensis</i>	Dong Quai	Ferulic acid, ligustilide	Women's health tonic	May stimulate uterine contractions and increase bleeding	Pregnancy	Moderate	[198,199]
<i>Cimicifuga racemosa</i>	Black Cohosh	Triterpene glycosides	Menopausal symptoms	Possible oxytocic activity; avoid without	Pregnancy	Moderate	[198,199]





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				supervision			
<i>Vitex agnus-castus</i>	Five-leaved Chaste Tree	Flavonoids, iridoids	Hormonal regulation	Alters prolactin and reproductive hormones	Pregnancy & Lactation	Limited	[198,199]
<i>Hypericum perforatum</i>	St. John's Wort	Hypericin, hyperforin	Depression	Drug interactions; possible neonatal adverse effects	Pregnancy & Lactation	Moderate	[198,199]
<i>Ephedra sinica</i>	Ma Huang	Ephedrine alkaloids	Asthma	Hypertension, fetal cardiovascular risk	Pregnancy & Lactation	High	[198,199]
<i>Salvia officinalis</i>	Sage	Thujone	Digestive disorders	May reduce breast milk production in nursing mothers	Lactation	Moderate	[198,199]
<i>Mentha pulegium</i>	Pennyroyal	Pulegone	Cold remedies	Hepatotoxicity and reported abortions	Pregnancy & Lactation	High	[198,199]

10.1 Abortifacient Herbs

Abortifacient herbs are plants that can cause uterine contractions or disrupt the upkeep of pregnancy and, therefore, can contribute to miscarriage or premature labor. In the past, several herbs have been used for their traditional medicinal properties of promoting menstruation and/or causing abortion; but in pregnant women, these herbs can have significant effects. These include blue cohosh (*Caulophyllum thalictroides*), pennyroyal (*Mentha pulegium*), black cohosh (*Actaea racemosa*), and aloe latex (*Aloe vera latex*). These plants may have an effect on the uterine smooth muscle or cause systemic toxicity. Neonatal cardiovascular complications and fetal distress have been linked to blue cohosh, and severe maternal hepatotoxicity and neurotoxicity to pennyroyal oil, in case reports. Therefore, these herbs are





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not recommended for use in pregnancy without strong medical justification and under the guidance of trained health care practitioners [68,79,196].

- **Black Cohosh (*Actaea racemosa*):** This herb is not suitable for use during pregnancy. When used in large amounts or in early pregnancy, it has a high tendency to stimulate uterine contractions and is therefore a direct threat to miscarriage and premature labor.
- **Dong Quai (*Angelica sinensis*):** Known as "female ginseng", Dong Quai is another herb that is often avoided during pregnancy because it causes uterine contractions, which are strong enough to require a miscarriage or early labor.
- **Neem (*Azadirachta indica*):** Oral consumption of purified neem seed extracts is effective in pregnancy termination, showing a definite abortive effect, while it is traditionally used for malaria. In addition to maternal toxicity, neem oil poisoning may lead to severe maternal toxicity such as seizures, metabolic acidosis, and toxic encephalopathy.
- **Oral Aloe vera:** Although it is safe to use when applied topically to treat skin conditions, orally taken Aloe is a potent cathartic. This can stimulate the bowels and the adjacent uterus, causing contractions that can threaten the onset of labor or miscarriage.
- ***Andrographis paniculata* (Sambiloto):** Contraindicated in pregnancy because it is known to have abortifacient activity and is potentially toxic to the fetus; however, it is used for postpartum immune support and fever.

10.2 Toxic and Contraindicated Herbs

There are several medicinal plants, however, that are contraindicated due to direct toxicity, lack of safety data, or adverse effects on the mother or infant. Pyrrolizidine alkaloids are considered hepatotoxic and carcinogenic, and comfrey (*Symphytum officinale*) should not be taken while pregnant or breastfeeding. Likewise, liver toxicity, a nephrotoxic effect, or carcinogenic properties have been linked to the use of concentrated kava (*Piper methysticum*) and some *Aristolochia* species. Herbs such as goldenseal (*Hydrastis canadensis*), sage (*Salvia officinalis*) (in large doses), and licorice (*Glycyrrhiza glabra*) (also in large amounts) may affect blood





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pressure, hormone metabolism, or lactation and should be used with caution or avoided. Herbal products are composed of bioactive components that could be transferred to breast milk and influence infant physiology, especially in medically fragile and premature infants [171,200,201].

