



"CREATING AWARENESS ON EMERGING ISSUE PCOS FOR MAKE IN HEALTHY INDIA: AN INITIATIVE FOR WOMEN EMPOWERMENT"

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ABSTARCT

Women with PCOS have a hormonal imbalance and metabolism problems that may affect their overall health and appearance. Polycystic ovary syndrome (PCOS) affects up to almost 27 percent of women during their childbearing years. PCOS is a word that many us have now been come to know and even suffering from it too. But what is it? How it is occur or to whom it can occur? Does an only woman have such issues? There are many questions arise into the minds of people and patients for every diseases. Every now and then we come to know some new health issue and its research outcomes and status and prospects. Currently we all know government of India under the leadership of Prime Minister Shri Narendra Modi progressing towards make in clean India, Make in India and many more. This one little initiative is a pilot level contribution from the healthcare provider to healthcare sector of India by creating awareness on PCOS. This is cheapest method to prevent disease progression and mapping of the information and awareness about disease in population belongs to medical profession or do not. Rapidly increasing cases of PCOS in current scenario indicates that there is a dire need to create awareness on it at rural and urban level too. It is always said that a literate person is always alert for any complications in life so if we spread awareness regularly it will help in mapping of the disease and also helps in prevention and control of the disease. This initiative also helps in opening the conceptual spectrum and perception of general population and medical professional towards the metabolic disorder and its sufferer.

KEYWORDS: PCOS, Awareness, community pharmacist, metabolic disorder.

1.0 INTRODUCTION

Polycystic ovary syndrome (PCOS) is a health trouble that affects one in 10 women of childbearing age.^[1-9] Women with PCOS have a hormonal imbalance^[2] and metabolism problems that may affect their overall health and appearance.^[1-5] PCOS is also a common and treatable cause of infertility.^[1-2] PCOS is a common health problem caused by an imbalance of reproductive hormones. PCOS is considered to be a global metabolic health issue^[6] that presents major challenges to our health care systems of India.^[7-9] The review of PCOS literature indicates a much need for more public education and awareness on disease status and future prospects in the India especially the rural areas^[10-12] of the country. In comparison with other chronic metabolic disorders PCOS remains one of the least understood and the most confusing medical conditions by health care workers and also for the general public as well as the least funded metabolic disorder.^[1-3]

Even World health organization also mentioned in its report that in most of the countries where PCOS is a major public health concern.^[6-9] According to the scale of the public health problem there must be a comprehensive approach^[4-8] to prevention and management of PCOS is urgently required. Programs at community level like surveillance or mapping of disease and patient and public education must be delivered at the community and rural level through the primary health care system by community pharmacist so as to increase public awareness about the silent but major health related problem and extend the survival of affected women. This initiative will also prevent the general to become affected. The most important challenge is thus to improve the projection for implementation of research for the patients with PCOS in developing countries.^[1-5,7,12]

Currently many different formulations are being under research for the management of PCOS.⁴ But the main thing is more than formulations scientist are engage in

understanding the causal relationship and factors predisposing the PCOS.^[5] So current study with an aim to aware working women who are at prime age are the main target population by educating and assessing awareness into them so the positive initiative can be begin. No such kind of studies was performed on the assessment of PCOS related awareness in working women.^[7-10] Even This study may benefit government to find a new vision and mission in control and prevention of PCOS for development of women empowerment of India.^[11-15] Because without any collection of blood samples or without and psychological enforcement the purpose of the study is very clear as till date there is no study performed by healthcare professional actual responsibility of the pharmacist on grass root level to rise up the level of awareness in working women as a part of women empowerment and development of healthcare system of India.^[12] No doubt metabolic disorders like diabetes mellitus^[2], thyroid are already prevailing disease in surroundings and if the youth gets encouragement and education and timely based awareness like this initiative, it is possible to control on any disease or disorder or at least make people spectrum open for PCOS. May be the concept is at pilot level^[8-12] but on continuous level study it will be possible to have good results in favor of controlling activities. The awareness study will also be helpful in mapping the disease and also beneficial for the schools to have some basic information about the sickle cell anemia so they can take some extra care of those students. The implications for health counseling are many and varied. This study also determines the willingness of the youth to know about the disease and their willingness to spread awareness to other population to continue the chain.^[1-10]

