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

CHAPTER 1: INTRODUCTION TO WOMEN'S HEALTH AND PHYTOTHERAPY

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Abstract

The therapeutic use of plants, known as phytotherapy, has re-emerged as a significant area of research within pharmacognosy. This paper reviews traditional and modern applications of plant-based remedies, drawing on evidence from databases such as PubMed, Embase, and the Cochrane Library. Despite the wide range of pharmacological properties attributed to medicinal plants, systematic evaluations remain scarce, limiting their integration into mainstream healthcare. Greater collaboration between researchers and clinicians could help bridge the gap between laboratory findings and clinical practice.

Across Africa, nearly four-fifths of the population depends on herbal medicine due to its affordability, accessibility, and cultural acceptance. Women, in particular, employ these remedies to address reproductive health concerns including menstrual irregularities, infertility, and menopausal symptoms. Several plants demonstrate oestrogenic, oxytocic, or anti-implantation activity, though their mechanisms require further clarification. Phytoestrogens—plant compounds structurally similar to oestradiol—such as isoflavones and *Cimicifuga racemosa* have shown potential in reducing menopausal discomfort, lowering LDL cholesterol, and supporting bone health.

To advance phytotherapy, rigorous clinical validation through randomized controlled trials is essential. Standardized extraction methods, toxicological profiling, and long-term safety



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assessments must be prioritized. Establishing international regulatory frameworks will ensure reproducibility, patient safety, and evidence-based integration of phytotherapy into women's healthcare.

Keywords: Herbal medicine, Women's health, Phytotherapy, Phytoestrogens, Clinical validation

1. INTRODUCTION

Globally, the usage of herb-based medicines and Medicinal Plant Raw Materials (MPRM) is becoming more popular. The use of dietary supplements with natural substances is steadily rising. Children are increasingly using natural medicines in accordance with this worldwide trend. Previous research has examined the general use of over-the-counter medications and medicinal plants in Estonia, but not in children. Herbal Medicine Substances (HMS) are among the alternative therapies that parents are increasingly looking for because they believe they are safer for their kids' health. (Ain Raal et al., 2026).

Herbs, herbal materials, herbal preparations, and completed herbal products that incorporate plant parts with active substances, additional plant materials, or combinations thereof are all included in the World Health Organization's (2021) definition of HMC. A medical product originating from plants that contains several active ingredients at once demonstrates a polyvalent (multitarget) activity, whereas synthesised chemical compounds typically target a single target. Five to ten percent of women of reproductive age have polycystic ovarian syndrome (PCOS), a heterogeneous endocrine disorder with a variety of symptoms. Overweight, hyperandrogenism, polycystic ovarian morphology, and hyperinsulinemia are the primary clinical manifestations of PCOS. Uncontrolled steroidogenesis may be the main characteristic of PCOS, despite the fact that its exact cause is yet unknown. Being overweight or obese, type 2 diabetes, impaired glucose tolerance, insulin resistance, hyperandrogenism, and elevated luteinizing hormone (LH) are only a few of the genetic, metabolic, endocrine, and environmental disorders that can be linked to PCOS. Follicle stimulating hormone (FSH) and oestrogen have been shown to significantly decrease in PCOS humans and animal models, while oxidative stress levels, inflammatory markers, LH, and androgens have been found to increase. Numerous studies have examined the effects of non-chemical and herbal ingredients on the hypothalamic-pituitary-ovarian axis, hormonal and metabolic factors, and recovery and improvement of certain abnormalities and disorders in PCOS patients. The investigations carried out over a specific time period that demonstrate the effectiveness of various natural and





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herbal remedies in treating PCOS are compiled in this review. (Farahnaz Azin Ph.D.et al ., 2020).

Breast cancer is the most common disease among women worldwide, and it is a major global public health concern. There are 2.3 million cases of breast cancer in women worldwide. The annual rate of new cases of breast cancer is predicted to approach 3 million by 2040, an increase of nearly 40% from 2020. Similarly, the mortality rate from breast cancer is predicted to grow more than 50%, from 685,000 in 2020 to 1 million in 2040. Breast cancerogenesis is among the most complex of all cancers. Normal human growth is closely regulated by complex signalling pathways that allow cells to communicate with each other and with their surroundings. It should come as no surprise that proto-oncogene activating mutations can cause signalling pathways to become hyper-activated, while the inactivation of tumour suppressors can cause them to become markedly hypo-activated. Generally speaking, the formation of cancer is caused by genetic and epigenetic alterations that allow cells to evade the systems that typically control their migration, survival, and proliferation. Many of these alterations align with signalling networks that regulate cell motility, proliferation, differentiation, and death.(Amel Elbasyouni et al.,2023).

Plant extracts in the form of infusions or mixtures are utilised to treat a variety of illnesses in this traditional medical practice. Certain plants are utilised in relation to the reproductive health of women. With varying degrees of social support, women have attempted to regulate or improve their fertility throughout history. Since then, plant-based medications have been utilised to treat menopausal symptoms, breast pain, dysmenorrhea, menstrual cyclicity, and fertility suppression. Additionally, plant materials have been employed throughout pregnancy to prevent foetal malposition, abortion threats, and neonatal amnionitis. The hypothalamus, anterior pituitary, ovary, oviduct, uterus, and vagina are the sites of action of fertility and/or antifertility medications in females. (Dieudonne Njamen et al.,2013).

2. PHYTOTHERAPY FOR THE MANAGEMENT OF OBESITY

health issue that can lead to metabolic syndrome, diabetes, stroke, osteoarthritis, cancer, and chronic heart disease. Over 300 million people have Obesity is a major worldwide been diagnosed as obese worldwide, and the prevalence of overweight and obesity is increasing every day. Genetic, physiological, behavioural, and environmental factors all contribute to obesity by increasing calorie consumption and causing fat to accumulate in adipose tissues, which can result in diabetes, cardiovascular disease, hyperlipidaemia, and many other illnesses. The pathophysiology of obesity involves alterations in the activity of several regulatory





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molecules in the brain, gut, and adipose tissue, including neuropeptides, hormones, and adipokines. Treatment options for obesity include lifestyle modifications, anti-obesity medications, and surgical procedures. Due to severe side effects, the majority of anti-obesity medications have been taken off the market. These days, plant-based medications with numerous active ingredients and different ways to lose weight are widely accessible and reasonably priced. Compared to synthetic drugs or operations, these plant-based products are more affordable. (ABDUL MALIK et al.,2024).

CLASSIFICATION OF OBESITY BASED ON BMI

Obesity is measured using the body mass index (BMI), which is calculated by dividing body mass by height squared. The formula for BMI is as follows:

BMI is equal to mass kg/height m². BMI according to Table 1.

RISK FACTORS OF OBESITY

Weight gain and obesity are the results of abnormally high fat levels. Obesity can be attributed to a number of things. The risk factors for obesity might be either changeable or non-modifiable. (ABDUL MALIK et al.,2024).

PATHOGENESIS OF OBESITY

Increased appetite and decreased calorie expenditure are two abnormalities that contribute to the pathology of obesity. These abnormalities change cellular functioning and physical activity, which in turn stimulates adipogenesis and causes the production and release of cytokines that cause serious cardiovascular problems like hyperlipidaemia and atherosclerosis. The two forms of adipose tissue that are present throughout the human body are brown and white. While white adipose tissue is the most prevalent type of fatty tissue in adults that stores fat, brown adipose tissue is primarily found in small, discrete areas of infants where it creates heat. In the past, it was thought that fat tissue primarily acts as a storehouse where extra triglycerides can be either kept or converted into glycerol and free fatty acids in response to the body's metabolic needs. Adipose tissue has recently been shown to be metabolically active and capable of creating a network of communication across various body organs. Fats generally fall into two categories:

visceral and under the skin. Visceral fat, sometimes referred to as active fat, is accumulated over organs such as the kidney, liver, intestines, pancreas, heart, and belly. It affects the expression of hormones that control metabolic rate, body fat distribution, and hunger. Additionally, in the legs and underarms, subcutaneous fat is located beneath the outer layer of





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skin. Elevated blood levels of LDL cholesterol are associated with increased visceral fat accumulation. Excessive calorie intake combined with a sedentary lifestyle results in an energy imbalance and an increase in subcutaneous fat.

Overconsumption of calories causes fatty acids to be stored in visceral adipocytes in the mesentery, omentin, liver, pancreas, kidneys, pericardium, and epicardium, as well as in adipocytes larger than 100–120 μm . Apple and pear are the two sorts of body forms based on fat deposition. An apple-shaped person (Android) is more likely to develop type 2 diabetes because they build visceral fat in the upper waist, abdomen, neck, arms, and shoulders. Pear-shaped people are less likely to develop weight-related illnesses, have less abdominal fat, and deposit fat on their legs and hips. (ABDUL MALIK et al.,2024).

COMPLICATIONS OF OBESITY

Obese individuals are more prone to have the co-morbidities of the metabolic syndrome, such as hypertension, type 2 diabetes, high blood cholesterol, and high triglycerides. The health effects of obesity can be broadly divided into two categories: those brought on by excess fat mass, such as obstructive insomnia, osteoarthritis, and social rejection, and those brought on by a greater number of fat cells, such as diabetes, cancer, heart disease, and non-alcoholic fatty liver syndrome. The body's altered reaction to insulin brought on by an abnormal increase in body fat mass in humans is known as insulin resistance . In Table1 that are given values are not according to this than human is considered as obesity. (ABDUL MALIK et al.,2024).

TABLE 1: BMI based classification of obesity

CATEGORY	BMI
Underweight	< 18.5
Normal weight	18.5 - 24.9
Overweight	25.0 – 29.9
Class 1 obesity	30.0 – 34.9
Class 2 obesity	35.0 – 39.9





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Class 3 obesity	≥ 40.0
Extremely obese	$\geq 40 - 50$

DIAGNOSIS / ASSESSMENT OF OBESITY

The degree and extent of obesity are evaluated using body mass index and anthropometric measures such as skinfold thickness, waist circumference, and waist-to-hip ratio.

ANTI-OBESITY MEDICINAL PLANTS

Anti-obesity medications are no longer utilised to lose weight due to their high cost and severe side effects. In order to treat obesity, it is necessary to investigate novel natural products. Several well-known medicinal herbs that are thought to be useful in the treatment of obesity were listed by Moro & Basil (2020). Numerous therapeutic plants have anti-obesity qualities. *Zingiber officinale*, for instance, reduces intestinal fat absorption by inhibiting the pancreatic lipase enzyme. Alkaloids, flavonoids, tannins, saponins, and polyphenols are examples of secondary metabolite phytochemicals found in medicinal plants that contribute to weight loss. Coffee (*Coffea arabica*) contains caffeine, an active phytoconstituent that reduces BMI and encourages weight loss. The browning of white adipose tissue into brown adipose tissue, the upregulation of proopiomelanocortin (POMC) and cocaine- and amphetamine-related transcript (CART), the inhibition of the lipase enzyme, the regulation of adipogenesis by PPARgamma, and the reduction of triglyceride accumulation in adipocytes are just a few of the signalling pathways that many phytochemicals. (ABDUL MALIK et al.,2024).

3.UNDWESTANDING BREAST CANCER : A CRUCIAL FOCUS ON PHYTOTHERAPY AND MOLECULAR SIGNALLING PATHWAYS.

Breast cancer is the most common disease among women worldwide, making it a significant global public health concern. There are 2.3 million cases of breast cancer among women worldwide. By 2040, the number of new cases of breast cancer is predicted to be close to 3 million, a rise of over 40% from 2020. In a similar vein, the number of deaths from breast cancer is expected to increase by over 50%, from 685,000 in 2020 to 1 million in 2040. Due to lifetime exposure to a range of endogenous and exogenous factors, as well as the interaction of hereditary elements, breast cancerogenesis is one of the most complicated of all cancers. Normal human growth is closely regulated by complex signalling pathways that allow cells to





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communicate with one another and with their surroundings. It should come as no surprise that proto-oncogene activating mutations can cause signalling pathways to become hyper-activated, while the inactivation of tumour suppressors can cause them to become markedly hypo-activated. The formation of cancer is typically caused by genetic and epigenetic alterations that allow cells to evade the systems that normally control their migration, proliferation, and survival. Signalling networks that regulate cell motility, differentiation, proliferation, and death are correlated with several of these alterations. Surgery, radiation, chemotherapy, hormonal therapy, and targeted therapy are the primary forms of treatment for breast cancer. When treating localised breast cancer, neoadjuvant and adjuvant therapy are administered after surgery. Following surgery, radiotherapy is used to lower the chance of a local cancer recurrence. Since natural products are safer, more effective, and less likely to develop resistance than hormone-targeting and chemotherapeutics, they have shown promise as cancer treatments. Focusing on defective signalling pathways like Wnt/ β -Catenin, NF- κ B, and PI3K/Akt/m-TOR, alkaloids, flavonoids, and polyphenols are among the many naturally occurring chemicals derived from plants that have anti-cancer potential. Plant-based compounds can stop cell growth and proliferation, angiogenesis, migration, metastasis, and the epithelial-to-mesenchymal transition. The actual prevalence of breast cancer cases, intrinsic and extrinsic risk factors, diagnosis methods, related pathogenesis theories, and the universal classification of breast malignant tumours are all covered in detail in this thorough review. We highlight the primary compromised signalling pathways linked to the onset and spread of breast cancer. Lastly, we highlight how phytochemicals can reverse the molecular impairments associated with breast carcinomas. (Amel Elbasyouni et al.,2023).

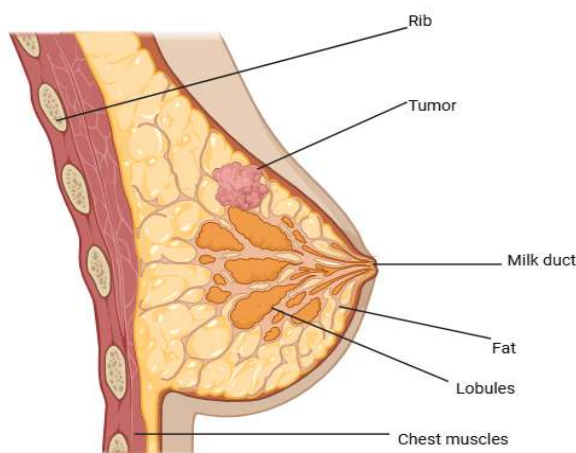


Fig. Breast Cancer





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DIAGNOSIS OF BREAST CANCER

Imaging

An essential technique for the early detection of breast cancer is image in examination. It incorporates magnetic resonance imaging and two-dimensional ultrasonography, both of which have high sensitivity and specificity. However, magnetic resonance imaging is more difficult, time-consuming, and insensitive to calcification than ultrasonography. Furthermore, because of their low cost, convenience of use, low invasiveness, and high accuracy, mammography exams are frequently used for breast disease screening in order to diagnose calcifications in lesions and show the shape and boundary of breast masses. Nevertheless, these imaging methods were unable to identify mammary tumours in dense-tissue breasts. Consequently, high-resolution functional images of the breast are now possible because to the development of digital mammography, also known as "scintimammography" or "Molecular breast imaging." It uses tiny semiconductor-based γ -cameras in a mammographic setup to find tiny breast lesions following Tc-99m sestamibi injection.

Breast Biopsy

One of the two kinds of needle biopsies is performed in conjunction with breast imaging to increase the diagnostic accuracy:

- i. Fine needle aspiration cytology: A tiny needle is used to extract fluid and/or cells from the worrisome breast lesion.
- ii. Core needle biopsy: a pathologist removes tiny tissue cylinders with a bigger needle and examines them for cancerous cells.

Immunohistochemistry

Breast cancer histological types can be distinguished using immunohistochemistry (IHC). Sections stained with haematoxylin and eosin make it simple and quick to distinguish between ductal and lobular carcinomas [64–66]. However, when the morphology is unclear, IHC can be helpful in differentiating between ductal and lobular carcinomas using molecular markers such as E-cadherin, high molecular weight cytokeratin, P120, and β -catenin; membrane staining is positive for all of these markers in ductal carcinomas and negative in lobular carcinomas. Additionally, IHC could be utilised to distinguish between invasive mammary carcinomas, which penetrate the basement membrane and disseminate across the surrounding stroma, and in situ carcinomas, which are contained by a basement membrane. Myoepithelial cell markers,





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such as calponin, smooth muscle myosin heavy chain, and p63, are indicators of invasiveness because, histologically, the absence of myoepithelial cells surrounding a lesion is typical of invasion.

Additionally, hormone receptors (progesterone and oestrogen receptors) can provide prognostic information, primarily in terms of predicting the response to endocrine therapy. Another indicator of Tamoxifen resistance and Herceptin (trastuzumab) sensitivity is immunohistochemistry responses to HER2/neu. Additionally, indicators of angiogenesis, metastasis, cell proliferation, and apoptosis might be evaluated by IHC. (Amel Elbasyouni et al.,2023).

MAIN SIGNALLING PATHWAYS INVOLVED IN BREAST CANCEROGENESIS

One of the main factors in breast cancer is the epidermal growth factor signalling pathway. The four members of the Epidermal Growth Factor Receptors (EGFRs)—HER1, HER2, HER3, and HER4—are overexpressed in breast cancer tissues and are linked to worse clinical outcomes and increased aggression [89]. EGFRs have seven distinct ligands: betacellulin, heparin-binding EGF, amphiregulin, epiregulin, tumour growth factor- α (TGF α), and epidermal growth factor (EGF). The constitutively active version of HER2 is characterised by its capacity to impact several cellular functions through multiple pathways, which also makes it the perfect component to form dimers with other molecules. Ligand binding and subsequent dimerisation of HER2 activate several downstream signalling pathways, such as the Mitogen-Activated Protein Kinase (MAPK) and phosphatidylinositol 4,5-bisphosphate 3-kinase (PI3K) pathways, which result in cell survival, cell growth, and tumour progression.

Numerous carcinogenic signalling pathways, including the epidermal growth factor pathway, interact with the oestrogen signalling system. Membrane G protein-coupled receptors and nuclear oestrogen receptors (ER α , ER β), which are transcriptional regulators that control target gene expression upon ligand binding, make up oestrogen receptors. The primary function of ERs is transcriptional regulation, which is accomplished by these two types of nuclear hormone receptors forming homo- or heterodimers upon ligand binding and translocating into the cell nucleus. ER dimers bind to the ERE region of target genes and recruit co-regulators to achieve transcriptional activity regulation. ERs also regulate target gene expression by co-regulating other transcription factors.

Additionally, around 17–20% of newly diagnosed breast tumours have a triple negative profile, which is defined by the absence of expression of the human epidermal growth factor receptor 2, progesterone receptor, and oestrogen receptor [83]. It is most common in younger African





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women and is defined by rapid progression to death, frequent relapses, and metastases. There is currently no proven way to lessen the aggressiveness of this kind of breast cancer. The poor prognosis and the inadequate use of general treatments, such as chemotherapy, which may make patients' health issues worse, are directly responsible for high death rates. Receptor tyrosine kinases (RTKs) and downstream signalling pathways are the primary TNBC-associated carcinogenic signalling pathways.

RTKs are crucial parts of signal transduction pathways that control proliferation and are specifically linked to two downstream signalling pathways: Phosphoinositide 3-kinase (PI3K)/AKT/Mechanistic Target of Rapamycin (mTOR) and Ras/Mitogen-Activated Protein Kinase (MAPK) pathways. The pathogenesis, development, and progression of TNBC depend heavily on the epithelial-to-mesenchymal transition (EMT) and related pathways. During EMT, vimentin and other mesenchymal markers are acquired by epithelial cells while E-cadherin expression is lost. Numerous RTKs, including as EGFR, IGF1R, hepatocyte growth factor receptor, and c-Met; non-RTKs, such as Src; and embryonic transcription factors, such as Twist and Slug, have been shown to trigger EMT. EMT is also supported by a variety of signalling pathways, including as nuclear factor- κ B, PI3K, and MAPKs. EMT is also linked to other pathways, including as Notch and Wnt/ β -catenin signalling pathways. (Amel Elbasyouni et al., 2023).

PHYTOTHERAPY IN THE MANAGEMENT OF BREAST CANCER

Surgery, radiation, chemotherapy, hormonal therapy, and targeted therapy are the basic kinds of treatment for breast cancer. Treatment for localised breast cancer requires surgery, neoadjuvant therapy to reduce tumour bulk, and adjuvant therapy to guarantee full healing and reduce the likelihood of metastases.

Following surgery, radiation may be delivered to minimise the probability of a local cancer recurrence. Despite the widespread and efficient use of standard treatment approaches, resistance, tumour relapse, and metastasis remain to be the leading reasons of death for patients with breast cancer. Natural product-based cancer treatments have showed good outcomes. Compared to hormone-targeting and chemotherapeutics, they are safer, more efficacious, and less prone to cause resistance. Different chemotherapy regimens and substances produced from plants have promising synergistic relationships.

Because natural materials are less likely to negatively impact healthy human cells due to their selectivity, they are chosen over conventional pharmaceuticals. Among the various naturally occurring chemicals derived from plants that may have anti-cancer activities include quercetin,





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catechin, formononetin, calycosin, and carotenoids. Plant-based therapies can suppress cell growth and proliferation, angiogenesis, epithelial-to-mesenchymal transition, migration, and metastasis by targeting defective signalling pathways such as Wnt/ β -Catenin, NF- κ B, PI3K/Akt/m-TOR, and hedgehog pathways.

Examples of polyphenols with anti-cancer properties against a variety of tumour types include quercetin, resveratrol, and catechin. Research has demonstrated that quercetin induces apoptosis both intrinsically through the mitochondrial pathway and extrinsically through the suppression of the Signal Transducer and Activator of Transcription 3 (STAT3) factor, which activates caspases in breast cancer. It initiates autophagy, inhibits the synthesis of metalloproteases, and halts the cell cycle in breast cancer. Additionally, quercetin inhibits HER2 overexpression and promotes its ubiquitination. This phytochemical attenuates the PI3K-Akt signalling pathway, down-regulates VEGF and matrix metalloproteinase 2/9, and lessens the ability of breast cancer to spread. have also looked into the effects of quercetin on the metabolism of cancerous cells.

Quercetin prevents the uptake of glucose, glycolysis, and the creation of lactic acid by reducing the expression of glucose transporter 1 and lactate dehydrogenase A. Hypoxia, acidity, and migration are thereby decreased. Similarly, it was found that resveratrol deactivates Yes-Associated Protein 1 (YAP1), which prevents cells from migrating. When resveratrol deactivates RhoA, lats1 phosphorylates and inactivates the proto-oncogene YAP1. Because YAP1 is closely associated with the overexpression of EMT-related pathways, the development of distant metastases of breast cancer, and a poor prognosis, targeting this nuclear transcription factor may improve patient survival.

The anti-cancer effects of panepoxydone are also widely documented. It lessens TNF α -induced activation of NF κ B and the NF- κ B signalling pathway by inhibiting the phosphorylation of I κ B and promoting its degradation. By downregulating the NF- κ B transcription factor FOXM1, panepoxydone prevents cell proliferation and reverses EMT in breast cancer. Additionally, by encouraging the overexpression of N-cadherin and the downregulation of vimentin, slug, and zeb1, this phytochemical reverses the features of EMT. (Amel Elbasyouni et al.,2023).

4. PHYTOTHERAPY AND WOMEN'S REPRODUCTIVE HEALTH: THE CAMEROONIAN PERSPECTIVE

Herbs have long been used by traditional communities in Africa and other regions to improve health. Prior to the development of conventional medicine, traditional medical practices on the





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African continent date back up to 4,000 years and served as the only healthcare system. Approximately 80% of people in underdeveloped nations still rely on traditional medicine for their health care, making it the most common form of treatment even today. The key factors contributing to the widespread usage of medicinal herbs have been their affordability and accessibility. Their popularity is also influenced by traditional beliefs, the expectation of minimal or no adverse effects, and a "natural" and hence safe treatment plan.

Plant extracts in the form of infusions or mixtures are utilised in this traditional medical practice to treat a variety of illnesses. Certain plants are employed in relation to the reproductive health of women. With varying degrees of social support, women have attempted to regulate or increase their fertility throughout history. Since then, plant-based medications have been utilised to treat menopausal symptoms, breast pain, dysmenorrhea, fertility suppression, and menstrual cyclicity regulation. It has been shown that the majority of chemicals with oestrogenic activity are found in plant extracts having estrogen-like characteristics. Since these substances imitate some aspects of oestrogen action through oestrogen receptor-mediated processes, they should be referred to as plant secondary metabolites with oestrogenic activity rather than phytoestrogens. Additionally, the amounts of endogenous oestrogens influence their mode of action. With a focus on Cameroonian plants, the current research sought to highlight Central African medicinal plants that women utilise to treat issues pertaining to their reproductive health during or after their reproductive lives, during pregnancy, or after giving birth. (Dieudonne Njamen et al., 2013).

CAMEROONIAN MEDICINAL HERBS AND WOMEN'S REPRODUCTIVE HEALTH

Women's reproductive health includes genital organ health (prevention and/or treatment of gynaecological infections) in addition to fertility control and infertility therapy. As a result, many Cameroonian medicinal plants are used as oxytocics (which stimulate uterine contractions, especially to promote labour), emmenagogues (which stimulate uterine flow), abortifacients (which prevent implantation or push out unwanted conceptus), or contraceptives (which prevent ovulation or fertilisation). Other herbs can be used for vaginal douching to avoid infections or pregnancy [26] or to tighten or dry the vagina to increase the male partner's sexual arousal. In addition to the availability of current birth control technologies, unplanned pregnancies and population growth continue to be major global public health concerns. The global population has surpassed 6.43×10^9 and is growing by 1×10^9 every 12 years. Developing countries, especially those in Africa, account for 95% of this expansion. Over 1×10^6 elective abortions are performed each year in the USA since half of pregnancies are





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unplanned. This necessitates the development of an improved form of contraception that is accessible, effective, and acceptable in both developed and developing countries.

There are a significant number of plants having antifertility qualities in the African pharmacopoeia. Birth control is another name for antifertility, a word used to prevent pregnancy. Preventing pregnancy or fertilisation is the fundamental goal of antifertility medications. While significant progress has been made in developing highly effective, acceptable, and reversible methods of contraception for women, there are currently few and sluggish options for men. Antifertility medications are those that regulate ovulation in females and, when used consistently, serve as effective contraceptives. For example, well-known steroidal oral contraceptives are substances that regulate ovulation and the female menstrual cycle. Traditionally used as birth control, natural materials may have anti-implantation or early abortifacient, anti-zygotic, blastocytotoxic, and anti-ovulation properties. By lowering the fertility index, certain herbs may function as postcoital contraceptives or as suppressors of sexual desire.

When it comes to women's reproductive health, birth control is not the only burden. Infertility is still a major issue for many African women. In fact, 8–14% of couples in European and Eastern nations are reportedly affected by infertility, which is defined as the inability to conceive after a year of consistent sexual activity. With regional incidence rates of 30–40%, infertility is a major reproductive health issue in Africa. Both men and women's physical health is impacted by infection, which is the most frequent cause of infertility. Serious negative social repercussions, including stigmatisation, exclusion, violence, and financial hardship, are also frequently experienced by women in particular.

Reproductive health in Africa is consequently significantly impacted by the appropriate management of infertility. Thus, urogenital infections, tubal blocage, anovulatory cycles, or early menopause may be prevented by traditional medicinal herbs used to treat female infertility. Herbs that promote menstruation flow are known as emmenagogues. Emmenagogue herbs may stimulate uterine contractions to cause menstrual bleeding. Depending on the stage of pregnancy, emmenagogue herbs may induce childbirth or abortion. These emmenagogue herbs can subsequently be used as an abortifacient, an oxytocic to speed up labour, or to treat amenorrhoea. Other herbs have historically been used to treat prolonged menstruation (menorrhagia) or oligomenorrhea. Additionally, plants may protect the unborn child from amnionitis, foetal malposition, and threatening abortion during pregnancy. .(Dieudonne Njamien et al.,2013).





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5. PHARMACOLOGICAL CHARACTERISTICS OF SOME OF THE MAIN MEDICINAL PLANTS

Aesculus hippocastanum

Aesculus hippocastanum, a native of the Balcans, is grown all over the world. In particular, β -escin, tannins, D-catechol, pectin, potassium, volatile oil, calcium, phosphorus, bioflavonoids, and A2 proanthocyanidins make up this complex mixture of saponins. Its mode of action decreases leukocyte activation and promotes ion transport through calcium canal. Clinical recommendations include haemorrhoids, varicose veins, decreased inner ear perfusion, chronic venous insufficiency, and postoperative oedema. It functions as an anti-inflammatory and increases the body's antioxidant defence system. It may intensify the effects of an anticoagulant medication when taken with it.

There aren't many adverse effects at the suggested dosage. Nonetheless, itching, headaches, dizziness, and stomach problems are frequently seen. 16–20% of escin is required for the normal dosage. 100–150 mg should be taken orally, and 2% escin should be used topically three to four times a day.(FERREIRA et al.,2014).

Cimicifuga racemosa

Originating in the North's temperate zones In certain parts of America, *Cimicifuga racemosa* is referred to as "Black Cohosh," whereas in Brazil, it is named "Erva-de-SãoCristóvão." Alkaloids, aromatic acids, and triterpenic glycosides are all present in its extract. The activity of the extract is altered by its nature.

It works by lowering serum levels of luteinizing hormone (LH) by means of negative feedback in oestrogen receptors. It possesses hypotensive effects in central vasomotor centers and partial agonist effects in opioid receptors. Amenorrhoea, dysmenorrhea, problems returning the uterus's rhythmic activity to normal after giving birth, oedema, asthma, migraine, inflammations, metabolic disorders, muscular rheumatism, and rheumatoid arthritis are among the conditions for which it is advised . It causes rejection in transplant recipients by counteracting the immunosuppressive effects of cyclosporine. Additionally, it is compatible with hormones like conjugated oestrogen and oral contraceptives . However, it may have adverse effects like glycoside-related digestive discomfort, headache, nausea, vomiting, changes in vision, tremors, nervous instability, abdominal pain, and possibly hepatic damage. 40 milligrams of the extract should be taken each day. After two weeks of treatment, the first therapeutic benefits become apparent .(FERREIRA et al.,2014).





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Ginkgo biloba

It is used all throughout the world and has its roots in Korea, China, and Japan. It is made up of 6% terpenoids and 24% ginkgo flavone glycosides. Ginkgo biloba exhibits both antiapoptotic and antioxidant properties. It has an anti-ischemic action, lowers clastogenic activity, and employs nitrous oxide to relax blood vessels. G. biloba may enhance acetylcholinesterase's effects. As a result, it is advised for the therapeutic treatment of Alzheimer's disease, cardiovascular conditions, hepatic fibrosis, sexual impotence, memory enhancement, cerebral vascular insufficiency, PMS, and certain types of cancer.

Anticoagulant-treated patients may develop subdural haematomas. Side effects include headaches, dizziness, ringing in the ears, nausea, vomiting, salivation, lack of appetite, and hypersensitivity reactions such as rashes on the skin. There is no proof that G. biloba has a mutagenic effect. It is advised to take 40–80 mg of the plant extract twice or three times a day. Patients with Alzheimer's disease should take 240 mg every day. (FERREIRA et al., 2014).

Hypericum perforatum

Hypericum perforatum, also called "Saint John's wort" or "Erva-de-São-João," is a plant that grows in Asia, Europe, and America. A crimson material containing hypericins can be extracted from its blossoms. Tannins, resins, pectin, naftodiantrona, and flavonoids (luteolin, kaempferol, isoquercetine, quercetine, rutine, and myricetin) with antiviral and anti-inflammatory qualities make up this mixture. Procianydins, phytosterols, vitamin C, carotene, amino acids, and saponins are also present.

The shape, duration, and location of cultivation all affect these compounds' composition. Given that some research indicates that hypericin and pseudohypericin may contribute to the antidepressant effect, it is thought that this plant contains elements that can prevent the absorption of serotonin, noradrenalin, and dopamine. Some claim that hyperforins are responsible for this effect. The antidepressant is more commonly prescribed and consumed in Europe, where the plant extract is used to treat mild to moderate depression. The interaction with γ -aminobutyric acid (GABA) receptors and the inhibition of catechol-o-methyltransferase and monoamine oxidase enzymes are among the mechanisms of action described.





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Cytochrome P450 and the isoenzyme CYP1A2 have been shown to lower serum concentrations of protease inhibitors, simvastatin, tricyclic antidepressants, carbamazepine, phenytoin, and phenobarbital. Hypericum has been shown to be dosage-dependent and may primarily cause photosensitivity in the skin and eyes. For the treatment of mild to moderate depression, a dosage of 500–1,050 mg is used two or three times daily. Research continues to show that it has antiviral properties against enveloped viruses such as human immunodeficiency virus type 1, murine cytomegalovirus, and simplex herpes virus type 1.(FERREIRA et al.,2014).

Panax ginseng

East Asia and Russia are where *Panax ginseng* first appeared. The most often utilised structure in medicine is its root. It is composed of proteins, polypeptides, alkaloids, phenols, amino acids, saponins, and vitamins B1 and B2. By helping with stresses and physiological tolerance, these substances support vitality, longevity, and mental capacity. This plant is used to relieve anxiety in therapeutic settings. Cytochrome P450 is considerably inhibited by *P. ginseng*, according to research. A reversible rash and mild jaundice may occur after prolonged use. A dosage of 50 to 70 mg three times a day is recommended to achieve the therapeutic range. *P* did not exhibit any teratogenic or hormonal effects, nor did pregnant or breastfeeding women. Ginseng and other drugs interact. It is dosage-dependent and has minimal toxicity. A few side effects, including as rash, headaches, sleeplessness, nausea, diarrhoea, and hypertension, were recorded.

(FERREIRA et al.,2014).

Passiflora incarnata

The aerial parts of this native American plant, called passion fruit, are typically utilised. It is made up of alkaloids, flavonoids, and other components like pectin that have received less attention in the literature. The central nervous system is depressed by its effect, possibly at benzodiazepine sites. The impact of the phytotherapeutic was confirmed to be prevented by the administration of flumazenil, an antagonist of the benzodiazepine receptor. During its use, there were phases of nervous agitation and irritability, sleeplessness, and anxiety problems.

Studies on its efficacy as an anticonvulsant, aphrodisiac, antitussive, sexual dysfunction, and cancer are still ongoing. Pentobarbital, hexobarbital, and amino oxidase inhibitors all have their effects enhanced by *Passiflora incarnata*. Warfarin may interact with it. Although there aren't many instances of *P. incarnata* toxicity, there have been cases of nausea, vomiting, cardiac arrhythmia, and persistent drowsiness. Three times a day, 500–1000 mg of *P. incarnata* is the recommended therapeutic dosage.(FERREIRA et al.,2014)





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Piper methysticum

Piper methysticum, often known as kava kava, is native to the Pacific Islands. Native Americans made a concoction of the plant's extract with water or coconut milk for ages. It is composed of lactones, kavalactones, or kavapirones, which function as the phytotherapeutic's active component. In addition to inhibiting noradrenaline reuptake or blocking serotonin release, the lactones link and enhance the activation of GABA receptors. (FERREIRA et al.,2014).

Rhamnus purshiana

According to the two most popular commercial names for *Rhamnus purshiana* are Eparema (Altana Pharma) and Cáscara Sagrada (Herbarium). Cascarosides A, B, C, and D, tannin, saponin, aloin, and free anthraquinones are its constituents. It works by stimulating the intestinal mucus's nerve terminations, which raises stool humidity and peristalsis. It is also possible for the sodium and potassium canals to be inhibited, which would increase the flow of fluids to the extracellular environment. When constipation occurs occasionally, *R. purshiana* is therapeutically advised.

There is proof that the effects of corticoadrenal steroids and thiazide diuretics are amplified while the effects of antiarrhythmics are diminished. Arrhythmia, hypokalaemia, and nephropathy are a few adverse consequences. Long-term usage of it may cause the neural plexus in the colon to be destroyed, resulting in cramping, irritation of the digestive mucosa, and decreased intestinal movement. The doctor should decide on the suggested oral dosage, the course of treatment should not be continuous and should not extend beyond ten days. (FERREIRA et al.,2014).

Valeriana officinalis

Valeriana officinalis is indigenous to Europe and northern Asia, and Hypocrates describes its use. Its rhizome, roots, and stem are used to manipulate various preparations, and it has a distinctive smell. Sesquiterpenes, valepotriates, and valerianic acid are some of its ingredients. No research was able to demonstrate each of these components' efficacy independently. It inhibits the breakdown of GABA and promotes its synthesis in the synaptic gap. Some preparations contain glutamine, which could enhance their effects.

V. officinalis may be addictive to those who use alcohol or other sedatives, and it is professionally advised in cases of sleep disturbances and mild insomnia. Strict research on the phytotherapeutic's interactions with other medications was lacking. Counterindications include headache, lightheadedness, itching, and digestive issues. Nevertheless, no reports of the drug's





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toxicity exist, despite some data suggesting that it might be connected to dosage. The recommended dosage is 400–900 mg of its extract for 28 days. Each tablet contains 187 mg of valerian extract and 41.9 mg of humulus lupulus extract; take two pills at bedtime.(FERREIRA et al.,2014).

Plantago ovata

Iran, Pakistan, and particularly India are places where *Plantago ovata* is grown. The primary component of its seeds is mucilage. It is abundant in fibres and polysaccharides with a faintly acidic taste. The plant works by increasing the excretion of cholesterol and gallbladder acid while decreasing its absorption by the gut. Additionally, there may be less intestinal absorption of carbs. *P. ovata* is recommended for clinical cases of diabetes, haemorrhoids, faecal incontinence, chronic intestinal constipation, and hypercholesterolaemia. The pharmaceutical sector uses the seeds to treat amoebic dysentery and intestinal cancer. Additionally, this plant interferes with the intestinal absorption of vitamins and minerals, particularly B12, and it is not advised to use it with intestinal motility inhibitors and antidiarrheal medications since it may clog the intestine.

If the recommended dosage is administered correctly, adverse effects are rare. Intestinal cramps, severe diarrhoea, and electrolyte and hydration loss are possible outcomes of overdosing. Ten to thirty grams per day, split into two doses, is the suggested dosage. Starting with a lesser dosage and increasing it gradually as needed is advised. (FERREIRA et al.,2014).

6.CONCLUSION

There is an urgent need to educate doctors and the public about the use of medicines not recommended by the EMA, the proper use of herbal medicines, and the potential risks associated with their use because herbal raw materials and medicines play a significant role in the treatment of children and are also used during pregnancy and breastfeeding. Additionally, research results indicate the use of products not recommended by the EMA. (Ain Raal et al.,2026).

The effects and variety of phytotherapy and non-chemical treatments related to PCOS condition were illustrated in this review. Future research on the genesis and management of this syndrome—the most frequent cause of infertility in women—may benefit from these discoveries.(Farahnaz Azin Ph.D. et al.,2020).

The utilisation of compounds produced from plants is the focus of current research in breast cancer therapy. By focusing on compromised signalling pathways like Wnt/ β -catenin, NF- κ B,





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PI3K/Akt/mTOR, and EMT-related pathways, phytochemicals can inhibit the growth and spread of cancer cells, cause cell death, and improve the effectiveness of traditional cancer treatments. In general, further research is needed on the application of phytochemicals in cancer treatment. Further research is necessary to fully understand these chemicals' methods of action and potential interactions/synergies with traditional cancer medications, even if they may have potential as complementary or alternative cancer therapy.(Amel Elbasyouni et al.,2023).

Obesity and overweight are the most prevalent health problems with several potentially catastrophic outcomes. The current chapter covered the therapeutic potential of plants to treat obesity and its consequences. Phytotherapy has proved more effective in treating a number of ailments since ancient times, and the use of plant-based medications to treat obesity is rapidly expanding. Plant-based weight-loss therapies include ginger, green tea, coffee, turmeric, chilli pepper, blueberries, soybeans, lotus leaf with taurine, hibiscus sabdariffa, and coptis root. Plants include a variety of phytochemicals that target the pathophysiology of obesity and have anti-obesity activities. Flavonoids, alkaloids, tannins, saponins, and polyphenols are the most prevalent phytochemicals that enhance insulin sensitivity and regulate appetite by controlling lipid metabolism and adipocyte development. These phytochemicals' anti-obesity properties determine the efficacy and safety of conventional medicinal plants in the treatment of obesity. The pharmacokinetics, pharmacodynamics, and safety of phytochemicals found in medicinal plants that might support their use in the treatment of obesity need more investigation.(ABDUL MALIK et al.,2024).

Given the great diversity of its flora, the tropical forest continues to supply raw materials for the development of novel pharmaceuticals. Numerous plants are utilised for women's reproductive health, namely for fertility, genital organ health, or birth control, according to the African pharmacopoeia. In this essay, we have examined the information regarding plants that have historically been utilised for women's reproductive purposes, primarily in central Africa. Cameroon is home to a considerable number of these plants. Some of these traditional medicinal herbs have already undergone scientific characterisation, albeit to differing degrees, and some of their qualities are ascribed to oestrogenic, oxytocic, or anti-implantatory qualities. The phytochemical and pharmacological characterisation of these therapeutic plants still needs a lot more work, given the diversity of the Cameroonian pharmacopoeia.(Dieudonne Njamen et al.,2013)

Numerous investigations have been conducted utilising raw plant extracts, and many writers have encouraged elegant experiments using isolated chemicals from plant species. These





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articles describe the true active ingredients and, in certain situations, the synergistic effects of several extracts that vary depending on the region and custom.

There is still much to learn about the biologic variety, particularly in nations like Brazil, as well as the numerous unidentified biologics and their therapeutic potential. Additionally, the advancement of translational science from in vitro research to clinical trials will be accelerated by attempts to incorporate the knowledge gained from medication interactions and the findings of multidisciplinary research teams, offering society safer and more effective advantages.(FERREIRA et al.,2014).

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