Impact of white poisons in Management of Women with PCOS

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Abstract

Introduction: The Poly Cystic Ovaries Syndrome is considered to be most prevalent of all endocrine disorders which women face. It is the leading cause of Infertility in women of child bearing age. The purpose of our study was to collect data on how many women had symptoms of this syndrome including hirsutism, amenorrhea, dysmenorrhea and oligomenorrhoea. Furthermore what was the ratio of women who were aware of this disorder was evaluated.

Methods: Data was collected from Eighty eight women who were either seeking or imparting education in Rao’s college of pharmacy. A small portion of our subjects were educated house wives. Subjects were inquired through survey forms of above mentioned symptoms.

Results: The collected data was then interpreted to find the prevalence of above mentioned symptoms and awareness about PCOS. 17% of 88 women had Acne & Hirsutism. Regarding menstruation 18.1% had some sort of irregularity with hirsutism and 30.6% had menstrual irregularity with acne. 13.6% had acne, hirsutism and menstrual irregularity. 17.4% of women are still consuming the 5 white poisons out of 88 women.

Discussion: The results show that the level of awareness about dietary white poisons in the study population is very low, even in the participants who are literates, in this study we concluded that dietary white poisons may play essential role in management of weight loss, and helps to reduce the symptoms which is very common in the PCOS. We have also observed that by avoiding & replacing the white poisons such as refined rice, wheat, high sugar and salts and pasteurized milk, helps to regulate the biochemical hormones like Androgen and Progesterone which, abnormalities are very common in the PCOS. Hence we conclude that management of diet helps in the management of PCOS in the study population.

Keywords: Ovaries Syndrome; Hirsutism; Oligomenorrhoea; Ultrasonography
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Introduction

Poly Cystic Ovarian Syndrome (PCOS) is the most widely recognized and complex endocrinological disorder influencing females of childbearing age [1]. It is also known as hyperandrogenic anovulation and Stein-Leventhal syndrome [2].

Now a day’s PCOS is perceived to be a metabolic disorder [3] and it is discriminated by prolonged anovulation, hyperandrogenism, infertility and often women with this syndrome have been noticed to be hyperinsulinemic [4]. Currently Rotterdam criteria is preferred for diagnosing PCOS which states that for determining the PCOS with the accompanying signs such as anovulation/oligo ovulation, hyper-androgenemia and appearance of polycystic ovaries on ultrasound [5].

PCOS is a heterogenic disorder with intermediate aetiology and is described by androgen excess and polycystic ovaries. Ovulatory dysfunction is the most important clinical aspect observed in PCOS [6]. It is considered as a multi-organ disorder as it can impact adrenal and sex hormones along with ACTH gonadotropins and development hormone [7].

According to Fauser B.C.J.M studies 6-15% infertility is due to PCOS [8]. The incidence of PCOS can be as high as 30% in women with insignificant amenorrhea, 15% in women with oligomenorrhea and 90% in women with hirsutism [9].

Patients with PCOS are at risk of diabetes mellitus as they suffer from insulin resistance besides the symptoms of abdominal obesity in addition to increase secretion of interleukins, chemokines and adipokines (because of body’s inflammatory state) [10]. The hallmark of this disease can be described into clinical, endocrine and metabolic. The clinical features are abnormal menstrual, acne, hirsutism, alopecia, anovulation, infertility and miscarriages. The endocrine features are increased levels of androgens leutinizing hormone and prolactin. The metabolic perspective of this disorder is insulin resistance, obesity, lipid abnormalities and as increased risk of impaired glucose tolerance which can lead to Type 2 Diabetes. And further more hazard for cardiovascular disease and endometrial carcinoma [11,12].

Life style interventions are the first-line treatment for PCOS, especially when it is accompanied by obesity. This suggested priority is based on the fact that reduction of central fat ameliorates the PCOS phenotypes, inter alia improved cyclicity and resumption of ovulation [13]. Also, weight loss improves the status of cardiovascular risk factors accompanied by a decreased intima media thickness [14].