Another factor that can help address this issue is placing a public figure in the forefront for PCOS.^[1-4] Ideally, anyone can help and start a movement on PCOS awareness^[8-17] and support this chain. The public figure would more than likely generate additional funds for research, treatment and even cures for PCOS.^[13-18] Public interest would increase more medical training on this particular disease and help eliminate attitudes and preconceived notions of this disease. With more education and training, patients will be able to receive optimum attention and care, may be more centers can be built to specifically treat this disease in high-risk communities.^[10-17]

Encouraging all types of the media to describe and focus problems of the persons with PCOS in a manner consistent with the purpose of the present convention; Promoting awareness-training program regarding the PCOS^[1,2,8,14-16] and its complications and must emphasize to provide some of the beneficial perception towards the patients of PCOS.^[10-14]

Reason for emphasizing the issue with respect to spreading awareness is community pharmacist can play a vital role and constant encouragement and awareness by

healthcare provider will definitely boost the healthcare system of India.^[1-4]

2.0 Epidemiology of PCOS^[5-15]:-The prevalence of PCOS depends on the choice of diagnostic criteria. The World Health Organization (WHO) estimates that it affects 116 million women worldwide as of 2010 (3.4% of the population). 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.^[10-17]

- **Predisposing factors for PCOS**:- The predisposing factors for PCOS include the following: Genetic factors: Family history of PCOS.^[11,18,19]
- **High maternal androgen**: Prenatal exposure to androgens poorly controlled maternal congenital adrenal hyperplasia, Androgen- secreting tumors, Low birth weight/small for gestational age, Premature adrenarche.^[2,6,9]
- **Endocrinal factors**: Onset of type 1 diabetes mellitus before menarche, insulin resistance and obesity.^[1,3,7,9]
- **Drugs**: such as anti-epileptic drugs (e.g., Valproate).

PCOS is a complex disorder of uncertain etiology. There is strong evidence that it is a genetic disease.^[1,2,11-15] Such evidence includes the familial clustering of cases, greater incidence in monozygotic than in dizygotic twins and heritability of endocrine and metabolic features of PCOS. The genetic component appears to be inherited in an autosomal dominant fashion. This means that each child has a 50% chance of inheriting the predisposing genetic variant(s) from a parent.^[7-17] The genetic variant(s) can be inherited from either the father or the mother and can be passed along to both sons (who may be asymptomatic carriers or may have symptoms such as early baldness and/or excessive hair) and daughters who will show signs of PCOS. The genetic variant manifests itself at least via elevated androgen levels^[1,2,14] secreted by ovarian follicle theca cells. The exact gene affected has not yet been identified. The clinical severity of PCOS symptoms appears to be largely determined by factors such as obesity.^[14-22]

3.0 Pathogenesis of PCOS^[1,2,8,10]:- Polycystic ovaries expand when the ovaries are moved to produce too much amounts of male hormones (androgens), mainly testosterone, by either the release of too much luteinizing hormone by the adenohypophysis, hyper insulinaemia in women whose ovaries are sensitive to this stimulus or reduced levels of sex-hormone binding globulin (SHBG) resulting in augmented free androgens.^[1,2,9,11,14-27]

The syndrome acquired its name due to the general sign on ultrasound examination of multiple ovarian cysts which represent immature follicles. The follicles have developed from primordial follicles but the development has stopped at an early stage due to the disturbed ovarian function.^[12-14] The follicles may be oriented along the

ovarian periphery appearing as a 'string of pearls' on ultrasound examination.^[15-18] Patients with PCOS have higher gonadotrophin releasing hormone (GnRH), which in turn results in an increase in LH/FSH ratio in females with PCOS. The majority of patients with PCOS have insulin resistance and/or obesity. Their elevated insulin levels give to or cause the abnormalities seen in the hypothalamic-pituitary-ovarian axis that lead to PCOS. Hyperinsulinemia.^[1,2,8,9,22] increases GnRH pulse frequency, LH over FSH dominance, increased ovarian androgen production, decreased follicular maturation and decreased SHBG binding. All these factors contribute to the development of PCOS.^[14-18] PCOS is characterized by a complex positive feedback of insulin resistance^[23] and hyperandrogenism. In most cases, it cannot be determined which of those two should be regarded to be the causative agent.^[24] Experimental treatment with either anti-androgens or insulin sensitizing agents improves both hyper-androgenism^[25] and insulin resistance. Adipose tissue possesses aromatase, an enzyme that converts androstenedione to estrone and testosterone to estradiol. The excess of adipose tissue in obese patients causes them to have both excess androgens (which are responsible for hirsutism and virilization) and estrogens (which inhibit FSH via negative feedback).^[27]

