

Review Article

EFFECT OF YOGA ON MANAGEMENT OF POLYCYSTIC OVARIAN SYNDROME (PCOS): A SYSTEMATIC REVIEW

ABSTRACT

Background:

Nowadays, polycystic ovarian syndrome is a very common condition that affects women at their reproductive age. Women are considered to have very elevated amount of insulin resistance, obesity, and higher levels of androgens within the part of the body with PCOS. The crucial thing about overcoming these signs and symptoms of illness is weight management. It has a primary preventive and healing ability that can be accomplished by implementing lifestyle changes to fight this disease.

Yogic interventions are the primary key which continues person healthful and modify endocrine system. Postures (*Asanas*), Breathing techniques (*Pranayama*) and meditation (*dhyana*) facilitates plenty in relieving the signs and symptoms of PCOS associated with incorrect dwelling life-style and deep-rooted stress and hold the person high to combat with this sickness.

Purpose:

This Review study is aimed to review the trends in researches conducted over a period of time frame. Only randomized Control Trials and Clinical Trials are subjected of interest in this study. Using PUBMED, Google Scholar and other Indian databases searches were performed using keywords "Yoga and PCOS" which yielded up to 31 relevant articles showing the effect of Yoga on PCOS.

Selections were made to include only studies published in peer reviewed journals and investigating effects of regular Yogic practices on hormonal imbalances, weight loss, stress reduction and various other related aspects pertaining to PCOS in these studies.

Summary and Outlook:

Noteworthy variance was observed between the interventional group participants on the domain of hormones, weight loss, Anxiety, Stress and physical function with better results in Yoga groups than in control group. Collectively these studies suggest that specific Yogic module may help to balance hormone, reduce body weight and released stress and it may improve the physical function of the body.

Keywords: Yoga, Stress, PCOS and Hormones

1. INTRODUCTION

A very common condition, Polycystic Ovarian Disease (PCOD), also known as Polycystic Ovary Syndrome (PCOS), affects 5% to 10% of women in the 12-45 age group.¹⁸

Polycystic ovary syndrome (PCOS) is a complex condition characterized by elevated androgen levels, menstrual irregularities, and/or small cysts on one or both ovaries. The disorder can be morphological (polycystic ovaries) or predominantly biochemical (hyperandrogenemia). Hyperandrogenism, a clinical hallmark of PCOS, can cause inhibition of follicular development, microcysts in the ovaries, anovulation, and menstrual changes. (Ndefo et al., 2013)

Yoga is a full body and mind prescription that can eradicate the root cause of PCOS, i.e., Stress and obesity. In addition, Yoga is a fantastic tension buster stress in women's lives that can also lead to an unnecessary rise in weight. Entering a peaceful state decreases the production of cortisol, a stress hormone that is one of the most significant causes of fat accumulation in the body. Yoga ultimately advocates a move beyond the comfort zone to optimistically better understand one's self from a very different viewpoint. Ultimately, it contributes to improved quality of life.³

Because of genetics, obesity, drugs, aging, pregnancy and lifestyle, these variables build insulin resistance. Altered metabolism of steroid hormones and lipid metabolism can develop PCOS. Signs and symptoms of PCOS can involve menstrual disruption (primary amenorrhea, secondary amenorrhea, oligomenorrhea). Infertility (due to lack of ovulation.), high level of masculinizing hormones (acne, hirsutism, hypermenorrhea) metabolic syndrome (obesity, resistance to insulin) and several other symptoms such as: oily skin, dandruff.

PCOS-Adolescent Diagnostic Appearance - Menstrual Irregularity, Cosmetic problems, i.e., Reproductive acne, hirsutism and hair loss- Infertility, Early Pregnancy Loss, Menopausal Syndrome, and Ca Endometrium during pregnancy (PIH and GDM) .¹⁴ A close association between obesity, stress and PCOS exists. About 50-60 percent of PCOS women are obese. With prevalence rates ranging from 2.2 percent to as high as 26 percent, PCOS is the most common female endocrine disorder. Both genetic predisposition and life style variables are thought to contribute to PCOS etiology. Altered life pattern involving a high calorie diet and lack of exercise contributing to obesity and insulin resistance, which has been well established as an exacerbating factor for PCOS.² Studies have shown that sympathetic function is chronically activated as a consequence of stressful life.