According to the literature, dietary management is the primary choice to treat the PCOS and many studies described that increased intake of five white poisons such as pasteurized milk, refined salt, refined rice, refined sugar, and white flour.

The process of pasteurization keeps the milk good for a longer period but harms its nutritive value. It removes enzymes, vit-A, B12 and C beneficial bacteria &calcium. Calcium works with vit-D which is vital to growth &health of children as well as improving immune system. Considering all these facts we should avoid consuming pasteurised milk.

Salt makes body hold on to water if you eat too much salt. The extra water stored in your body increase your B.P.
The process of refining rice beats to the removal of outer layer, germ & endosperm only these layers contains starch in huge quantity which can increase blood sugar to a great extent.

Refined sugar can cause insulin resistance, a stepping stone towards metabolic syndrome & diabetes. Insulin is a very important hormone in the body. It allows glucose to enter cells from the blood stream & tells the cell start burning glucose instead of fats.

Maida Known as white poison. We are consuming it in the form of bread at our home and market or food joints in the form of fast food. During processing of maida from wheat endosperm, germ and bran and nutrients are removed, which is very crucial for digestion. As a result, our body get depleted of vitamins & minerals. High intake of the above said white poisons in diet leads to Obesity, Diabetes, Hormonal imbalance, Cancer [15].

Obesity is a common finding in PCOS and aggravates many of its reproductive and metabolic features. The relationship between PCOS and obesity is complex, not well understood and most likely involves interaction of genetic and environmental factors [16]. In this study we aimed to evaluate the effect of dietary white poisons in women with PCOS and to evaluate the knowledge of women about diet and obesity.

Women with PCOS had a greater risk of overweight, obesity and central obesity although our findings support a positive association between obesity and PCOS, our conclusion are limited by the significant heterogeneity between studies and further studies are now required to determine the sources of these heterogeneity. Clinical management of PCOS should include the prevention and management of overweight and obesity [17].

The pcos is a metabolic disease which has unfavorable effects on lipid profile, carbohydrate metabolism and cardiovascular risk parameters. It has been shown that some drugs which are used in treatment of some pcos also unfavourable effects on these parameters. Therefore, the metabolic effects of drugs should be considered in treatment [18].

The Metaanalysis showed a twofold risk of arterial disease for patients with pcos in respect to women without pcos. BMI modification did not impact these findings, suggesting the expanded hazard for cardiovascular event in the pcos isn’t totally identified with higher BMI in patients with pcos [19].

**Aim and Objective**

- To study and evaluate the effect of dietary white poisons in women with pcos.
- To evaluate the knowledge of women about diet and obesity.
- To evaluate the effect of patient counselling in study population

**Methodology**

This study was conducted in Nellore which is a city of India, a country situated in South Asia [20]. This research study was approved by Institutional Ethics Committee of RaosCollege of Pharmacy, Nellore. In this study, 88 female, Pre-Menopausal women with PCOS were recruited into the study. All subjects were given informed consent before participating in the study. Participants who were diagnosed of PCOS, according to the Rotterdam consensus by two of the following three criteria 1) Menstrual irregularity (cycle length < 26 days or > 31 days).2) Clinical (Hirsutism or biochemical hyper androgenize (free androgen index >5.4 or testosterone >1.4 mmol/L).3) Pasitive ultrasound presentation of PCOS by trans vaginal smear. Women with pregnancy, breast feeding and those who are in use of oral contraceptives and hormonal treatment, those who are using insulin sensitizing agents are excluded from the study.

All the subjects documented their menstrual cycle throughout the study duration, weight change Biochemical measurements and symptoms such as acne, Hisutism were also documented. All study participants were
counseled about the dietary white poisons and their complications and suggested the how to avoid those poisons and given alternatives to replace the white poisons, and all study participants were followed up throughout the study period. At the end of the study all participants were again interviewed and collected the data and disseminated.