PCOS may be associated with chronic inflammation of the ovary which may induce conformational, endocrinal and metabolic changes which may predispose to PCOS. Several studies correlate the inflammatory mediators^[26-29] and oxidative stress with an ovulation and other PCOS symptoms. It was previously suggested that the excessive androgen production in PCOS could be caused by a decreased serum level of insulin-like growth factor binding protein-1 (IGFBP-1), in turn increasing the level of free IGF-1 which stimulates ovarian androgen production, but recent data concludes this mechanism to be unlikely. PCOS has also been associated with a specific fragile X mental retardation 1 (FMR1) sub-genotype. Many studies suggested that women who have heterozygous-normal/lowFMR1 have polycystic-like symptoms of excessive follicle-activity and hyperactive ovarian function.^[29-32]

4.0 Clinical manifestations of PCOS^[26,33-37]:- The most common symptoms of PCOS include menstrual disorders such as oligomenorrhea or amenorrhea, infertility, high levels of masculinizing hormones manifested by acne and hirsutism and metabolic syndrome which appears as a tendency towards central obesity and other symptoms associated with insulin resistance. Serum insulin, insulin resistance and homocysteine levels are higher in females with PCOS than in the normal females. Diagnosis of PCOS. Not all women with PCOS have polycystic ovaries, nor do all women with ovarian cysts have PCOS. Although pelvic ultrasound is a major diagnostic tool, it is not the only one. Many definitions are used for diagnosis of PCOS such as National Institutes of Health (NIH) criteria, Rotterdam criteria and Androgen Excess

PCOS Society criteria. NIH criteria: In 1990, a workshop sponsored by the NIH suggested that a patient has PCOS if she has oligoovulation, signs of androgen excess (clinical or biochemical) and other entities are excluded that would cause polycystic ovaries. Rotterdam criteria: In 2003, a consensus workshop held in Rotterdam indicated PCOS to be present if any 2 out of 3 criteria are met including oligoovulation and/or anovulation, excess androgen activity and polycystic ovaries (By gynecologic ultrasound). The Rotterdam definition is wider, including many more patients, most notably patients without androgen excess. Critics say that findings obtained from the study of patients with androgen excess cannot necessarily be extrapolated to patients without androgen excess.^[30-34] Androgen excess PCOS Society criteria: In 2006, the Androgen Excess PCOS Society suggested a tightening of the diagnostic criteria to all of the following including excess androgen activity, oligoovulation/ anovulation, polycystic ovaries and other entities are excluded that would cause excess androgen activity.^[28-32]

5.0 Standard Diagnostic Assessment^[12-22]

- 1. History-taking**:- Specifically for menstrual pattern, obesity, hirsutism and the absence of breast development. If obese, the time of onset, progression and problems should be explored. Lifestyle parameters such as diet, exercise and smoking need evaluation, as do the age of onset and progression of hirsutism and/or acne. Any medications used and their effects on acne and hirsutism should also be considered. Family history should explore infertility, menstrual disorders, age of puberty and hirsutism in female relatives.^[15-19]
- 2. Physical examination^[10-17]**:- This includes general body habitus, obesity, body mass index, blood pressure, presence of acne, male pattern of baldness and evidence of acanthosis nigricans. The severity and distribution of hirsutism should be graded clinically. Girls with PCOS with marked hyperandrogenism such as clitoromegaly, deepening of the voice or a masculine body habitus should alert one to the possibility of virilizing adrenal/ovarian tumours or congenital adrenal hyperplasia.
- 3. Gynecologic ultrasonography**:- It looks for small ovarian follicles. According to the Rotterdam criteria, 12 or more small follicles should be seen in an ovary on ultrasound examination. The numerous follicles contribute to the increased size of the ovaries that is 1.5 to 3 times larger:- than normal.^[9-16]
- 4. Laboratory tests**
 - Serum levels of androgens, including androstenedione and testosterone may be elevated. Dehydroepiandrosterone sulfate (DHEA-S) levels above 700-800 mcg/dL are highly suggestive of adrenal dysfunction. The free testosterone level is thought to be the best measure, with about 60% of PCOS patients demonstrating high levels.

- The ratio of LH (Luteinizing hormone) to FSH (Follicle stimulating hormone) is greater than 1:1 (sometimes more than 3:1), as tested on day 3 of the menstrual cycle.
- Fasting biochemical screen and lipid profile.
- Two-hours oral glucose tolerance test (GTT) in patients with risk factors (Obesity, family history, history of gestational diabetes) may indicate impaired glucose tolerance (insulin resistance) in patients with PCOS.^[15-27]
- Fasting insulin level or GTT with insulin levels (also called IGTT): Elevated insulin levels have been helpful to predict response to medication and may indicate patients who will need higher doses of metformin or the use of a second medication to lower insulin levels. A hypoglycemic response in which the two-hour insulin level is higher and the blood sugar lower than fasting is consistent with insulin resistance. A mathematical derivation known as the HOMAI, calculated from the fasting values in glucose and insulin concentrations, allows a direct and moderately accurate measure of insulin sensitivity (glucose-level x insulin-level/22.5).^[22-28]

6.0 Differential Diagnosis of PCOS^[18-27]:- Other causes of irregular or absent menstruation and hirsutism, such as hypothyroidism, congenital adrenal hyperplasia (21-hydroxylase deficiency), Cushing's syndrome, hyperprolactinemia, androgen secreting neoplasms and other pituitary or adrenal disorders should be investigated. PCOS has been reported in other insulin-resistant situations such as acromegaly.

7.0 Management of PCOS^[9-26]:- Medical treatment of PCOS aims to lowering insulin levels, restore fertility, treat hirsutism or acne, restore regular menstruation and prevent endometrial hyperplasia and endometrial cancer. General interventions that help to reduce weight or insulin resistance can be beneficial for all these aims because they are believed to be the underlying causes.

8.0 Diet regulation^[11-20]:- Where PCOS is associated with overweight or obesity, successful weight reduction is the most effective method of restoring normal ovulation and menstruation. Low-carbohydrate diet and sustained regular exercise may help. It has been recommended that a diet in which a significant part of total carbohydrates is obtained from fruit, vegetables and whole grain sources may be helpful. Vitamin D deficiency may play a role in the development of the metabolic syndrome because vitamin D is essential for the formation of the hormones of the adrenal cortex. So, treatment of vitamin D deficiency is indicated in the management of PCOS.^[22-26]

9.0 Medications^[1-5,9-22]:- Reducing insulin resistance by improving insulin sensitivity through medications such as metformin and thiazolidinedione have been an obvious approach and initial studies seemed to show effectiveness. The United Kingdom's National Institute

for Health and Clinical Excellence recommended in 2004 that women with PCOS and a body mass index above 25 be given metformin when other therapy has failed to produce results.

10.0 Infertility:- Not all women with PCOS have difficulty becoming pregnant. For those who do, anovulation or infrequent ovulation is a common cause. Other factors include changed levels of gonadotropins, hyperandrogenemia and hyperinsulinemia.^[13-23] For overweight anovulatory women with PCOS, weight loss and diet adjustments, especially to reduce the intake of simple carbohydrates, are associated with resumption of the normal ovulation.^[21-26]

For those who after weight loss still are anovulatory or for anovulatory lean women, the ovulation-inducing medications such as clomiphene citrate and FSH are the principal treatments used to promote ovulation. Previously, the anti-diabetes medication metformin was the recommended treatment for anovulation, but it appears less effective than clomiphene. Assisted reproductive technology procedures such as controlled ovarian hyper-stimulation with FSH injections followed by in vitro fertilization are used for patients who do not respond to clomiphene, diet and lifestyle modification. Though surgery is not commonly performed, the polycystic ovaries can be treated with a laparoscopic procedure called ovarian drilling, which often results in either resumption of spontaneous ovulations or ovulations after adjuvant treatment with clomiphene or FSH. However, there are concerns about the long-term effects of ovarian drilling on ovarian function.^[27-32]

11.0 Hirsutism and acne:-Contraceptive pills are frequently effective in reducing hirsutism. A common choice of contraceptive pill is one that contains cyproterone acetate which is a progestogen with anti-androgen effects that blocks the action of male hormones that are believed to contribute to acne and the growth of unwanted facial and body hair.^[15-24] On the other hand, progestogens such as norgestrel and levonorgestrel should be avoided due to their androgenic effects. Other drugs with anti-androgen effects include flutamide and spironolactone which can give some improvement in hirsutism.^[22-26] Metformin can reduce hirsutism, perhaps by reducing insulin resistance, and is often used if there are other features such as insulin resistance, diabetes or obesity that can also benefit from metformin. Eflornithine is a drug which is applied to the skin in cream form and acts directly on the hair follicles to inhibit hair growth. It is usually applied to the face. Medications that reduce acne by indirect hormonal effects also include ergot dopamine agonists such as bromocriptine. 5-alpha reductase inhibitors (such as finasteride and dutasteride) may also be used. They act by blocking the conversion of testosterone to dihydrotestosterone (the latter of which is responsible for most hair growth alterations and androgenic acne).^[31-35]

Although these agents have shown significant efficacy in clinical trials, the reduction in hair growth may not be enough to eliminate the social embarrassment of hirsutism or the inconvenience of shaving. Individuals vary in their response to different therapies and drug treatments do not work well for all individuals. For removal of facial hairs, electrolysis or laser treatments are faster and more efficient alternatives than the above mentioned drugs.^[21,23,29]

12.0 Menstrual irregularity and endometrial hyperplasia:- If fertility is not the primary aim, then menstruation can usually be regulated with contraceptive pills. The purpose of regulating menstruation is essentially for the woman's convenience and perhaps her sense of well-being. There is no medical requirement for regular periods, so long as they occur sufficiently often.^[26-29] If a regular menstrual cycle is not desired, then therapy for an irregular cycle is not necessarily required. If a regular menstrual cycle is not desired, then therapy for an irregular cycle is not necessarily required. If menstruation occurs less often or not at all, some form of progestogen replacement is recommended. Some women prefer a uterine progestogen device such as the intrauterine system or the progestin implant, which provides simultaneous contraception and endometrial protection for years. An alternative is an oral progestogen taken at intervals (e.g., every three months) to induce a predictable menstrual bleeding.^[28-30]

13.0 Alternative medicine:- Acupuncture is one of the alternative medicine modalities that had been emerging as one of the commonly used methods for treatment of PCOS. Acupuncture may help PCOS patients to regulate and manage their periods. Moreover, it may help in decreasing body weight, reducing headache and improving patients' mood.^[31-33] Also, placing acupuncture needles in the areas related to the reproductive system may improve blood supply to the reproductive area, normalize hormone levels and help the proper functioning of the reproductive system. There is insufficient evidence to conclude an effect from D-chiro-inositol in PCOS. However, myo-inositol appears to be effective. It is capable of restoring spontaneous ovarian activity and consequently fertility in most patients with PCOS.^[33-35]

14.0 Prognosis of PCOS:- Women with PCOS are at risk for endometrial hyperplasia and endometrial cancer, insulin resistance^[26-32] and type II diabetes, hypertension, depression, psychological disorders, dyslipidemia, cardiovascular diseases, cerebrovascular stroke, weight gain, sleep apnea, non-alcoholic fatty liver disease, acanthosis nigricans (patches of darkened skin under the arms, in the groin, on the back of the neck) and autoimmune thyroiditis. Early diagnosis and treatment may reduce the risk of these complications, such as type 2 diabetes and heart disease.^[35-37]

15.0 Strategy for creating awareness on constant level Work plan

The work plan of the study is in sequential step from starting a chain to put forward the concept on big platform for implementation.

- Collection of review of literature on PCOS
- Seek to get approval from the educational officer and health committee of the respected area.
- Randomly selection based on multi stage technique selection of working women according to geographical area to uniform justification of sampling and representation of data
- Seek to get feedback from political and other women empowerment based working NGOs
- Perform questionnaire survey to above mentioned and deliver a awareness information on disease
- Collection of the data and feedback from the working women and their organization of concern background population about the program.
- Interpretation of the data and construction of results.
- Seek to get support from government and non profitable agency help to utilize the data and study to implement in state control program.
- Seek to get support from media agencies to support in creating such awareness on continue bases.
- Organize seminar and workshop at regular interval into various rural and urban areas
- Organized awareness week campaign for spreading awareness into the general population
- Seek support from pharmaceutical institutions and university to encourage students to involve in spreading awareness and mapping of the disease regularly.

16.0 Conclusion:- PCOS emerging is the major silent threat to female population in India and very little importance is given to the spectrum of the disease. The emerging issues and symptoms of such disease need to be conveyed to the general population as well as to medical professionals too. Regular awareness at the community level in different parts of the country can help population aware of the disease and its complications. Regular awareness program will help in decreasing the number of unwanted complications based hospital admissions. The regular awareness sessions help the country to decrease monetary funds for research on management of the disease. Awareness on disease and its precautionary measures in women may help to make women proactive towards such conditions. Eventually reported the number of cases will be declined definitely if constant and channelized way awareness program and study are carried out. This is just an initiative for using awareness as the major tool for making in healthy India concept without spending a money making India healthy and wealthy together at the time.

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