1.1 YOGA

Yoga comes from the root, symbolizing the unification with the cosmic consciousness of one's own consciousness. Regular Yoga practice has been shown at a functional level to promote strength, stamina, and flexibility and produce qualities of generosity, compassion, and better self-control and tranquility. Yoga practice induces a physiological state of rest and relaxation that activates the parasympathetic nervous system (instead of the flight-or-fight stress response) and can achieve a sense of equilibrium and union between the mind and body.

An eightfold path to enlightenment is illustrated by *Patanjali Yoga Sutras*, from socio-emotional wellbeing to physical and mental health, ending with spiritual liberation. Through the use of the *Asanas* and *Pranayama*, *Hatha* Yoga strengthens the ability of the physical

body. Hatha Yoga's breathing methods prolong inhalation, holding of breath, and exhalation. It is through the convergence of the *Sharira*, *Prana*, and *Mana* that blocks in the *Prana* channels are cleared when performing Asanas. The system then reaches equilibrium. This is particularly useful for a lifestyle condition that hinders the body's normal functioning. According to Yoga ideology, stress or psychosomatic disorders are the cause of any illness in the human body. The most prominent mental symptoms of PCOS are depression and anxiety, according to the literature, while mood and anxiety disturbances are the most prevalent clinical diagnosis of PCOS. ^(15, 16).

Although the system of Yoga is not developed for the purpose of treatment, it has been observed through the applied researches shows evidence that the regular practice of Yoga not only controls this disease but also promotes and maintain the healthy condition of the body and mind and prevents the disease progression. Yoga has a potential to tranquilize and balance the mind, which is the main key in the management of stress disorders.

1.2 SIGNIFICANCE OF YOGA ON PCOS (RATIONALE):

Yoga science is based on the root cause, i.e., stress and obesity, of PCOS. Yoga is often more holistic than just the physical body level. Yoga helps profoundly accumulated stress to be released by the system, which can further strengthen PCOS symptoms.

1. Doing weight-bearing poses strengthens muscles. In fact, enhanced muscle mass leads to the fight against insulin resistance, one of the links to PCOS regulation.
2. Yoga's daily practice increases the heart rate, provides cardiovascular activity and leads to the loss of weight.
3. Hormonal balance and deep relaxation are facilitated by asanas and pranayama, helping to increase adrenal and cortisol levels.

2. MATERIAL AND METHODS

Search articles for this systematic review were identified by using PUBMED, Google Scholar and general Google search which yielded total 31 research papers which met our inclusion criteria. Out of which 5 were found to be duplicate articles, 5 articles include different pathies with Yoga as an intervention, one study was a clinical roundup study, 9 were review articles, one article with other language are excluded from our study. Only Randomized Control Trials and Clinical Trials are subjected to this review study. Which were published in English, had clear diagnostic criteria for PCOS Patients. Out of 12 articles available on Google Scholar, 8 articles were available on PUBMED which are short-listed. (Fig 1)

After scrutinizing 31 articles, 09 trials were selected as they met criteria for final review.

2.1 INCLUSION CRITERIA:

1. Studies included Randomized control trial and Clinical trial.
2. Published in English, between the years from 2001-2020.
3. Age group 12–55 years suffering from PCOS.

4. Investigating only effect of Yoga on obesity, hormones, glucose metabolism, stress and physical activity.

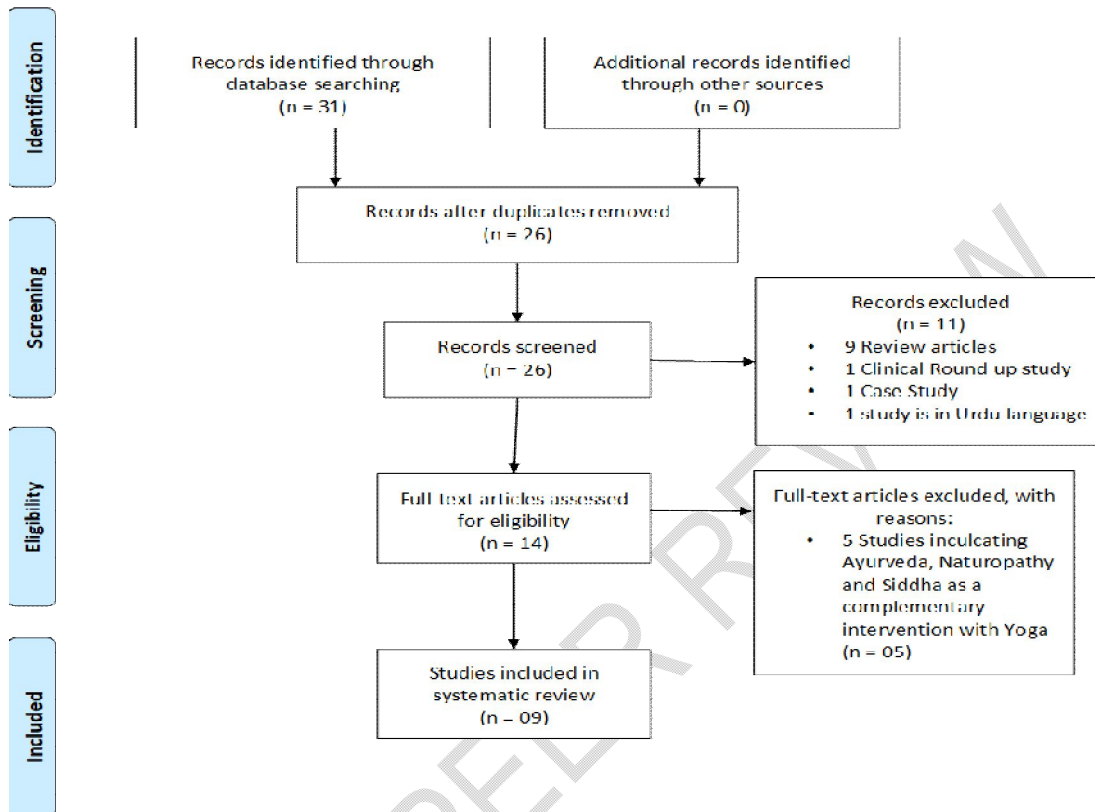
2.2 EXCLUSION CRITERIA:

Studies were excluded if -

1. Studies which include other interventions like naturopathy, Ayurveda and siddha.
2. Age ranges above 55 and suffering from other menstrual disorders
3. Literary review articles.
4. Paper published before 2001.
5. Duplicate articles are excluded.

UNDER PEER REVIEW

Fig 1: SCHEMATIC REPRESENTATION OF STUDY SEARCHING AND SELECTION AS PER CRITERIA.



3. RESULTS AND DISCUSSION

3.1 RESULT:

Search yielded a total of 31 trials, of which 09 met criteria for final review which shows a significant difference between Yoga group and control group in terms of hormones, weight balance, stressed level and physical activity. Yoga was found to be more effective than conventional physical exercises in improving glucose, lipid, and insulin values, including insulin resistance values.

Yoga can play important role in the prevention & management of PCOS. Yoga can maintain the Physiology of H-P-O axis.¹⁷ Yoga is one of the important refreshing and rejuvenating modalities which can content and even root out stress completely. Since stress is playing important factor in exaggerating PCOS, Yoga help to regulate the endocrine glands in body there by beneficial in balancing of hormones Yoga is effective in keeping your ovary & Uterus healthy. Yoga is precious gift which can enrich human life. In PCOS, Yoga plays a crucial role in regulating hormones by reducing androgens and promoting the development of eggs. Yoga relieves stress it promotes weight loss and also increases fertility and with the

help of Yoga gastrointestinal imbalance is also improve. Asana help to stretch the pelvic area and pranayama and meditation sooth the mind.

Asanas (Yoga postures) for polycystic ovary syndrome help to loosen up the pelvic region and facilitate relaxation, and pranayamas (breathing exercises) are important strategies that help to calm the mind. Coupled with few calming meditations that act at a very deep level and enable the whole system to De-toxify and de-stress.

Researches have shown very significant changes in Yogic intervention group. Yoga: -

- Reduced distress feelings
- Increased sensitivity to insulin
- Equilibrated amounts of androgen
- Enhanced Hirsutism
- Led to significant regularity of menstruation

3.2 DISCUSSION:

Literature Review:

The Randomized control Study conducted by Chattha R et al., 2008 .Hot flushes and night sweats could enhance by holistic approach to Yoga therapy. Cognitive functions such as remote memory, mental control, attention and concentration, delayed and immediate recall, verbal retention and tests for identification may also be improved.¹ The randomized controlled study by Laxmi et al., 2018 which objectifies to analyze and discuss about the impact of Yoga on women's suffering from PCOS. And the result of this study shows that Symptoms such as weight gain, cysts or fibroids in the uterus, irregular menstrual cycle, unwanted facial hair, and emotions are reduced after 3 months of Yoga practice. The overall quality of life improvement is reflected in the form of symptoms such as weight reduction, reduction in unusual hair loss, elevated menstrual bleeding, cramps, fat, constipation, and the reduction of emotional disturbances.⁴ hence this study has shown the very significant impact of Yoga on females. Study by Ram Nidhi et al. 2013 shows that: A 12-week holistic Yoga program is considerably better than physical activity in minimizing AMH, LH, and testosterone, mFG hirsutism ranking, and non-significant menstrual frequency enhancement. In adolescent PCOS, improvements in bodyweight, FSH, and prolactin.⁶

In the 2 groups of study by Ram Nidhi et al.2012 on the effect of glucose metabolism and body lipid level in adolescent's girls with PCOS , the changes in fasting insulin, fasting blood glucose, and homeostasis model evaluation of insulin resistance were substantially different. Yoga in adolescent girls with PCOS individual with anthropometric improvements was found to be more effective than conventional physical exercises in improving glucose, lipid, and insulin values, including insulin resistance values.⁸

According to study conducted by Nidhi r. et al 2012 ,A holistic Yoga program for adolescents with PCOS for 12 weeks is significantly better than a physical exercise program for reducing symptoms of anxiety.⁹

Women that had completed the mindful thrice-week intervention of Yoga in randomized controlled study of Patel V et al. 2020 had resulted slightly lower levels of free testosterone. Improved testosterone, lower trend in dehydroepiandrosterone levels. In addition, improvements in depression and anxiety interventions were observed.¹⁰

After the intervention of study conducted by Selvaraj V et al. 2020, psychological factors such as the menstrual cycle, blood flow during periods of cramps, pimples, hair fall, fatigue and weight gain have improved. Most girls showed more energy and were relieved from depression. It is also essential that exercise and Yoga, since it includes both body and mind, can certainly enhance the psychological aspects of any person.¹² Sode JA et. al 2017 Yoga therapy among women suffering from infertility may be potentially useful in improving anxiety scores.¹⁴ Vanitha A et al. 2018 After Yoga training, the degree of stress and depression is low relative to the pre-test state (Before Yoga training).¹⁶

4. CONCLUSION

The most common health issue in women of reproductive age is polycystic ovarian syndrome. Women diagnosed with PCOS have profound resistance to insulin, obesity and elevated androgen levels. The main key to keeping people safe is the Yoga therapies listed in several trials. After studying these papers, we may conclude the following practices that may help in PCOS and may improve their other comorbidity like stress, hypertension etc.:

Table 1 TABLE OF RECOMMENDED YOGA PRACTICES:

Shatkarma	❖ <i>Vaman Dhauti, Kapalbhati</i>
Asana	1. Standing– <i>Tiryaktadasana, katichakrasana</i> 2. Sitting- <i>Padmasana, Bhadrasana, Ustrasana</i> <i>,Malasana</i> 3. Prone - <i>Bhujangasana , Dhanurasana</i> <i>,Makarasana</i> 4. Supine – <i>Setubandhasana, Ardhalasana ,Shavasana</i>
Pranayama	❖ <i>Anulom Vilom ,Bhramari , and Ujjayi</i>
Mudra	❖ <i>Vipreetkarani Mudra</i>
Dhyana /Yog Nidra	❖ <i>Om Meditation</i>

Supportive basis of certain practices taken in above protocol:

Shatkriya (cleansing practices) helps to detoxify the impure toxins from the body and is very effective in the management of obese person. **Asanas (physical postures)** helps to balance the whole endocrine system by direct massaging the ovarian glands and improve the blood circulation there by regulates the menstruation cycle. **Pranayama (breathing regulation)** helps to balance both the brain hemispheres and induces relaxation of mind & body.⁵ **Mudra (gestures)** helps to redirect the *prana* within the affected body organ and improves flow of *prana* and blood there. **Yoga Nidra / Dhyana (Meditation)** Both Meditation and Yoga Nidra assist in the activation of the calming reflex and the enhancement of nervous system and endocrine system function, which affects hormones, as well as decreasing anxiety and enhancing mood.

5. STUDY LIMITATION

Studies have been carried out in different demographic areas, which prompt the issue of the study's findings being generalizable. However, the fact a randomized control trial with a large sample participating in each arm provides evidence for the intervention being more effective. Our searches were limited to few databases only, wide range of databases are needed in this context. Studies should consider a longer period of follow to check long term efficacy & long-term acceptability to observe the Changes in the number of ovaries and follicle size. A lot of studies are not PubMed indexed. They are to be searched from various sources. This consumes a lot of time.

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UNDER PEER REVIEW

APPENDIX 1

S.no.	1st author ,Year, Place	Design	Objective	Sample size	Intervention for experimental group (with duration)	Measurable outcome & results	Limits & recommendation
1	Vishesha Patel et al.,2020,Erie County, Pennsylvania,U.S	Randomized Control Study	Regular Mindful Yoga Practice as a Method to Improve Androgen Levels in Women With Polycystic Ovary Syndrome	<ul style="list-style-type: none"> ➤ 30 females suffering from PCOS. ➤ Sampling method was purposive sampling ➤ Age range was 25-35 years. 	(3-part Yogic breath): <ol style="list-style-type: none"> 1. Ujjayi breath, 2. Alternate nostril breathing, and 3. Breath of fire, <ul style="list-style-type: none"> ➤ Vinyasa flow Yoga, ➤ Restorative Yoga <i>asanas</i>, ➤ Guided meditation imagery of healing energy and mindful "I am" statements. (For 3 Months.) 	<ul style="list-style-type: none"> ➤ Free testosterone levels ➤ Dehydroepiandrosterone Levels. 	NIL
2	Valarmathi Selvaraj et al.,2020,Tamilnadu	A comparative and post design	To identify the adolescent school girls with risk for (PCOS), assess their risk status, and evaluate the impact of lifestyle	<ul style="list-style-type: none"> ➤ A total of 204 (control-102; experimental-102) girls Of AP. 	Yoga and exercise (for two months.) <ol style="list-style-type: none"> 1. Pranayama, 2. Meditations, 3. <i>Bhaadrasana</i> (Butterfly pose), 4. <i>Chakki Chalanasana</i> (moving the grinding wheel). Brisk walking exercise for control group.	Yoga and exercise were beneficial in minimizing PCOS risk, as reflected in the risk assessment score.	NIL

S.no.	1st author, Year, Place	Design	Objective	Sample size	Intervention for experimental group (with duration)	Measurable outcome results	Limitation & recommendation
3	Vanitha A et al.,2018, Tamil Nadu	Intervention-al Study	Effect of <i>Yoga nidra</i> on resting cardiovascular parameters in polycystic ovarian syndrome women	<ul style="list-style-type: none"> Study includes 40 PCOS women. Age between 18 and 35years 	<i>Yoga nidra</i> intervention (in the lying position daily once for the period of 40 min ;for 12 weeks)	Show favorable changes in: <ul style="list-style-type: none"> BP, HR, and Other Anthropometric parameters 	Larger sample size Would be better study design.
4	Laxmi et al.,2018,Patanjali, Haridwar	Randomized control study	The objective of the study is to analyze and discuss about the impact of Yoga on Women's (PCOD) & their quality of life.	<ul style="list-style-type: none"> Selected 32 Subjects of PCOD out of 409 infertility patients. Two groups are formed 16 in each of experimental and control groups. The experimental group followed 40 min Yoga practices daily for 6 days in a Week for 12weeks. 	Asana Time (in mins) for 12weeks <ul style="list-style-type: none"> <i>Padmasana/sukhsana</i> - 5 <i>Suryanamkar</i>(sun posture) -15 <i>Bhadrasana</i>(Butterfly posture)-5 <i>Savasana</i> (corpse posture) - 5 <i>AnulomVilome</i>(Alternate Nostril breathing)-5 <i>Bhramari</i> (Humming bee sound) - 5 	Those who practiced Yoga have significantly: <ul style="list-style-type: none"> ↓Weight, ↓No. of cysts, ↓Irregular menstrual cycle ↓Emotional disorders 	Results encourages Further research work in the field of PCOD.

S.no.	1st author ,Year, Place	Design	Objective	Sample size	Intervention for experimental group(with duration)	Measurable outcome & results	Limitation & recommendation
5	Jaimala A Sode et al.,2017, maharashtra	Comparative study with pre and post design	To study the Effect of Yoga on Level of Depression among Females suffering from Polycystic Ovarian Syndrome (PCOS)	30 females suffering from PCOS. Sampling method was purposive sampling. The age ranges between 25 –35 Years.	Yoga Training was conducted for a month's period: 1.Bhadrāsana (Butterfly pose) 2.Bhāradvājasana(Bharadja's Twist) 3.Bhujāngasana (Cobra pose) 4.Naukasana (Boat pose) 5.Padmasana 6.Dhanurasana (Bow pose) 7.ViparītaŚalābhāsana (Superman pose) 8.Chakki Chalanāsana (moving the grinding wheel) 9.Sun Salutation (Surya Namaskar 10.Śhavasana (Corpse pose) 11.Bhrāmri Prāṇayāma 12.Meditation	↓ Level of depression	of NIL

S.no.	1st author Year, Place	Design	Objective	Sample size	Intervention for experimental group(with duration)	Measurable outcome & results	Limitation & recommendation	
6	Ram Nidhi et al. 2012, Andhra Pradesh	Randomized Control Study	To study the effect of holistic Yoga program on anxiety symptoms in adolescent girls with polycystic ovarian syndrome	Adolescent girls aged 15 to 18 years of AP. Satisfied Rotterdam criterion (2/3 of the features) for PCOS. 90 participants were randomly divided into 2 study arms: 1 arm practiced the other arm practiced conventional physical exercises for the same Duration.	Both groups practiced their respective set of practices, 1 h of daily, 7 days a week for 12 weeks: 1. Group lecture 2. Lectures in the form of cognitive restructuring based on spiritual philosophy underlying Yogic concept. 3. Surya namaskar sun salutation 4. Prone Asanas: • Cobra pose (<i>Bhujangasana</i>) • Locust pose (<i>Shalabhasana</i>) • Bow pose (<i>Dhanurasana</i>) 5. Standing Asanas: • Triangle Pose (<i>Trikonasana</i>) • Twisted Angle Pose (<i>Parshava Konasana</i>) • Spread leg intense stretch. (<i>Prasarit Padottanasana</i>)	Supine Asanas: • Shoulder Stand (<i>Sarvangasana</i>) • Plough Pose (<i>Halasana</i>) 7. Sitting Asanas: • Sitting Forward Stretch (<i>Paschimottasana</i>) • Fixed angle pose (<i>Badhha konasana</i>) • Garland Pose (<i>Malasana</i>) 8. Guided Relaxation (<i>Shavasana</i>) 9. Breathing techniques (<i>Pranayama</i>) • Sectional breathing (<i>Vibhagya Pranayam</i>) • Forceful exhalation (<i>Kapalbhati</i>) • Right Nostril breathing (<i>Suryanulom vilom</i>) • Alternate Nostril breathing (<i>Nadi Shuddhi</i>) 10. OM Meditation (<i>OM Dhyana</i>).	Holistic Yoga program is better than physical exercises	A randomized control trial with a large sample participating in each arm provides evidence for this intervention being effective.

S.no.	1st author, Year, Place	Design	Objective	Sample size	Intervention for experimental group (with duration)	Measurable outcome results	Limitation & recommendation
7	Ram Nidhi et al.;2012, AndhraPradesh	Randomized Control Study	Effect of a Yoga program on glucose metabolism and blood lipid levels in adolescent girls with PCOS.	Recruited 90 adolescents aged between 15 to 18 years who met the Rotterdam criteria for PCOS.	<ul style="list-style-type: none"> ➤ A yoga group Practiced <i>suryanamaskara, asanas, pranayama, and meditation</i> 1 hour per day each day for 12 weeks. ➤ While another group practiced conventional physical exercises. <p>The Mann Whitney U test was used to compare score changes between the 2 groups.</p>	<p>Yoga is better than physical exercise in:-</p> <ul style="list-style-type: none"> ➤ Improving glucose, Lipid, and ➤ Insulin values, including insulin resistance values. 	NIL

S.no	1st author, Year, Place	Design	Objective	Sample size	Intervention for experimental group (with duration)	Measurable outcome & results	Limitation & recommendation	
8	Ram Nidhi et al., 2012, Andhra Pradesh	Randomized Control Study	The objectives of this trial were to compare the effects of a holistic Yoga program with the conventional exercise program in adolescent polycystic ovarian syndrome (PCOS).	Ninety (90) adolescent (15–18 years) girls	<p>Yoga group practiced a holistic Yoga module:</p> <ol style="list-style-type: none"> Group lecture Lectures in the form of cognitive restructuring based on spiritual philosophy underlying Yogic concept. <i>Surya namaskar</i> sun salutation Prone Asanas: <ul style="list-style-type: none"> Cobra (<i>Bhujangasana</i>) Locust (<i>Shalabhasana</i>) Bow (<i>Dhanurasana</i>) Standing Asanas: <ul style="list-style-type: none"> Triangle (<i>Trikonasana</i>) Twisted Angle Pose (<i>Parshava Konasana</i>) Spread leg intense stretch. <p><i>Prasarit Padottanasana</i></p>	<p>Supine Asanas:</p> <ul style="list-style-type: none"> Shoulder (<i>Sarvangasana</i>) Plough Pose (<i>Halasana</i>) <p>Sitting Asanas:</p> <ul style="list-style-type: none"> Sitting Forward Stretch (<i>Paschimottanasana</i>) Fixed angle pose (<i>Badhha konasana</i>) Garland Pose (<i>Malasana</i>) <p>8. Guided Relaxatio (<i>Shavasana</i>)</p> <p>9. Breathing techniques (<i>Pranayama</i>)</p> <ul style="list-style-type: none"> Sectional breathing (<i>Vibhagya Pranayam</i>) Forceful exhalation (<i>Kapalbhati</i>) Right Nostril breathing (<i>Suryanulom vilom</i>) Alternate Nostril breathing (<i>Nadi Shuddhi</i>) <p>10. OM Meditation (<i>OM Dhyana</i>).</p> <p>The control group practiced a matching set of physical exercises (1 hr/day, for 12 weeks).</p>	<p>Yoga is helpful in : <ul style="list-style-type: none"> AMH, LH, and testosterone, mFG score for hirsutism. Improving menstrual frequency. </p>	NIL

UNDER REVIEW

S.no	1st author, Year, Place	Design	Objective	Sample size	Intervention for experimental group (with duration)	Measurable outcome & results	Limitation & recommendation
9	Chattha R et al., 2008, S VYASA .Bangalore	Randomized control study	To assess the efficacy of an integrated approach of Yoga therapy (IAYT) on cognitive abilities in Climacteric syndrome.	<ul style="list-style-type: none"> ➤ Women between 40 and 55 years with follicle-stimulating hormone level \leq 15 miu/ml. 120 perimenopausal women were randomly allotted into the Yoga and the control groups. 	<p>Yoga group practiced a module comprising.</p> <ul style="list-style-type: none"> ➤ Breathing practices, ➤ Sun Salutation and ➤ Cyclic Meditation, 	<p>Yoga:</p> <ul style="list-style-type: none"> ➤ Improve hot flushes and night sweats. ➤ Improve cognitive functions 	<p>Restricted to English speaking women's</p>

APPENDIX – 2

S.no.	1st author ,Year, Place	Intervention for experimental group
1	Vishesha Patel et al.,2020,Erie County, Pennsylvania,U.S	<ol style="list-style-type: none"> 1. Ujjayi breath, 2. Alternate nostril breathing, and 3. Breath of fire, <ul style="list-style-type: none"> ➤ Vinyasa flow yoga, ➤ Restorative yoga asanas, ➤ Guided meditation imagery of healing energy and mindful “I am” statements.
2	Vanitha .A et al.,2018,Arumbakkam, Chennai,Tamil Nadu	<i>Yoga nidra</i>
3	Laxmi et al.,2018,Patanjali, Haridwar	<ul style="list-style-type: none"> ➤ <i>Padmasana/sukhsana</i> - 5 ➤ <i>Suryanamkar</i>(sun posture) -15 ➤ <i>Bhadrasana</i> (Butterfly posture)-5 ➤ <i>Savasana</i> (corpse posture) - 5 ➤ <i>AnulomVilome</i> (Alternate Nostril breathing)–5 ➤ <i>Bhramari</i> (Humming bee sound) - 5
4	Jaimala.A Sode et al.,2017, maharashtra	<ol style="list-style-type: none"> (i)Bhadrasana (Butterfly pose) (ii) Bharadvajasana (Bharadvja’s Twist) (iii) Bhujangasana (Cobra pose) (iv) Naukasana (Boat pose) (v) Padmasana (vi) Dhanurasana (Bow pose) (vii) ViparitaShalabhasana (Superman pose) (viii) Chakki Chalanasana (moving the grinding wheel) (ix) Sun Salutation (Surya Namaskar) (x) Shavasana (Corpsse pose) (xi) Bhramri Pranayama (xii) Meditation

S.no.	1st author ,Year, Place	Intervention for experimental group
5	Ram Nidhi et al.,2012, Andhra Pradesh	<ol style="list-style-type: none"> 1. Group lecture 2. Lectures in the form of cognitive restructuring based on spiritual philosophy underlying yogic concept. 3. Surya namaskar sun salutation 4. Prone Asanas: <ul style="list-style-type: none"> • Cobra pose (Bhujangasana) • Locust pose (Shalabhasana) • Bow pose (Dhanurasana) 5. Standing Asanas: <ul style="list-style-type: none"> • Triangle Pose (Trikonasana) • Twisted Angle Pose (Parshava Konasana) • Spread leg intense stretch (Prasarit Padottanasana) 6. Supine Asanas: <ul style="list-style-type: none"> • Shoulder Stand (Sarvangasana) • Plough Pose (Halasana) 7. Sitting Asanas : <ul style="list-style-type: none"> • Sitting Forward Stretch (<i>Paschimottanasana</i>) • Fixed angle pose (<i>Badhha konasana</i>) • Garland Pose (<i>Malasana</i>) 8. Guided Relaxation (<i>Shavasana</i>) 9. Breathing techniques (<i>Pranayama</i>) <ul style="list-style-type: none"> • Sectional breathing (<i>Vibhagiya Pranayam</i>) • Forceful exhalation (<i>Kapalbhati</i>) • Right Nostril breathing (<i>Suryanulom vilom</i>) • Alternate Nostril breathing (<i>Nadi Shuddhi</i>) 10. OM Meditation (<i>OM Dhyana</i>).
6	Ram Nidhi et al.;2012, Andhra Pradesh	<ul style="list-style-type: none"> ➤ <i>Suryanamaskara,</i> ➤ <i>Asanas,</i> ➤ <i>Pranayama,</i> and ➤ <i>Meditation</i>

S.no.	1st author ,Year, Place	Intervention for experimental group
8	Valarmathi Selvaraj et al.;2020 ,Tiruvallur district of Tamil nadu	<ol style="list-style-type: none"> 1. <i>Pranayama</i>, 2. Meditations, 3. <i>Bhadrasana</i> (Butterfly pose), 4. <i>Chakki Chalanasana</i> (moving the grinding wheel).
9	Ram Nidhi et.al.;2012,Andra Pradesh	<p>➤ Holistic yoga module for Yoga group:</p> <ol style="list-style-type: none"> 1. Group lecture 2. Lectures in the form of cognitive restructuring based on spiritual philosophy underlying Yogic concept. 3. <i>Surya namaskar</i> sun salutation 4. Prone <i>Asanas</i>: <ul style="list-style-type: none"> • Cobra pose (<i>Bhujangasana</i>) • Locust pose (<i>Shalabhasana</i>) • Bow pose (<i>Dhanurasana</i>) 5. Standing <i>Asanas</i>: <ul style="list-style-type: none"> • Triangle Pose (<i>Trikonasana</i>) • Twisted Angle Pose (<i>Parshava Konasana</i>) • Spread leg intense stretch (<i>Prasarit Padottanasana</i>) 6. Supine <i>Asanas</i>: <ul style="list-style-type: none"> • Shoulder Stand (<i>Sarvangasana</i>) • Plough Pose (<i>Halasana</i>) 7. Sitting <i>Asanas</i> : <ul style="list-style-type: none"> • Sitting Forward Stretch (<i>Paschimmottanasana</i>) • Fixed angle pose (<i>Badhha konasana</i>) • Garland Pose (<i>Malasana</i>) 8. Guided Relaxation (<i>Shavasana</i>) 9. Breathing techniques (<i>Pranayama</i>) <ul style="list-style-type: none"> • Sectional breathing (<i>Vibhagiya Pranayam</i>) • Forceful exhalation (<i>Kapalbhati</i>) • Right Nostril breathing (<i>Suryanulom vilom</i>) • Alternate Nostril breathing (<i>Nadi Shuddhi</i>) 10. OM Meditation (<i>OM Dhyana</i>). <p>➤ A matching set of physical exercises for Control group.</p>

UNDER PEER REVIEW