- **Licorice Root (*Glycyrrhiza glabra*):** Large or medicinal doses of licorice root put the mother at a high risk for ingestion of glycyrrhizin. It is associated with a high risk of maternal hypertension, serious electrolyte abnormalities, and premature delivery, and has been linked to fetal neurodevelopmental defects.
- **Tena Adam (*Ruta chalepensis*):** This herb is used in some African traditional remedies and should be avoided during pregnancy. It has been shown in animal models that its aqueous infusion reduces vascular resistance in the placental bed and induces fetal thymic involution (shrinkage of the fetus's thymus gland).
- ***Solanum nigrum* (Leunca):** Contraindicated in pregnancy (due to the presence of active steroidal saponins and possible neurotoxicity at high doses (solanine content)) and generally only recommended for cautious use in the postpartum period.
- **Thyme (*Thymus vulgaris*):** Safe in normal culinary doses, but has particular emmenagogue properties in medicinal or concentrated doses. This is a serious issue to consider, particularly during the first couple of months of your pregnancy, because it can cause a miscarriage.
- **Turmeric / Curcumin (*Curcuma longa*):** Turmeric is safe in dietary quantities, but curcumin extracted from turmeric is mildly uterotonic. Hence, high doses must be avoided during the first trimester of pregnancy because of the increased risk of accidental stimulation of the uterus.
- ***Sauropus androgynus* (Katuk):** This herb is very effective and is commonly used to stimulate breast milk after childbirth (postpartum), but should not be used during the gestation period. In high enough concentrations.





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10.3 Risk Assessment

Before suggesting any herbal medicines for use during pregnancy or lactation, an appropriate risk assessment should be carried out. Botanical identity, phytochemical composition, dosage, route of administration, duration of use, quality of the preparation, and available evidence on maternal, fetal, and neonatal safety should be evaluated. Special care should also be taken concerning possible interactions between the herbs and drugs and contamination with heavy metals, pesticides, microorganisms, or undeclared pharmaceutical substances. While keeping herbs supported by high-quality clinical evidence in mind, herbal products with ambiguous safety should not be selected for evidence-based decision-making. Herbal supplements should be reported to health care providers, and women should be given individualized counseling and monitoring. Regulatory authorities and international organizations recommend harmonizing the manufacturing process, pharmacovigilance, and research on herbal medicines to increase the evidence base for herbal products in maternal healthcare [13,96,202].

While some herbal remedies are used for therapeutic purposes, many have the potential to cause harm during pregnancy and breastfeeding. While waiting for more complete safety information, contraindicated and inadequately studied herbs should not be used, and clinical recommendations should be made only in the light of scientific evidence and medical advice.

11. Challenges and Future Perspectives

Herbal medicines for pregnancy, lactation, and postpartum are becoming popular, and their therapeutic potential and challenges have been highlighted. While some herbal products have been in use for centuries, many have not been well scientifically validated, nor have they been well established in their manufacturing processes, nor have they been well supported with extensive safety data. To overcome these limitations, the need for the integration of herbal medicine in evidence-based maternal health care is examined. For further studies, it is





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recommended to enhance quality control, advance clinical research, and promote cooperation between traditional and modern healthcare systems [203,204].

11.1 Standardization and Quality Control

Maintaining the standardization of raw materials and finished products is one of the big problems in herbal medicine. Medicinal plants contain phytochemicals that may change due to plant species, location, cultivation, harvest, processing, and storage. This variability can result in variable therapeutic effects and safety properties. Other issues with quality are contamination with heavy metals, pesticides, microbial pathogens, mycotoxins, and adulteration with synthetic pharmaceuticals or substitution with the wrong plant species. These issues are especially of concern when a woman is pregnant and breastfeeding, when even low-level exposures could be harmful to the mother or baby. Good Agricultural and Collection Practices (GACP), Good Manufacturing Practices (GMP), validated analytical methods, and standardised phytochemical profiling are essential to guaranteeing the quality, purity, and reproducibility of herbal products [99,203].