**Statistical evaluation**

Data was presented as Mean ± SEM, results are presented for 88 subjects, two tailed statistical analysis was performed using SPSS for windows 10.0 software (SPSS Inc, Chicago, USA.)

**PRE QUESTIONARIES**

**PATIENT INFORMATION (DEMOGRAPHIC DETAILS):**

- Name:
- Date of birth:
- Age:
- Height:
- Weight:
- Phone no:
- Education qualification:
- Occupation:
- Current status:

1) What are the primary reasons for consultation check those that apply?
   - Lose weight
   - Irregular periods
   - Infertility
   - Relieve symptoms of PCOS others

2) Do you have any other significant medical history such as high B.P, Diabetic, Thyroid etc.?

3) If you are diabetic. Are you insulin resistant?

4) What are your symptoms?
   - Irregular periods
   - Mood swings
   - Hair loss
   - Difficulty sleeping
   - Excessive hair growth
   - Skin issues

5) What medications are you on and how long have you been on them for?

6) Are you taking any vitamins/mineral supplements? please list.

7) Are you exercising on a regular basis? If so, please describe what activity, how many times a week & for how long?

8) If you are not exercising, why not?

9) Do your family members (parents, siblings) have weight problems?

**DIET**

10) Give an idea of what kind of diets you have tired (low fat, low carbohydrates etc.)

11) Did you have success with diet?
    - Yes
    - No

12) Where do you feel that some of your problem’s areas might be? Check all those that apply?

    - Emotional eaters
    - Large portions
    - Crave sweets
    - Crave others crabs
    - Excessive fat intake
    - Eat out alot
    - Too few calories
    - Exercise

    - Inadequate
13) Please check off which of the following foods you would eat?

| DRINKS         | SWEETNERS | FLOURS | HIGH SALTS | LOW SALTS | RICE              |
|----------------|-----------|--------|------------|-----------|-------------------|
| Tea            | Sugar     | Wheat flour | Pickles   | Fruits    | Parboiled rice   |
| Coffee         | Honey     | Maida flour | Chips     | Vegetables | Polished rice    |
| Almond milk    | Jiggery   | Rice flour | Corn snacks| Eggs      | Brown rice       |
| Pasteurized milk| Candy    | Prawns  |            |           | Cakes & cookies  |
| Yogurts        |           |         |            |           | Soups             |

14) List several choices for each meal/snack as well as the time that you might eat it?

|                  |                  |
|------------------|------------------|
| Breakfast:       |                  |
| Snack:           |                  |
| Lunch:           |                  |
| Snack:           |                  |
| Dinner:          |                  |
| Snack:           |                  |

15) I crave carbohydrates and sugars

Yes    No

16) I have always had difficulty with losing weight?

Yes    No

17) I have or had problems in the past acne

Yes    No

18) My periods last longer than 35 days

Yes    No

19) My periods are unpredictable

Yes    No

20) My periods last longer than a week

Yes    No

21) My periods are very heavy or prolonged

Yes    No

22) I have with excessive facial hair

Yes    No

23) I have symptoms of hypoglycemia

Yes    No

24) I feel extremely hungry, irritable, sleepy or fatigued after eating sweets

Yes    No

25) I have a family history of diabetes

Yes    No

26) I have noticed skin color or pigmentation changes

Yes    No
27) I have history of high blood pressure
   Yes  No

28) I have difficulties getting pregnancy
   Yes  No

29) I have PMS symptoms
   Yes  No

30) My acne is worse at different times of my cycle
   Yes  No

Post Questionaries

POST INTERVENTION QUESTIONARIES

Name:
Age :
Date of birth:
Weight:  BMI:
Occupation:
Education:

1. Are you on regular periods after changing the diet?
   “Yes ” “No

2. Has your androgen levels are normal?

3. Have you seen changes in your symptoms after changing diet and starting exercise?
   “Yes ” “No

4. Have you been working out every day for about an hour?
   “Yes ” “No

5. Please choose, which type of food did you cut down/out from your diet?
   Polished rice
   Maida
   Refined sugar
   Refined salt
   Pasteurized milk

6. Comment how did you replaced above said white poisons in your diet?
   Polished rice: ______________________________________________
   Maida: ___________________________________________________
   Refined sugar: ____________________________________________
   Refined salt: ______________________________________________
   Pasteurized milk: ___________________________________________
7. Do you think that the lifestyle changes have reduced your PCOS symptoms?
   "Yes"  "No"

   If Yes, please mention choose, what type of modification did you practiced.
   "Regular Exercise" "Yoga"
   "Diet modification" "Meditation"

8. Are your insulin level are in normal values date when last test performed?
   "Yes"  "No"

9. Are your thyroid level in normal values date when last test performed?
   "Yes"  "No"

10. Have your hirsutism is reduced?
    "Yes"  "No"  "N/A"

11. Have your acne is reduced?
    "Yes"  "No"  "N/A"

12. Has your PMS symptoms are relieved like back pain, stomach ache, etc.
    "Yes"  "No"  "N/A"

13. Are your Progesterone and estrogen are in normal level?
    "Yes"  "No"  "N/A"

14. Are you taking Fibers daily that promotes estrogen metabolism. check out Fibers
    Beans
    Leafy vegetables
    Apples
    Whole grains

15. what has helped you in dealing with PCOS?

Results

Our sample size was 88 Rural women from the age group of 15-45yrs. out of this 88, 11 are under age
   group of 15-20 and 25 are in the age group of 21-25, 32 are in age group of 26-30, 15 are in the age group
   of 31-35, 5 are under 36-45.

| Table 1: Distribution of age group in the study population. |  |
|-----------------------------------------------------------|---|
| Z: No.of.Patients (n=88)  Percentage (%)                  |   |
| 15-20          11           12.5
| 21-25          25           28.4
| 26-30          32           36.3
| 31-35          15           17
| 36-45          5            5.6
| Total          88           100

Out of this 88 womens 14(15.9%) are students and 49(55.6%) are housewifes, 25(28.4) are working
womens.
Pre-study interventions

In this Study, as shown in Figure 1. Out of 88 participants 16% are students, 28% are working women and 56% are Housewives, and according to the BMI scale, 50% of the population were fallen under overweight as depicted in Table 2. Out of this 59%, 34% and 7% are from Housewives, working women and students respectively as shown in Figure 2.

![Distribution of PCOS](image)

**Figure 1:** Distribution of PCOS in women.

| Pre-BMI       | Students | Housewife’s | Working women | Total | Percentage (%) |
|---------------|----------|-------------|---------------|-------|----------------|
| Under weight  | 2        | 0           | 2             | 4     | 4.5            |
| Normal weight | 9        | 23          | 8             | 40    | 45.4           |
| Overweight    | 3        | 26          | 15            | 44    | 50             |

According to the questionnaire 45 participants are consuming dietary white poisons daily, which is 51.13% of the whole population.
The major common symptoms were observed in the study participants is Acne, Hirsutism and Irregular periods, and incidence of these symptoms are given in Table 3.

**Table 3: incidence of symptoms in the participants**

| Pre symptoms        | No. of patients | Percentage (%) |
|---------------------|-----------------|----------------|
| Acne+Hirsutism      | 18              | 20.4           |
| Acne +IRP           | 37              | 42             |
| Hirsutism+IRP       | 19              | 21.5           |
| Acne+Hirsutism+IRP  | 15              | 17             |

Pre–intervention bio chemical hormones such as Androgen and Progesterone was estimated and observed as abnormal levels in majority of the study participants i.e., 89.7%, results are depicted in table 4.

**Table 4: Distribution based on hormone levels**

| Pre-Hormones | