An Integrative Review of Yoga and Traditional Herbal Remedies in the Management of Polycystic Ovary Syndrome (PCOS)

[1]Adrija Baruah, [2] Ankita Borah, [3]Bornali Haloi

[123]M.Sc Zoology Graduate
[1]Department of Zoology,
[1]Cotton University, Guwahati, Assam, India
[1]adrijabaruah08@gmail.com, [2]borahankita142@gmail.com, [3]haloibornali5@gmail.com

***Abstract*—Polycystic ovary syndrome is a multifaceted endocrine and metabolic disorder characterized by hyperandrogenism, ovulatory dysfunction, insulin resistance and psychological distress that affects an extensive number of women of reproductive age. Conventional care focuses primarily on symptoms relief and frequently overlooks the disorder's complex hormonal, metabolic and psychosocial elements. This has resulted in a greater interest in in integrative and non-pharmacological therapies. The review gives a brief about the therapeutic potential of yoga and traditional ethnomedicinal plants particularly used in Assam, in the management of PCOS. Clinical research shows that yoga interventions, such as particular asanas, pranayama and relaxation techniques that contribute to improve insulin sensitivity, reduction in androgen levels, better menstrual regularity, weight management, improved cardiovascular parameters and significantly reduce anxiety and depression. These effects are mediated through modulation of the hypothalamic- pituitary- ovarian axis, autonomic balance and stress response pathways. In parallel, ethnomedicinal plants that have been used in Assam for a long time, like *Saraca indica, Curcuma longa, Cinnamomum verum, Trigonella foenum graecum, Mentha spicata and Tinospora cordifolia* possess documented antioxidant, anti-inflammatory, endocrine regulatory and insulin sensitizing properties that directly affect key patio physiological mechanisms of PCOS. These plant-based medicines, which come in many forms like decoction, extracts and herbal preparation are a valuable yet under explored therapeutic resources. This integrative review demonstrates that connecting traditional herbal remedies with yoga-based lifestyle interventions provides a comprehensive, patient cantered strategy that can address the psychological and metabolic aspects of PCOS. To verify safety and effectiveness, however standardization of herbal formulations, identification of active phytoconstituents and carefully planned clinical trials are crucial. In order to provide evidence based integrative strategies for long term PCOS care, the review emphasizes the necessity go bridging traditional wisdom with contemporary scientific research.**

Keywords—**Polycystic Ovarian Syndrome, yoga, ethnomedicinal plants, integrative medicine, Assam**

I. INTRODUCTION

A woman's overall physiological, metabolic and psychological well-being can be determined by her reproductive health, which is a sensitive but crucial indicator of the complex interplay between endocrine function, lifestyle and emotional well-being. Conditions like Polycystic Ovary Syndrome (PCOS), which encompasses both metabolic and reproductive dysfunction, are frequently caused by disruptions in this harmonious interaction of hormones, metabolism and mental health. According to the National Institute of Health and Rotterdam criteria, polycystic ovarian syndrome (PCOS) is a hormonal condition marked by the development of at least one polycystic ovary or many cysts together with ovulatory failure and excessive release of androgens [1] .PCOS is thought to affect 5.5% to 12.6% of women in the 17–45 age range worldwide and depending on the diagnostic method, prevalence estimates in India range from 8.2% to 22.5% [2][3].

One of the main causes of ovulatory dysfunction and infertility in women of reproductive age is Polycystic Ovarian Syndrome (PCOS), a common and complicated endocrine disorder . It causes irregular or nonexistent ovulation and the development of immature follicles by interfering with normal ovarian function. Numerous metabolic, hormonal and dermatological characteristics, including obesity, insulin resistance, acne, hirsutism, irregular menstruation and altered lipid profiles are linked to PCOS [4]. The precise etiology of PCOS is still unknown and involves a number of extra-ovarian factors, including insulin resistance, hyperandrogenism, obesity, inflammation, oxidative stress, genetic and environmental influences, even though an altered LH–FSH ratio and increased GnRH pulsatility are acknowledged contributors. Insulin resistance and oxidative stress are made more worse by obesity and hirsutism. Acne and alopecia are symptoms of clinical hyperandrogenism that cause severe psychological distress. PCOS raises the risk of type 2 diabetes, metabolic syndrome and long-term cardiovascular and neurological problems if treatment is not received [5].

The rising incidence of PCOS is strongly related to overweight conditions, sedentary lifestyles, and poor dietary habits, which disrupt metabolic and hormonal homeostasis. Unlike in the past, when women were routinely engaged in physically demanding daily activities, modern lifestyles are characterized by reduced physical movement and prolonged inactivity. Moreover, chronic psychological stress, anxiety and depression, now common due to academic, occupational and social pressures, further exacerbate dysregulation of the neuroendocrine axis. These lifestyle and psychosocial factors together contribute heavily to the onset and perpetuation of PCOS.

Research indicates that changing one's lifestyle is a successful first-line strategy for PCOS management and prevention. The risk and severity of the condition can be considerably decreased by making even small adjustments to daily routines. As of right now, there is no medication that completely cures PCOS. However, it has been demonstrated that lifestyle modifications like a healthy diet, yoga and frequent exercise can reduce symptoms and enhance the course of the illness [6].

A paradigm shift toward non-pharmacological and integrative treatments that address the multifactorial pathophysiology of PCOS rather than just providing symptomatic relief has occurred in recent years. Among these methods, yoga has received significant scientific recognition as a successful mind-body therapy that may improve insulin sensitivity, reduce chronic stress reactions, regulate neuroendocrine signaling and restore hormonal homeostasis [7]. It has been demonstrated that regular practice of yoga techniques, such as particular asanas, controlled pranayama and meditative practices, influences the hypothalamic-pituitary-ovarian axis, improves autonomic balance and mitigates metabolic dysregulation while also reducing psychological distress that is frequently linked to PCOS.

Global interest in natural resources has helped create new paths for drug development based on traditional knowledge, with special emphasis on aspects such as safety and efficacy. Medicinal plants play an integral part in the management and administration of female reproductive health, which has become embedded within traditional medicine. In India, especially within biodiversity regions like Assam, the ethnomedicinal knowledge pertaining to reproductive problems among women has been passed on, not only within traditional knowledge processes, but also mentioned within classical literature like Ayurveda. With the introduction of recent advancements made within modern medicine, traditional herbal recipes have received recognition for their potential benefits within hormonal imbalance or metabolism problems. Initiatives undertaken by international organizations like the WHO have helped enhance the recognition of herbal-based treatments regarding female reproductive health [8] .Therefore, the significance of traditional knowledge processes can be clearly related within the scope that can be derived within regions like Assam. The majority of female health problems are treated with infusions, decoctions or tinctures made from medicinal herbs. Several plant parts, including the stem, roots, leaves, fruits, flowers and trunks are most oftently used herbs in the Northeast for the treatment of infertility which includes Shalparni, Patala, Shatavari, Sweet Flag etc [9]. Several studies demonstrate the antioxidant qualities of crude plant extracts and their secondary metabolites, which scavenge ROS and control the production of ovarian hormones. In order to treat infertility, these extracts which come from different plant parts can directly activate ovarian cells, encouraging folliculogenesis and steroidogenesis [10].

Given the intricate and multifaceted nature of PCOS, comprehensive care approaches that go beyond symptomatic medication therapy are desperately needed. The disorder's underlying metabolic, hormonal and psychological disorders are addressed by integrative therapies including yoga and conventional medicine. Assam provides important but little-known therapeutic expertise for female reproductive health due to its extensive ethnomedical legacy. Therefore, the current study intends to methodically record and assess certain yoga techniques and traditional methods utilized in the treatment of PCOS and related reproductive illnesses.

II. YOGA INTERVENTIONS FOR PCOS

Yoga which combines asanas, pranayama, relaxation and meditation to harmonize mind and body is derived from the Sanskrit word yuj, which means "to unite." It has been extensively researched for the treatment of chronic illnesses and stress. Yoga has emerged as a beneficial lifestyle intervention for the management of polycystic ovary syndrome (PCOS) addressing its hormonal, metabolic, menstrual and psychological manifestations through mind–body regulation. Evidence from clinical studies supports its role in improving key PCOS-related parameters and overall well-being. A summary of the effects of yoga on PCOS parameters and supporting clinical evidence, along with commonly practiced yoga asanas beneficial for PCOS management and their methods of practice is presented in the tables below.

Table 1: Effects of Yoga on PCOS Parameters and Supporting Clinical Evidence

Yoga benefits on PCOS parameters	Literature evidence	References
Improved androgen levels	A randomized controlled study found that thrice-weekly mindful yoga for 3 months reduced free testosterone levels in women with PCOS with improvements in anxiety and depression as well	[11]
Improved hirsutism score	A randomized controlled trial compared a 12-week holistic yoga program with conventional exercise in adolescent girls with PCOS. Yoga significantly reduced anti-Müllerian hormone (AMH), luteinizing hormone (LH), LH/FSH ratio, testosterone levels and hirsutism scores compared to exercise .	[12]
	A clinical trial on 61 women with PCOS undergoing infertility treatment showed that 6 weeks of yoga significantly reduced hirsutism, abdominal circumference and hip circumference compared to routine care. These findings support yoga as an effective treatment to improve clinical signs and body measurements in women with PCOS.	[13]
Improved body weight and BMI	A 12-week organized yoga practice dramatically decreased body weight, BMR, BMI, visceral fat, and waist-hip circumference, according to a 2023 PCOS intervention trial.The yoga intervention group also showed changes in insulin responsiveness, AMH levels, lipid profile and liver enzyme indicators.	[14]
Reduction in primary dysmenorrhoea	A randomized controlled study involving 60 female students evaluated the effect of a 12-week yoga program on primary dysmenorrhea pain.	[15]

	The experimental group showed a significant reduction in menstrual pain over three cycles while the control group had no significant change .	
Improved Insulin sensitivity Improved menstrual regularity	A 12-week single-arm trial with 49 women with PCOS showed that a structured yoga program improved menstrual regularity, reduced testosterone and also normalized LH/FSH ratio. Participants also experienced better insulin sensitivity, lower BMI and reduced stress and anxiety.	[16]
Improved cardiovascular parameters	A 12-week study on 40 women with PCOS showed that daily 40-minute Yoga Nidra sessions significantly reduced resting heart rate, systolic and diastolic blood pressure. These results suggest Yoga Nidra may improve cardiovascular health in PCOS	[17]
Psychological health	A study on 30 women with PCOS found that practicing yoga significantly reduced anxiety and depression levels. Before the intervention, most participants had moderate to severe anxiety and depression, which improved notably after the practice.	[18]

Table 2: Some Yoga Asanas beneficial for PCOS Management and Their Method of Practice

Yoga asana	**Method of practice**
Nadi Shodhana Pranayama	Nadi Shodhana is a breathing technique in which inhalation and exhalation are performed alternately through each nostril. The practice involves inhaling through the left nostril and exhaling through the right, followed by inhaling through the right nostril and exhaling through the left. These steps are repeated slowly in continuous cycles.
Bhujangasana (Cobra Pose)	The practitioner is made to lie comfortably on the abdomen with the legs extended and feet close together. The palms are placed on the floor beside the chest and elbows positioned close to body. The forehead is rested on the mat. During inhalation the head and chest are gently raised by pressing the palms into the floor while the lower abdomen is kept in contact with the ground. The posture is maintained for a few moments with normal breathing. Finally, during exhalation, the chest and head are slowly lowered back to the floor.
Baddha Konasana (Butterfly Pose)	The practitioner sits comfortably on the floor with the spine kept straight. The soles of the feet are brought together and moved close to the body and the knees are allowed to gently fall toward the floor. The feet are held with the hands and legs are relaxed. While breathing normally, the knees are softly moved up and down like butterfly wings or simply kept still in a comfortable position. The pose is held for a short time after which the legs are gently released and stretched out.
Dhanurasana(Bow pose)	The practitioner is made to lie flat on the stomach with the arms resting alongside the body. The knees are then bent and hands reach back to hold ankles firmly. During inhalation, chest and thighs are lifted off the floor by pulling the ankles upward forming a bow-like shape with the body. The head is raised gently to look forward and the posture is held while breathing normally. Finally during exhalation the body is slowly lowered back down to the floor and the pose is released.
Trikonasan (Triangle Pose)	The practitioner is made to stand with the feet placed wide apart. The right foot is turned outward at a 90-degree angle while the left foot is slightly turned inward. The arms are extended horizontally at shoulder height. The body is then bent sideways allowing the right hand to reach down toward the right ankle or the floor while the left arm is extended upward. The gaze is directed toward the raised hand. The posture is held while

	breathing steadily. Finally, the body is brought back to the starting position and the same steps are repeated on the opposite side
Surya Namaskar (Sun Salutation)	The practitioner is made to stand at the front of the mat with feet together and hands folded in prayer position at the chest. The arms are then raised overhead while inhaling followed by a forward bend from the hips with hands reaching toward the feet during exhalation. The body is lowered into a half-lift position with the spine extended while inhaling. Next, the practitioner steps back into a plank pose, followed by lowering the body down with elbows close to the sides (Chaturanga). During inhalation, the chest is lifted into an upward-facing dog or cobra pose. Then, the hips are raised into a downward-facing dog position while exhaling. Finally, the practitioner steps forward, returns to a forward bend, rises up with arms overhead while inhaling and returns to the starting prayer position during exhalation. This sequence is typically repeated several times in a smooth, flowing motion.

Source: Adapted from Frawley and Kozak (2001) [61].

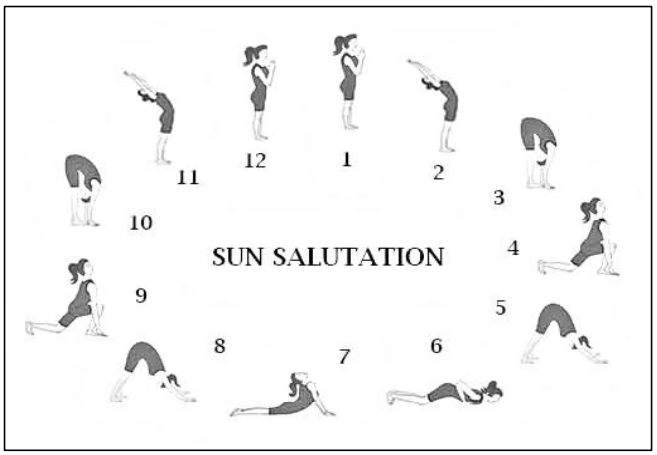

Figure 1. Twelve steps of *Surya Namaskar*. Adapted from *Yogic Way of Life* (n.d.).

III. ETHNOMEDICINAL PLANTS OF ASSAM FOR PCOS MANAGEMENT

Assam is rich in ethnobotanical diversity, with numerous indigenous and traditional medicinal plants being extensively used by local communities for the management of women's reproductive health disorders. Traditional knowledge systems of the region have long employed plant-based remedies to address menstrual irregularities, hormonal imbalance, infertility and metabolic disturbances, which are closely associated with Polycystic Ovary Syndrome (PCOS). Many of these ethnobotanical plants possess bioactive compounds with potential endocrine-regulatory, anti-inflammatory, antioxidant and insulin-sensitizing properties. Table-3 presents a comprehensive list of ethnomedicinal plants of Assam reported to have beneficial roles in the management of PCOS. The table includes the scientific name, local name, family, plant parts used, mode of consumption and therapeutic roles of each plant. This compilation aims to bridge traditional ethnobotanical knowledge with available scientific evidence, highlighting plant-based interventions that may serve as complementary approaches for PCOS management.

Table 3: List of medicinal plants native to Assam used in treatment of PCOS complications.

Sl. no	Scientific name	Local name	Family	Parts used	Mode of consumption	Therapeutic role	References
1.	*Mangifera indica L.*	Mango, Aam	Anacardiaceae	Leaves, fruits.	Leaf decoction	Prevent heavy bleeding or antimenorrhagia and leucorrhoea.	[19],[20], [21]
2.	*Saraca indica L.*	Ashoka	Fabaceae	Bark, flower	Bark Extract	Prevent menorrhagia and menstrual pain, helps in overcoming irregular menstruation cycles and other uterine disorders.	[19], [22]
3	*Mentha spicata L.*	Spearmint, garden mint, pudina.	Lamiaceae	Leaves	Spearmint tea	Antiandrogenic effects, improvement in hirsutism, hormonal regulation, work against insulin resistance.	[23],[24], [25]
4	*Centella asiatica (L.) Urb.*	Barmani muni	Apiaceae	leaves	Leaf extract	Prevents amenorrhea	[26],[27]
5	*Coriandrum sativum L.*	Dhania	Apiaceae	Seeds	Seed decoction	Maintain hormonal levels, Regulate excessive menstrual flow, reduces cramps.	[28],[29], [30]
6	*Curcuma longa L.*	Turmeric, haldi	Zingiberaceae	Rhizome	Turmeric powder taken with warm milk or food.	Hormonal regulation, lowering of androgen levels, anti-inflammatory and antioxidant property	[31], [32], [33]
7	*Cinnamomum verum* J.Presl	Cinnamon	Lauraceae	Bark	Decoction of bark or as an extract	Insulin resistance, steroidogenesis, antiandrogenic activity, anti-inflammatory effects and antioxidant property.	[34], [35], [36],[37]

8	*Trigonella foenum- graecum* L.	Fenugreek	Fabaceae	Leaves, fruits	Seed extract	Induction of ovulation,hormone regulation , improvement of fertility, regulation of insulin sensitivity	[38], [39]
9	*Aloe Vera (L.) Burm. f.*	Indian aloe, First aid plant	Asphodelaceae	Leaves	*Aloe vera* gel	Improve steroidogenic activity, suppress androgen secretion.	[40],[41], [42]
10	*Ocimum sanctum* L.	Tulsi	Lamiaceae	Leaves	Fresh leaf juice or tea, leaf decoction.	Anti- androgenic properties, anti-oxidant property.	[43],[44], [45]
11	*Tinospora cordifolia* (Willd.) Hook.f. & Thomson	Giloy, Guduchi	Menisperm-aceae	Stem, leaves .	Aqueous decoction	Regulate menstrual flow, helps in overcoming insulin resistance, anti-inflammatory effects, natural immunity booster.	[22],[46], [47],[48]
12	*Foeniculum vulgare*	Fennel, saunf	Apiaceae	seeds	Fennel seeds tea or powder, decoct	Promotes menstruation , facilitates birth, induces estero genic properties and also useful in the treatment of hirsutism.	[40],[49], [50]
13	*Rubus spp.*	Wild Raspberry	Rosaceae	Fruits	Whole berries	Lowers androgen levels, improves insulin sensitivity, indicate antioxidant and immune- modulatory effects on thyroid function.	[43],[51], [52]

14	*Wedelia chinensis (Osbeck) Merr.*	Bhringraj, false daisy.	Asteraceae	Leaves	Decoction or juice	Prevents abnormally heavy and prolonged menstrual bleeding or menorrhagia	[53],[54]
15	*Cyperus rotundus*	keya bon	Cyperaceae	Whole plant	Decoction	Estrogenic activity, improve insulin sensitivity and reduces ovarian cyst formation	[53],[55], [56]

IV. DISCUSSION AND CONCLUSION

Yoga offers great benefits across multiple clinical features of polycystic ovary syndrome (PCOS). Evidence from randomized trials and clinical studies consistently shows improvements in hormonal balance, menstrual health, metabolic function cardiovascular parameters and psychological well-being following regular yoga practice[Table 1].

Yoga interventions were associated with reductions in androgen levels, including free testosterone, AMH, LH and LH/FSH ratio also accompanied by visible improvement in hirsutism scores [11,12,13]. These outcomes suggest that yoga may help restore endocrine balance by influencing neuroendocrine regulation and reducing stress-related hormonal disturbances. Improvements in menstrual regularity and reduced dysmenorrhea further support the role of yoga in enhancing reproductive health[15,16]. Yoga practice also improved insulin sensitivity, reduced BMI and decreased central fat accumulation [14,16]. Since insulin resistance plays a key role in driving hyperandrogenism in PCOS [57], these benefits suggest that yoga may help address underlying disease mechanisms rather than offering only symptomatic relief. Improvements in heart rate and blood pressure further highlight its relevance in reducing cardiometabolic risk in women with PCOS [17]. Beyond physical outcomes, yoga demonstrated a clear positive impact on mental health, with significant reductions in anxiety and depression [18]. This mind–body influence is particularly important in PCOS, where psychological stress often worsens hormonal and metabolic imbalance.

The plants examined in this study, which have been traditionally utilized in Assam for women's reproductive wellness, show significant promise in tackling the complex pathophysiology of Polycystic Ovary Syndrome. These ethnomedicinal species are abundant in bioactive compounds that have anti-androgenic, insulin-sensitizing, anti-inflammatory, antioxidant and estrogenic properties, all of which are pertinent to hormonal imbalances, ovulatory issues and metabolic concerns. For instance, *Mentha spicata* has been clinically validated for its capability to lower circulating androgen levels and enhance hirsutism, substantiating its traditional application in treating hyperandrogenism [23-25]. Likewise, *Curcuma longa* has demonstrated favorable outcomes in enhancing insulin sensitivity, decreasing inflammation and modulating hormonal levels in women with PCOS,as evidenced by randomized controlledtrials [31-33]. Several ethnomedicinal herbs described in this review, such as *Cinnamomum verum*, *Trigonella foenum-graecum* and *Tinospora cordifolia*, efficiently target insulin resistance, a key component of PCOS.

Research has shown that supplementing with cinnamon and fenugreek extracts improves metabolic indices, menstrual cyclicity and insulin sensitivity [35,36,38]. Furthermore, plants that have been traditionally used to treat amenorrhea, menorrhagia and irregular menstrual cycles include *Saraca indica*, *Mangifera indica*, *Cyperus rotundus* and *Wedelia chinensis*. These plants may have uterine-tonic and estrogenic effects that help maintain hormonal balance [19,22,54,55].

Furthermore, antioxidant-rich plants such as *Centella asiatica, Ocimum sanctum, and Rubus spp.* may help counteract oxidative stress, which plays a crucial role in the progression of PCOS-related ovarian dysfunction. Emerging evidence suggests that antioxidant and immune-modulatory effects may indirectly improve endocrine function and ovarian health [43,51,42]. Many people have reportedly used Triphala, a polyherbal combination of *Terminalia bellirica*, *Terminalia chebula* and *Emblica officinalis* to treat PCOS. Its traditional use in enhancing menstrual irregularities and general reproductive health is supported by its antioxidant, anti-inflammatory and hormone-modulatory qualities, which are primarily attributed to phenolic compounds [58-60].

In summary, the ethnobotanical plants of Assam discussed in this study signify a significant and predominantly underutilized resource for the complementary treatment of PCOS. The integration of traditional knowledge with new pharmacological and clinical findings underscores their ability to tackle major aspects of PCOS, such as hormonal *imbalances*, metabolic issues and reproductive problems. Nonetheless, although encouraging results have been observed for certain plants, numerous species still rely mainly on ethnomedicinal applications and initial research. Future studies need to emphasize mechanistic validation, the standardization of herbal products, safety evaluations and rigorously designed clinical trials to confirm effectiveness. Combining conventional ethnobotanical wisdom with contemporary biomedical studies could enhance the creation of safe, cost-effective and comprehensive treatment approaches for PCOS, especially in under-resourced areas

Based on available scientific evidence, the incorporation of yoga practices and plant-based interventions has been associated with notable improvements in clinical symptoms, hormonal regulation and overall quality of life among women with PCOS. An integrative management strategy that combines lifestyle interventions with herbal therapeutics offers a comprehensive and patient-centered approach to addressing the multifactorial nature of PCOS. This review therefore provides a valuable foundation for future research aimed at scientifically validating and standardizing such integrative therapeutic modalities on a global scale.

V. REFERENCES

[1] Yii, Ming Fong, et al. "Polycystic ovarian syndrome in adolescence." *Gynecological Endocrinology* 25.10 (2009): 634-639.

[2] Mehreen, T. S., Ranjani, H., Kamalesh, R., Ram, U., Anjana, R. M., & Mohan, V. (2021). Prevalence of polycystic ovarian syndrome among adolescents and young women in India. *Journal of Diabetology*, *12*(3), 319-325.

[3] Mehreen, T. S., Ranjani, H., Kamalesh, R., Ram, U., Anjana, R. M., & Mohan, V. (2021). Prevalence of polycystic ovarian syndrome among adolescents and young women in India. *Journal of Diabetology*, *12*(3), 319-325.

[4] Wal, A., Wal, P., Saraswat, N., & Wadhwa, S. (2021). A detailed review on herbal treatments for treatment of PCOS-Polycystic ovary syndrome (PCOS). *Curr Nutraceuticals*, *2*(3), 192-202.

[5] Kumari, D., Kumar, M., Tiwari, P., Mahey, R., Malhotra, N., Mishra, R., & Dada, R. (2023). Impact of Yoga in polycystic ovary syndrome. *International Journal of Ayurveda Research*, *4*(3), 132-136.

[6] Selvaraj, V., Vanitha, J., Dhanaraj, F. M., Sekar, P., & Babu, A. R. (2020). Impact of yoga and exercises on polycystic ovarian syndrome risk among adolescent schoolgirls in South India. *Health science reports*, *3*(4), e212.

[7] Rao, V. S., Cheema, B. S., Armour, M., Smith, C. A., Metri, K. G., & Ee, C. (2025). Yoga for weight management in women with polycystic ovary syndrome: A focus group study among yoga therapists. *European Journal of Integrative Medicine*, 102569.

[8] Sarma, H. N., Sarma, I., Misra, K., Saikia, A., & Doima, S. (2023). Female reproductive health-regulating hormones and phytosteroids as alternative modulator: A review. *Annal Multidiscip Res Innov Technol*, *2*, 45-53.

[9] Sinaga, S. E., Supratman, U., & Mayanti, T. (2022). Natural Bioactive Compounds: Volume 2 Chemistry, Pharmacology, and Health Care Practices: Editor: Mallappa Kumara Swamy & Mohd Sayeed Akhtar. Springer Nature Singapore Pte Ltd, 2019, 492 pages, EUR 169.99, Hardcover, ISBN: 978-981-13-7204-9.

[10] Lodh, S., & Swamy, M. K. (2019). Phytochemical aspects of medicinal plants of Northeast India to improve the gynaecological disorders: an update. In *Natural Bio-active Compounds: Volume 2: Chemistry, Pharmacology and Health Care Practices* (pp. 353-367). Singapore: Springer Singapore.

[11] Patel, V., Menezes, H., Menezes, C., Bouwer, S., Bostick-Smith, C. A., & Speelman, D. L. (2020). Regular mindful yoga practice as a method to improve androgen levels in women with polycystic ovary syndrome: a randomized, controlled trial. *Journal of Osteopathic Medicine*, *120*(5), 323-335.

[12] Patil, A. D., Pathak, S. D., Kokate, P., Bhogal, R. S., Badave, A. S., Varadha, M., ... & Dalvi, P. D. (2023). Yoga intervention improves the metabolic parameters and quality of life among infertile women with polycystic ovary syndrome in indian population. *International journal of yoga*, *16*(2), 98-105.

[13] Mohseni, M., Eghbali, M., Bahrami, H., Dastaran, F., & Amini, L. (2021). Yoga effects on anthropometric indices and polycystic ovary syndrome symptoms in women undergoing infertility treatment: a randomized controlled clinical trial. *Evidence-Based Complementary and Alternative Medicine*, *2021*(1), 5564824.

[14] Przesór, A., & Medźwiedzka, N. (2025). The Use of Yoga in the Treatment of PCOS. Quality in Sport, 37, 57642-57642.

[15] Kirca, N., & Celik, A. S. (2023). The effect of yoga on pain level in primary dysmenorrhea. *Health care for women international*, *44*(5), 601-620.

[16] Singh, S., Arya, V., Mishra, R. K., & Rajput, S. K. (2025). Clinical Efficacy of Yoga Practices in the Management of Polycystic Ovarian Syndrome: Insights from a Single-arm Pilot Trial.

[17] Vanitha, A., Pandiaraja, M., Maheshkumar, K., & Venkateswaran, S. T. (2018). Effect of yoga nidra on resting cardiovascular parameters in polycystic ovarian syndrome women. *National Journal of Physiology, Pharmacy and Pharmacology*, *8*(11), 1505-1508.

[18] Warghane, R. S., Mahakarkar, M. G., Taksande, V., Teltumbde, A. S., Warghane, S., Ghugare, S. B., ... & Gulghane, A. (2025). Effect of Yoga (Malasana) on Anxiety and Depression Among Women with Polycystic Ovarian Disease. *Journal of South Asian Federation of Obstetrics and Gynaecology*, *17*(5), 589-594.

[19] Majumdar, R., & Dutta, A. M. (1983). Some Ayurvedic important plants from district Kamrup (Assam). *Ancient Science of life*, *3*(2), 108.

[20] Qian, Qiaohong, et al. "Mangiferin ameliorates insulin resistance in a rat model of polycystic ovary syndrome via inhibition of inflammation." Tropical Journal of Pharmaceutical Research 19.1 (2020): 89-94.

[21] Sferrazzo, G., Palmeri, R., Vanella, L., Parafati, L., Ronsisvalle, S., Biondi, A., ... & Barbagallo, I. (2019). Mangifera indica L. leaf extract induces adiponectin and regulates adipogenesis. International Journal of Molecular Sciences, 20(13), 3211.

[22] Wal, A., Wal, P., Saraswat, N., & Wadhwa, S. (2021). A detailed review on herbal treatments for treatment of PCOS-Polycystic ovary syndrome (PCOS). *Curr Nutraceuticals*, *2*(3), 192-202.

[23] Grant, P. (2010). Spearmint herbal tea has significant anti-androgen effects in polycystic ovarian syndrome. A randomized controlled trial. *Phytotherapy research: An international journal devoted to pharmacological and toxicological evaluation of natural product derivatives*, *24*(2), 186-188.

[24] Akdoğan, M., Tamer, M. N., Cüre, E., Cüre, M. C., Köroğlu, B. K., & Delibaş, N. (2007). Effect of spearmint (Mentha spicata Labiatae) teas on androgen levels in women with hirsutism. *Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives*, *21*(5), 444-44

[25] Mehraban, M., Jelodar, G., & Rahmanifar, F. (2020). A combination of spearmint and flaxseed extract improved endocrine and histomorphology of ovary in experimental PCOS. Journal of ovarian research, 13(1), 32.

[26] Jyrwa, R., Mishra, M., Choudhury, A., Hussain, I., Obbalareddy, S., Marbaniang, D., & Borsaikia, A. (2024). Traditionally used Medicinal Plants of Darrang District, Assam, Northeast, India. *ESS Open Archive eprints*, *692*, 69208518.[25] Momin, AH., Acharya, SS., Gajjar, AV., 2012, Coriandrum sativum-review of advances in phytopharmacology. Int J Pharma Sci Res. 3(5):1233.

[27] Muhlida, V. I., & Kurniawati, E. Y. (2025). Pengaruh Rebusan Daun Centella asiatica terhadap Kadar HOMA IR Wanita dengan Sindrom Ovarium Polikistik. Agribiohealth (Journal of Agriculture, Biology & Health Sciences), 1(2), 60-65.

[28] Meghdadi, P., Ghasemi, E., Ghodoosi, F., Soheili, M., Moshfegh, F., Karimi, E., & Oskoueian, E. (2025). Microencapsulated phytochemicals from Coriandrum sativum enhance ovarian function and modulate gene expression in testosterone-induced PCOS. Food Bioscience, 64, 105862.

[29] Sharma, N., Kumar, V., Langeh, U., Singh, C., & Singh, A. (2023). A review on the pharmacological potential of Indian spices in polycystic ovarian syndrome. J Reprod Health Med, 4, 1-5.

[30] Momin, A. H., Acharya, S. S., & Gajjar, A. V. (2012). Coriandrum sativum-review of advances in phytopharmacology.

[31] Sohaei, S., Amani, R., Tarrahi, M. J., & Ghasemi-Tehrani, H. (2019). The effects of curcumin supplementation on glycemic status, lipid profile and hs-CRP levels in overweight/obese women with polycystic ovary syndrome: A randomized, double-blind, placebo-controlled clinical trial. Complementary therapies in medicine, 47, 102201.

[32] Jurenka, J. S. (2009). Anti-inflammatory properties of curcumin, a major constituent of Curcuma longa: a review of preclinical and clinical research. *Alternative medicine review*, *14*(2).

[33] Khani B, et al. Effect of curcumin on insulin resistance, inflammatory biomarkers, and oxidative stress in women with polycystic ovary syndrome: A randomized, double-blind, placebo-controlled trial. Phytother Res. 2020; 34(10):2686-93.

[34] Soni, P., Jain, D., Bhatti, M., Bhatia, D., & Sharma, C. (2024). Exploring the Intricacies of Polycystic Ovarian Syndrome (PCOS): A Comprehensive Review-from Prevalence to Natural Solutions. New Emirates Medical Journal, 5(1), e02506882339236.

[35] Borzoei, A., Rafraf, M., Niromanesh, S., Farzadi, L., Narimani, F., & Doostan, F. (2018). Effects of cinnamon supplementation on antioxidant status and serum lipids in women with polycystic ovary syndrome. *Journal of traditional and complementary medicine*, *8*(1), 128-133.

[36] Maleki, V., Faghfouri, A. H., Tabrizi, F. P. F., Moludi, J., Saleh-Ghadimi, S., Jafari-Vayghan, H., & Qaisar, S. A. (2021). Mechanistic and therapeutic insight into the effects of cinnamon in polycystic ovary syndrome: a systematic review. Journal of ovarian research, 14(1), 130.

[37] Moini Jazani, A., Nasimi Doost Azgomi, H., Nasimi Doost Azgomi, A., & Nasimi Doost Azgomi, R. (2019). A comprehensive review of clinical studies with herbal medicine on polycystic ovary syndrome (PCOS). DARU Journal of Pharmaceutical Sciences, 27(2), 863-877.

[38] Ebrahimi-Mameghani M, et al. The effect of fenugreek on insulin resistance and lipid profile in polycystic ovary syndrome: A double-blind, randomized trial. Eur J Clin Nutr. 2017; 71(1):54-60.

[39] Sankhwar, P., Jaiswar, S. P., Yadav, S., Awasthi, V., Goel, A., Kumar, P., ... & Bagchi, D. (2023). Beneficial effects of a novel fenugreek seed extract (Trigonella foenum-graecum, furocyst®) in women with polycystic ovary syndrome (PCOS): A follow-up compliance clinical investigation. *Journal of the american nutrition association*, *42*(7), 691-699.

[40] Lakshmi, J. N., Babu, A. N., Kiran, S. M., Nori, L. P., Hassan, N., Ashames, A., ... & Shaik, A. B. (2023). Herbs as a source for the treatment of polycystic ovarian syndrome: A systematic review. *BioTech*, *12*(1), 4.

[41] Maharjan, R., Nagar, P. S., & Nampoothiri, L. (2010). Effect of Aloe barbadensis Mill. formulation on Letrozole induced polycystic ovarian syndrome rat model. Journal of Ayurveda and integrative medicine, 1(4), 273

[42] Goswami, P. K., Khale, A., & Ogale, S. (2012). Natural remedies for polycystic ovarian syndrome (PCOS): a review. Int J Pharm Phytopharmacol Res, 1(6), 396-402.

[43] Tavva, S., Avagyan, M., & Martirosyan, D. (2025). Blueberries and raspberries as endocrine modulators: Mechanisms, clinical evidence, and translational guidance. *Bioactive Compounds in Health and Disease-Online ISSN: 2574-0334; Print ISSN: 2769-2426*, *8*(11), 445-461.

[44] Farhana, A., Reddy, T. A., Bhavana, K., Mutha, S., & Bakshi, V. (2018). Assessment of Ocimum sanctum to normalize the estrous cycle in letrazole induced polycystic ovary syndrome in female Wistar rats. World J. Pharm. Res, 7(14), 907-919.

[45] Poli, V., & Challa, C. (2019). A comparative study of eugenol and Ocimum sanctum Linn. leaf extract on the antifertility effect in female albino rats. Journal of the Chinese Medical Association, 82(3), 231-234.

[46] Devi, M. S., Muralidharan, P., Hari, R., Lavanya, M., & Abiraamavalli, T. (2021). PCOS modulatory activity of tinospora cordifolia leaves–an insilico approach. Biomedical and Pharmacology Journal, 14(3), 1125-1131.

[47] Rani, R., Chitme, H. R., Kukreti, N., Pant, P., Abdel-Wahab, B. A., Khateeb, M. M., ... & Bakir, M. B. (2023). Regulation of insulin resistance, lipid profile and glucose metabolism associated with polycystic ovary syndrome by tinospora cordifolia. Nutrients, 15(10), 2238.

[48] Devi, M. S., Chokkalingam, P., Hari, R., & Muralidharan, P. (2023). Analeptic efficacy of Tinospora Cordifolia ethanolic leaf extract and its loaded phytoniosome on enzymatic and non-enzymatic antioxidants in a rodent model of polycystic ovary syndrome. Pharmacological Research-Modern Chinese Medicine, 7, 100256.

[49] Meena, M., Sharma, M., Dhakar, A., Singh, C., Sharma, L., & Purvia, R. P. (2019). Role of Foeniculum vulgare in PCOS—a review article. World J Pharm Res, 8(10), 344-50.
[50] Ghavi, F., Taghizadeh, M., Taebi, M., & Abdolahian, S. (2019). Effect of Foeniculum vulgare essence on symptoms of polycystic ovarian syndrome (PCOS): A randomized double-blind, placebo-controlled trial. Journal of Herbal Medicine, 17, 100277.
[51] Li, H., Li, Y., Zhang, Y., Tong, L., Sa, Y., & Sun, W. (2023). Rubus chingii Hu relieved the polycystic ovary syndrome with enhanced insulin sensitivity through inhibiting TXNIP/NLRP3 inflammasome signaling. Gynecological Endocrinology, 39(1), 2237116.
[52]. Pires, V. C., Anacleto, S. L., Matté, C., Aguiar Jr, O., Lajolo, F. M., Hassimotto, N. M. A., & Ong, T. P. (2025). Paternal and/or Maternal Blackberry (Rubus spp.) Polyphenolic Extract Consumption Improved Paternal Fertility and Differentially Affected Female Offspring Antioxidant Capacity and Metabolic Programming in a Mouse Model. Antioxidants, 14(7), 779.
[53] Deka, J., & Kalita, J. C. (2013). Ethnobotanically important medicinal plants of kamrup District, Assam, India, used in fertility treatment. *Int Res J Pharm*, *4*, 229-32.
[54] Lin, F. M., Chen, L. R., Lin, E. H., Ke, F. C., Chen, H. Y., Tsai, M. J., & Hsiao, P. W. (2007). Compounds from Wedelia chinensis synergistically suppress androgen activity and growth in prostate cancer cells. Carcinogenesis, 28(12), 2521-2529.
[55] Majeed, A., Majeed, S., Devarajan, T. V., Rao, S. N., Gudimallam, S., Ramanujappa, M., ... & Mundkur, L. (2025). Efficacy and safety of Cyperus rotundus extract on weight management in obese individuals: A randomized, double-blind, placebo-controlled study. Medicine, 104(47), e45666.
[56] Stoller, E. W., & Sweet, R. D. (1987). Biology and life cycle of purple and yellow nutsedges (Cyperus rotundus and C. esculentus). Weed Technology, 1(1), 66-73.
[57] Baptiste, C. G., Battista, M. C., Trottier, A., & Baillargeon, J. P. (2010). Insulin and hyperandrogenism in women with polycystic ovary syndrome. *The Journal of steroid biochemistry and molecular biology*, *122*(1-3), 42-52.
[58] Majhi, L. (2024). Triphala: An Ayurvedic Solution for Hormonal Balance, Detoxification, and Women's Reproductive Health. metabolism, 24, 31.
[59] ita Wal, A., Wal, P., ita Saraswat, N., & Wadhwa, S. A Detailed Review on Herbal Treatments for Treatment of PCOS-Polycys-tic ovary syndrome (PCOS)
[60] Attri, M., Raghav, A., & Chaudhary, H. (2024). Nature's Remedy: Exploring Herbal Treatments for Polycystic Ovarian Syndrome. Current Nutraceuticals, 5(1), E230524230248.
[61] Frawley, D., & Kozak, S. S. (2001). *Yoga for your type: An ayurvedic approach to your asana practice*. Lotus Press.