

# Combine Impact of Shatavari and Shatpushpi on Polycyclic ovarian syndrome (PCOS)

Vrushali V. Neve<sup>1</sup>, Dr. Vaishali Undale<sup>2</sup>, Vrushali Bhalchim<sup>3</sup>, Ankita Shinde<sup>4</sup>, Gauri Patil<sup>5</sup>, Pritam Kutal<sup>6</sup>

<sup>1,2,3,4,5,6</sup>Dr. D.Y.Patil Institute of Pharmaceutical Sciences and Research, Sant Tukaram Nagar, Pimpri, Pune-411018, Maharashtra, India.

Email: vrushalivneve@gmail.com

DOI: 10.47750/pnr.2022.13.S06.060

## Abstract

**Background:** Polycystic ovary syndrome (PCOS) is one of the common disorder in female. Polycystic ovary syndrome causes irregular menstrual cycles, excessive body or facial hair and polycystic ovaries as its main symptoms. Polycystic means "many cysts," and PCOS often causes clusters of small, pearl-sized cysts in the ovaries. The cysts are fluid-filled and contain immature eggs. Women with PCOS produce higher amounts of androgens a male hormones, which leads to some of the symptoms of PCOS. PCOS is an emerging lot of health problem during adolescence therefore promotion of healthy lifestyles and early interventions are required to prevent future morbidities. Stress is one of the factor that deeply rooted in the society and women are most frequently exposed to psychological, physical and physiological stressors. PCOS cannot be prevented, but early diagnosis and treatment helps to prevent long-term complications, such as infertility, diabetes, obesity, metabolic syndrome and some heart disease. In India, prevalence rate of PCOS is higher and most of the cases reported in Maharashtra (22% upto year 2020) as compared to other state of India.

**Main body:** Shatavari and Shatpushpi both are used as tonic for female reproductive system. Effectiveness of combination of Shatavari and Shatpushpi is utilize in treatment of PCOS. Overactive pituitary gland start to secrete high amount of luteinizing hormone in bloodstream which disrupt normal menstrual cycle due to which follicle does not mature and ovulation does not takes place. As because of irregular ovulation hormonal imbalance occur and that leads to increase secretion of testosterone. High level of testosterone leads to infertility

**Conclusion:** This review describe that easily available beneficial herbs, Shatavari and Shatpushpi along with lifestyle management is much effective in prevention of PCOS than allopathic treatment which have large side effects.

**Keywords:** Polycystic ovary syndrome, Shatavari, Shatpushpi, Hyperandrogenism, Anovulation, hormonal imbalance, Cortisol, Oocyte, Ovary.

## INTRODUCTION

Stein and Leventhal first identified PCOS in 1935, describing its symptoms as complex, including amenorrhea, hirsutism, and enlarged ovaries with many cysts.

An endocrine disorder called polycystic ovary syndrome (PCOS) is characterised by anovulation, menstrual disorder, amenorrhea, hirsutism and infertility. PCOS is the most common disorder

of reproductive age group women as well as premenopausal women. PCOS directly impacts fertility, but has serious health implications if left untreated. It is characterized by hyperandrogenism, polycystic ovaries. The regular menstrual cycle is disrupted by an unusually high amount of luteinizing hormone released by the pituitary gland in PCOS. As a result the follicle does not mature and ovulation does not occur which can lead to anovulation.

PCOS is a heterogeneous disorder that affects at least 7% of adult women. According to the National Institute of Health Office of Disease Prevention, PCOS affects approximately 5 million women of child bearing age. Research suggests that 5-10% of females at 18 to 44 years of age are affected by PCOS making it the most common endocrine abnormality among women of reproductive age. In Europe, prevalence rate of disease was reported 5.6 to 8.9. According to the latest studies, the prevalence of PCOS in Iran is 19.5% based on Rotterdam criteria and 6.8% based on the NIH criteria. The main causes

of infertility in women of reproductive age are excessive levels of androgens, particularly testosterone in PCOS, their role in irregular ovulation, and the disruption of sex hormone production, which results in clinical symptoms and genital tract dysfunction in patients.,<sup>12,13</sup>. Treatment of PCOS is not curative. Treatment focuses on symptom management and treating the illness to avoid complications. Depending on specific symptoms, the course of treatment will differ from woman to woman. All women with PCOS, especially those who are overweight, should make lifestyle changes that include eating a nutritious diet and exercising frequently. Women with PCOS are at higher risk for pregnancy and delivery complications as three-fold increase in miscarriage risk in early pregnancy compared to women without PCOS, Gestational diabetes (diabetes during pregnancy) which can lead to large babies, Preeclampsia- which is characterized by sudden elevated blood pressure and body swelling after the 20th week of pregnancy.

The symptoms of PCOS include clinical ones menstrual disorders, hirsutism, acne, baldness,

and infertility,<sup>2</sup>. Pharmacological interventions include; antiandrogens (Spironolactone, Flutamide), insulin lower agents (Metformin and Thiazolidinediones), and estrogen-progestin combination (Oral contraceptives). Though such treatment is associated with substantial cost and may cause various side effects, such as irregular menstruation, gastrointestinal symptoms, weight gain, and increased insulin resistance<sup>14</sup> Early PCOS detection is crucial because it has been associated with a higher risk of developing a number of illnesses, such as insulin resistance, type 2 diabetes, high cholesterol, high blood pressure, and heart disease.<sup>15</sup> Numerous investigations, including case studies, randomised controlled trials, and animal experimentation, are devoted to the investigation of herbal medications since the adverse effects of these medications and their identification are crucial in the therapy of PCOS. Hence this review explored the potential of combination of Shatavari and Shatpuspi as an alternative treatment for PCOS.

Shatavari and Shatpuspi :

In Ayurveda, shatavari has been treated as one of the important herbal medicines, commonly prescribed to nourish ovary, promote production of reproductive hormones and maintain libido of women. Shatavari is mentioned under six important rasayanas. Rasayanas are herbal medications that improve a person's overall health by boosting cellular vitality and immunity. Botanical Name of Shatavari is *Asparagus Racemosus* and common Names are Shatavari, Satawar, Satamuli (Sanskrit, Bengali and Gujarati), Shatamuli (Hindi), Shatuli, Atirasa, Vrishya, buttermilk root, climbing asparagus, water root, wild asparagus, wild carrot, Indian asparagus root. It belongs to family Asparagaceae.<sup>17</sup> Roots are used in herbalism. With honey as a demulcent, the root's fresh juice is administered. It has been used for thousands of years as an aphrodisiac and to encourage both male and female fertility. Medically it having lot of important as use in cancer, convalescence, female organ debility, sexual debility, leukorrhea, menopause, impotence, infertility, cough, dehydration, diarrhea, dysentery, fevers (chronic), hematemeses, herpes, hyperacidity, lung abscess, ulcers, rheumatism, soothes dry, inflamed membranes of kidneys, lungs, sexual organs, and stomach<sup>18</sup> Chemical constituent of Shatavari is Steroidal saponins, known as Shatvarins, Carbohydrates - polysaccharides and mucilage, Flavanoids - Glycosides of quercetin, rutin and hyperoside are present in flower and fruits, Sitosterol, root contain zinc, magnesium, calcium, potassium.<sup>19</sup>

Shatpuspi: Shatpushpi botanical name is *Anethum sowa* .belongs to family Umbelliferae this species is native to Europe, Naturalised in North America and Eurasia. It has been introduced to India and cultivated in gardens, also found as an escape. Commonly it is called as satapuspa, ahichhatra, atichhatra, avakpushpi, avha, bahala, baspika, chhatra, ghosha, karavi, madhavi, misi, misih, misreya, misroya, poti, pushptapushpika, sanghatapatrika, satahva, satapushpi, shaley, shalina, , shataprasana, shatapushpa, shatavha, shipha, shitashiva, shophaka, shatapushpi. Reported activities of shatpushpi were antimicrobial, antibacterial, anti-inflammatory, anti hyperlipidemic, anti hypercholesterolaemic activities.<sup>20</sup> Fruits of plant are reported to have antispasmodic effect on smooth muscles of GIT. Shatpushpi effective in reducing acidity and total acid content. It is also effective to treat myiasis. Shatpushpa traditionally used in disorders wiz indigestion, excessive flatulence, anorexia In present days it is commonly used for Yoonishoola, Shukradosha, Raktagulma, Agnimandya Stanyakshaya, Aruchi, Atisara, Jwara, Netraamaya, Vrana, Samritinasha, Shoola, Daha, Trishnanashana, Vaman a, Arsha and Amaatisara .The parts of plant fruit, leaves, seed having lot of medicinal uses<sup>20</sup>.

Prevalence rate of PCOS in India

The exact prevalence of PCOS is not known as the syndrome is not defined precisely. Prevalence of PCOS is highly variable ranging from 2.2% to 26% globally. In few Asian countries prevalence figures are ranging from 2% to 7.5% in China and 6.3% in Srilanka. There are few studies conducted in India. Studies done in South India and Maharashtra, prevalence of PCOS (by Rotterdam's criteria) were reported as 9.13% and 22.5% (10.7% by Androgen Excess Society criteria) respectively<sup>15</sup>. The

World Health Organization accounts that it impacts 116 million female folk worldwide as of 2010 (3.4% of women) . One community-based prevalence study using the Rotterdam criteria found that about 18% of women had PCOS and that 70% of them were previously undiagnosed. Ultrasonographic findings of polycystic ovaries are found in 8-25% of normal women. 2114% women on oral contraceptives are found to have polycystic ovaries.<sup>8</sup> As per the results of a large scale survey conducted across India in 2020, about 16 percent of women respondents between the ages of 20 and 29 years suffered from polycystic ovary syndrome. Polycystic ovary syndrome occurs due to increased incidents of unhealthy eating patterns and irregular exercise.<sup>16</sup>

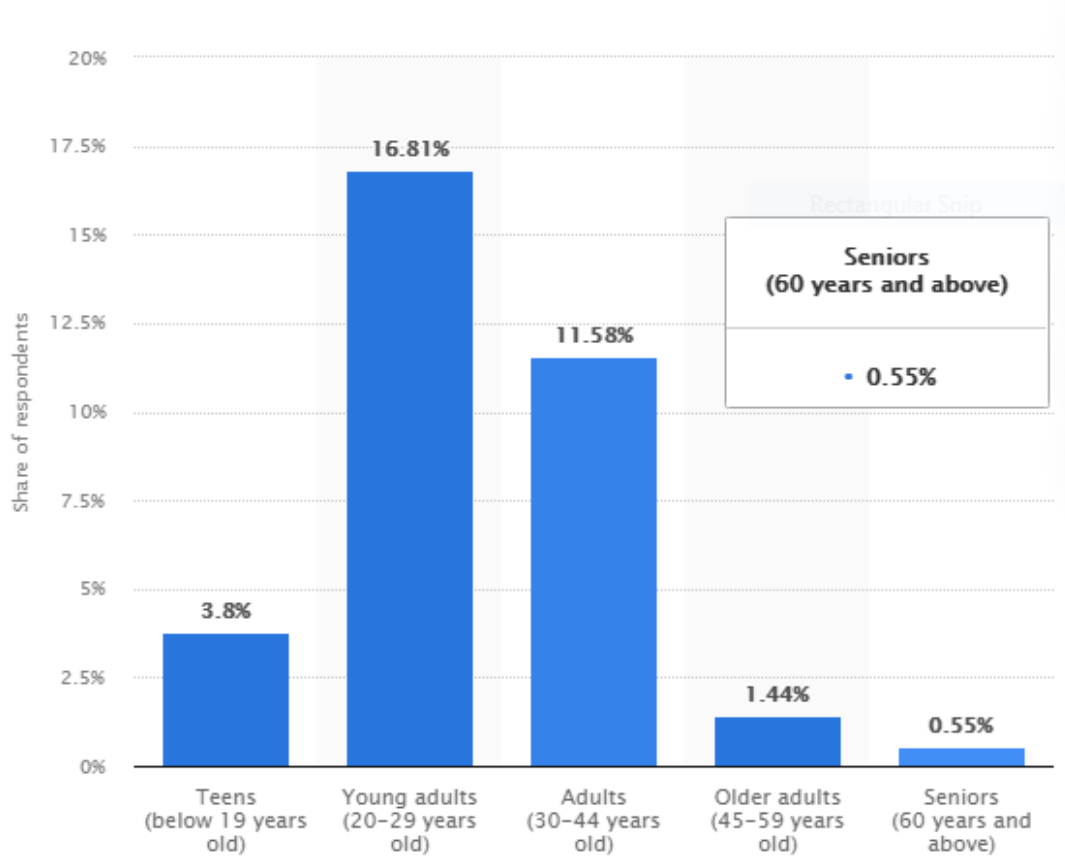


Fig.1 The prevalence rate of PCOS among women across India during 2020 by age group

## Main text

### Pathophysiology and Etiology of PCOS

The cause of PCOS has not yet been definitely determined; however, it is mainly characterized by hyperandrogenism, infertility, lack of ovulation , increased level of LH , increased insulin

resistance,<sup>2</sup>. PCOS has a heterogeneous etiology involving a variety of combination of reproductive, metabolic and genetic determinants. No single etiology has so far been found to have particular predictive power in explaining the occurrence of PCOS. PCOS is imbalance of female sex hormones. The ovaries are the part of female reproductive system along with uterus, fallopian tubes and vagina. The ovaries contain the lifetime supply of eggs. These eggs are immature and stored in tiny fluid filled follicles.

## Normal process of ovulation

Pituitary gland located at the base of brain produces hormones which direct the function of ovaries. Each month the pituitary gland secretes Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH) in blood stream. After these hormones reach the ovaries several hundred immature eggs start maturing expanding the size of follicles which simultaneously secretes estrogen, the main female sex hormone. Once the level of estrogen reaches to certain level, the pituitary gland senses the surge of luteinizing hormone to the ovaries causing the most mature follicle to release the egg called ovulation. The free egg travels the fallopian tube where it awaits fertilization, eventually the remaining follicles and eggs dissolves. If the egg is not fertilized the lining of uterus sheds during the menstruation<sup>3</sup>.

## Anovulation in PCOS

In PCOS the pituitary gland releases abnormally high amount of Luteinizing hormone in blood stream disrupting the normal menstruation cycle. As a result the follicle does not mature and ovulation does not occur which can lead to anovulation. The immature follicle which does not dissolve remains as fluid filled sacs or cysts. These cysts lead to a hormonal imbalance because of an increased amount of testosterone. This can result in acne, an increase in facial and body hair and irregular periods. In addition there is high level of insulin hormone produced by pancreas. Insulin combines with luteinizing hormone and lead to excess production of male hormone testosterone in ovaries. Abnormally high amount of testosterone in the ovaries prevent ovulation which can lead to infertility.<sup>3</sup>

## Negative impact of stress on ovary.

Physical, physiological and other stressors directly as well as indirectly may generate psychological stress that affect female reproductive health possibly by modulating the ovarian physiology and reproductive hormones. Increase of stress hormone such as cortisol may reduce estradiol-17 $\beta$  biosynthesis in the ovary. The high level of stress for a longer time may result in complete impairment of reproductive functions. Stress may result in amenorrhea, anovulation and menstrual irregularities in females<sup>6</sup>

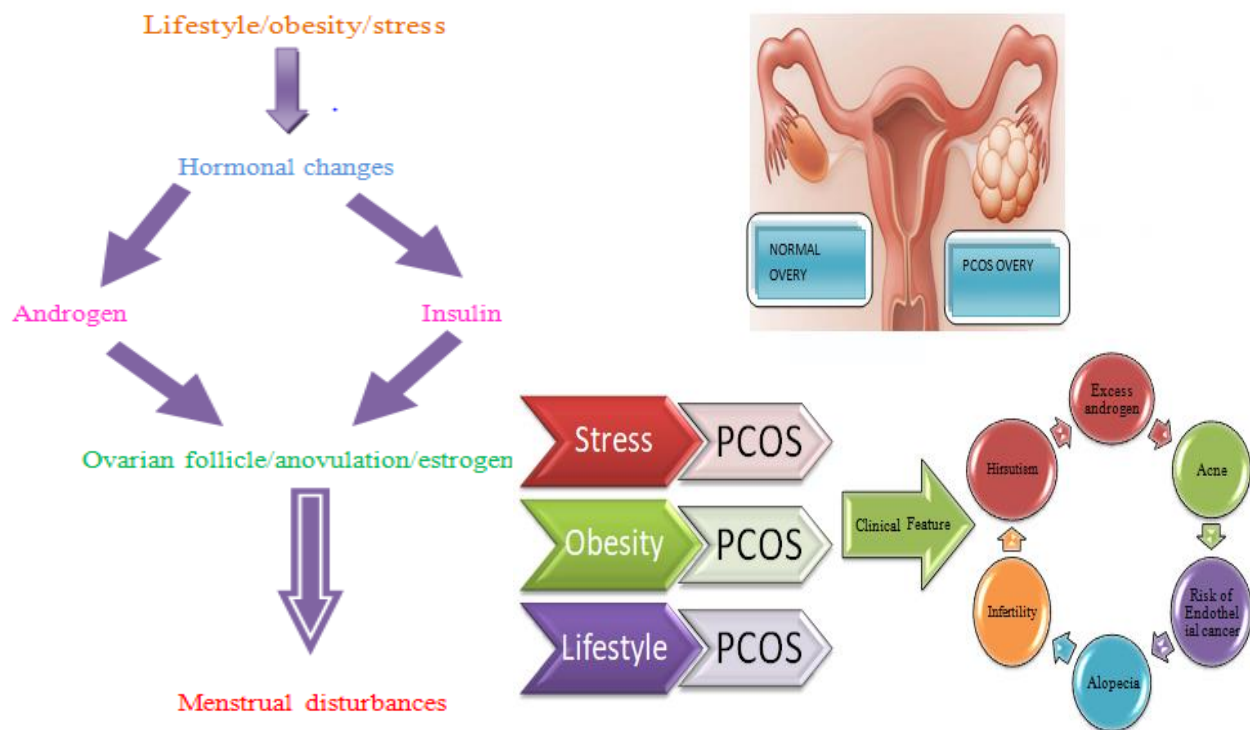


Fig.2 Etiology and clinical features of PCOS

The increased level of stress could affect follicular growth, development and ovulation<sup>15</sup> by inducing apoptosis within the follicular microenvironment<sup>16,17</sup>. The oocyte apoptosis may result in the depletion of germ cells from cohort of ovary and deteriorate oocyte quality after ovulation<sup>17</sup>. Studies suggest that chronic psychological stress results in poor IVF possibly due to its negative impact at the level of ovary and oocytes<sup>18</sup>. Oocyte quality affects early embryonic development, establishment and maintenance of pregnancy and fetal development<sup>19</sup>. The poor quality oocyte directly impacts reproductive outcome and may cause female infertility. Combination of Shatavari and Shatpushpi works as a stimulant of endometrium and ovarian tissues. Combination of Shatavari and Shatpushpi nourishes ovary and rejuvenates its functions by promoting growth and development of ovarian follicles, enhances ovulation, regulating menstrual cycle and revitalizing the female reproductive system<sup>19</sup>. Combination of Shatavari and Shatpushpi treatment is mainly focused to overcome the PCOS problem and to normalize the physiology of ovary, improve follicular growth, development and ovulation in clinical subjects, it is beneficial in female infertility by enhancing folliculogenesis and ovulation, preparing womb for conception and preventing abortions

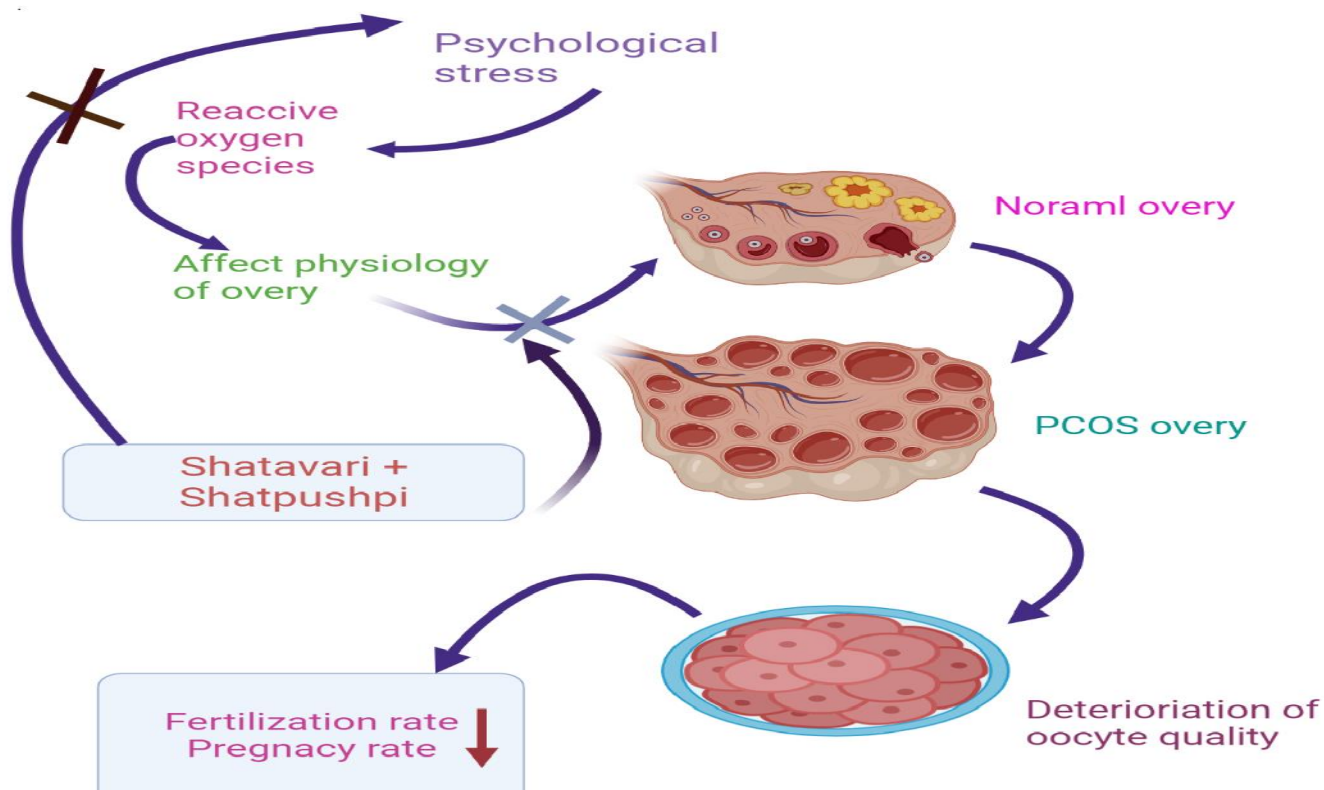


Fig.3 Protective impact of Shatavari and Shatapushpi

## Conclusion

Polycystic ovarian syndrome (PCOS) is one of the most common reproductive disorders in female. Different drugs are used in the management of PCOS with different symptoms, but effective treatment to manage PCOS is still a challenging.

The findings of the present study indicate that combination of shatavari and shatpushpi leads to comparable reduction of ovarian volume in a manner, which correlates with the degree of reduction of PCOS, and related signs, prompt growth and development of ovarian follicle and also normalize physiology of ovary. More pre-clinical and clinical studies are required to explore the effectiveness of this therapy in PCOS. This review is helpful in understanding the effectiveness of combination of shatavari and shatpushpi treatment of PCOS. In this review high impact of combine therapy of shatavari and shatpushpi in treatment of PCOS as compare to individual drug therapy have been identified.

## Acknowledgements

Not applicable

## Authors' contributions

Vrushali Bhalchim significantly contributed to the outset and design of the article, interpreting the relevant literature and drafted the article and Pritam Kutal contributed in critical reviews

## Funding:

Not applicable as no sources of funding has been utilized for this present review work.

## Availability of data and materials

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study

## Declarations

### Ethics approval and consent to participate

Not Applicable as this is a review manuscript which is not reporting any studies involving human participants, human data or human tissue.

### Consent for publication

Not applicable as this present review manuscript does not contain any individual person's data in any form.

## Competing interests

The authors declare that they have no competing interests.

## REFERENCES

1. Sudhakar Pachiappan, Suganeswari Matheswaran, Poorana Pushkalai Saravanan and Gayathiri Muthusamy, Medicinal plants for polycystic ovary syndrome: A review of phytomedicine research, *International journal of herbal medicine*, 2017; 5(2): 78-80
2. Zahra Abasian a, Ayoob Rostamzadeh a,b, Mohsen Mohammadi c, Masih Hosseini d, Mahmoud Rafieian-kopaei a, A review on role of medicinal plants in polycystic ovarian syndrome: Pathophysiology, neuroendocrine signaling, therapeutic status and future prospects, *Middle East Fertility Society Journal* 23 (2018) 255–262
3. Patel M G1, Prajapati D P2\*, Concept of Polycystic Ovarian Syndrome: Perspective of Ayurveda and Modern Science, *International Journal of Pharmacognosy and Phytochemical Research* 2017; 9(10); 1363-1372, doi: 10.25258/phyto.v9i10.10462
4. Divya Pawar\*1, Sameer Gholap, Role of Shatpushpa in womens life, *International Journal of Research in Indian Medicine*, January 2020 | Vol. 04th| Issue:1st
5. Sachin Hemantkumar Pandya1 Jasmine Ritesh Gujarathi2 Jatin Maheshkumar Vyas3, Effect of Shatpushpa in Female Infertility W.S.R to Anouulatory Factor: A Reiew study, *Volume-V, Issue-V (Sept.- Oct. 2017)*
6. Ajai K Pandeya, Anumegha Guptab, Meenakshi Tiwarib, Shilpa Prasadb, Ashutosh N. Pandeyb, Pramod K. Yadavb, Alka Sharmab, Kankshi Sahub, Syed Asrafuzzamanc, Doyil T. Vengayilc, Tulsidas G. Shrivastavd, Shail K Chaubeb, Impact of stress on female reproductive health disorders: Possible beneficial effects of shatavari (*Asparagus racemosus*), *Biomedicine & Pharmacotherapy*, 103 (2018) 46–49.
7. Krupa D. Patel, Laxmipriya Dei1, Shilpa B. Donga2, Nalini Anand3, Effect of Shatpushpa Taila Matra Basti and Pathadi Kwatha on Poly Cystic Ovarian Disease. *Ayu*, DOI: 10.4103/0974-8520.105245
8. Aasiya Bashir1, Lahanya Guha2 and Ishfaq Ahmad Bhat3\*, Comprehension, Management, and Treatment of Polycystic Ovarian Syndrome via Allopathic, Unani and Ayurvedic Perspectives, *Journal of Gynecology and Women's Health, Review Article* Volume 21 Issue 1 - March 2021, DOI: 10.19080/JGWH.2021.21.556055
9. Mangalika Kumarapeli 1, Kaumadi Karunagoda 1 and Pathirage Kamal Perera \* 2,

- A Randomized clinical trial evaluate the efficacy of satpushpa shatavari powered drug with satpushpa shatavari ghrita for the management of polycystic ovarian syndrome  
Kumarapeli et al., IJPSR, 2018; Vol. 9(6): 2494-2499.
10. M. Asunción, R.M. Calvo, J.L. San Millán, J. Sancho, S. Avila, H.C.F. Escobar- Morreale, A prospective study of the prevalence of the polycystic ovary syndrome in unselected Caucasian women from Spain, *J. Clin. Endocrinol. Metabolism* 85 (2000) 2434–2438.
  11. E. Diamanti-Kandarakis, C.R. Kouli, A.T. Bergiele, F.A. Filandra, T.C. Tsianateli, G. G. Spina, et al., A survey of the polycystic ovary syndrome in the Greek island of Lesbos: hormonal and metabolic profile, *J. Clin. Endocrinol. Metabolism* 84 (1999) 4006–4011.
  12. D. Kirilovas, A. Chaika, M. Bergström, E. Bergström-Petterman, K. Carlström, J. Nosenko, et al., Granulosa cell aromatase enzyme activity: effects of follicular fluid from patients with polycystic ovary syndrome, using aromatase conversion and [11C] vorozole-binding assays, *Gynecol. Endocrinol.* 22 (2006) 685–691.
  13. R.M. Brenner, O.D. Slayden, H. Critchley, Anti-proliferative effects of progesterone antagonists in the primate endometrium: a potential role for the androgen receptor, *Reproduction* 124 (2002) 167–172
  14. Nowak DA, Snyder DC, Brown AJ, Wahnefried WD. The Effect of Flaxseed Supplementation on Hormonal Levels Associated with Polycystic Ovarian Syndrome: A Case Study. *Curr Top Nutraceutical Res.* 2007; 5(4):177-181.
  15. . <https://www.nhp.gov.in/disease/endocrinal/ovaries/polycystic-ovary-syndrome-pcos>
  16. <https://www.statista.com/statistics/1136572/india-polycystic-ovary-syndrome-issues-among-women-by-age-group/>
  17. Devi, Alakananda Ma. Alandi Herb Manual. <https://www.saraswatiayurveda.com/blog/2019/9/8/shatavari>
  18. Tirtha SS. *The Ayurveda Encyclopedia Natural Secrets to Healing, Prevention & Longevity.* Bayville, NY: Ayurveda Holistic Center Press; 2007.
  19. Mohanta B, Chakraborty A, Sudarshan M, Dutta RK, Baruah M. Elemental profile in some common medicinal plants of India. Its correlation with traditional therapeutic usage. *J Rad Anal Nucl Chem.* 2003;258(1):175–179.
  20. Akhil Jain1\*, Nidhi Garg2\*, Therapeutic and Medicinal uses of Shatpushpa: A Review, *Word journal of Pharmacy and Pharmaceutical Sciences* ,Volume 6, Issue 2, 336-342.