11.2 Clinical Research Gaps

There are many herbs used in the treatment of mothers in traditional healing, but there is limited quality clinical evidence to support their efficacy and safety. Most studies available are small in size, observational, or contain heterogeneous herbal formulations, making it challenging to come to a specific conclusion. The number of randomized controlled trials is further limited by ethical questions about research in pregnant and breastfeeding women. Well-designed multicenter clinical trials, standard dosing schedules, pharmacokinetic studies, and long-term maternal and neonatal follow-up should be emphasized for future research. Understanding of the biological activity of medicinal plants, efficacy, and toxicity biomarkers, as well as the molecular mechanisms of action, can be further clarified with mechanistic investigations based on molecular pharmacology, metabolomics, and systems biology. Having extensive





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pharmacovigilance systems will also make it easier to conduct real-world monitoring of adverse events and herb–drug interactions [205–207].

11.3 Integration into Modern Maternal Healthcare

Herbal medicine in modern maternal health care should be done through an evidence-based and multidisciplinary approach that engages obstetricians, pharmacists, midwives, researchers, as well as traditional medicine practitioners. Healthcare practitioners should have the opportunity to openly ask about the use of herbal medicine with pregnant women, review the scientific evidence, and individualise their recommendations for pregnant women, according to their health status, the stage of pregnancy and lactation, and any other medicines they are taking. Harmonized regulations, common clinical guidelines, and educational materials will encourage rational use of herbal medicines and reduce avoidable adverse effects. A working partnership between traditional knowledge holders and biomedical researchers can help build the capacity for the discovery of new therapeutic agents and for the validation of traditional practices using scientific methods. Promising innovations in the fields of phytochemistry, biotechnology, artificial intelligence, and precision medicine could contribute to the creation of safer, standardized, and targeted herbal solutions for maternal assistance. The use of herbal medicines has great potential as alternative treatment options during pregnancy, lactation, and postpartum care. But, if they are to be widely accepted into the mainstream of clinical practice, significant challenges in standardization, quality assurance, scientific validation, and regulatory control must be surmounted. Ongoing interdisciplinary research and policy-making based on evidence will enable the optimized therapeutic benefits without compromising the safety of both mothers and infants [208,209]. Furthermore, establishing formal integrative pharmacovigilance networks within maternity clinics is crucial to capture systematic data on adverse effects and potential herb-drug interactions [210].





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12. Conclusion

Herbal medicines have been employed for many years as an aid to pregnant, lactating, and postnatal females and are as integral to traditional health care systems, including Ayurveda, Traditional Chinese Medicine, and indigenous medicine, as herbal medicine. Some medicinal plants have pharmacologically active properties that can have beneficial effects on the mother during pregnancy and after birth, such as milk production, digestion, recovery, immunity, and anti-inflammatory and anti-oxidant properties, which can alleviate common health issues of the mother, such as nausea, indigestion, lack of milk, weakness after birth, and delayed recovery. Of the herbs studied so far, ginger (*Zingiber officinale*) has the best clinical evidence of efficacy for the treatment of pregnancy-associated nausea and vomiting, and fenugreek (*Trigonella foenum-graecum*), fennel (*Foeniculum vulgare*), and Shatavari (*Asparagus racemosus*) may have some beneficial effects for lactation, but more rigorous clinical studies are needed. Similarly, various herbs like turmeric (*Curcuma longa*) and moringa (*Moringa oleifera*) could aid in the postpartum healing process due to their anti-inflammatory and nutritional effects. However, the therapeutic effectiveness of many of the traditional botanicals is not yet adequately substantiated with rigorous human studies. Even though these herbal medicines are widely used, they are not necessarily safe. Some herbs have uterotonic, abortifacient, embryotoxic, or toxic properties and must not be used during pregnancy or lactation. Besides, there is variability in their phytochemical composition, contamination, adulteration, herb–drug interactions, and inadequate regulation that makes their clinical use even more complicated and risky. Thus, patients should be advised to share all use of herbal products with maternal care providers, and healthcare providers should take care to evaluate the risks and benefits of their use, particularly using the evidence.

Standardized manufacturing procedures, comprehensive quality control, pharmacovigilance, and appropriately-designed clinical trials will be critical for future advances in this area to assess efficacy, safety, dosage, and longer-term maternal and neonatal outcomes. Phytochemical, molecular pharmacological, and translational research could help to identify





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bioactive compounds and provide the opportunity for the development of standardized botanical therapeutics for maternal health. Finally, herbal medicines are a potential complementary approach during pregnancy, after pregnancy, and the lactation period, provided that they have a strong scientific basis and are used correctly under the proper supervision of medical practitioners. The combination of traditional knowledge and contemporary pharmacology and clinical practice represents a chance to improve maternal and infant health while maintaining safety, quality, and efficacy.

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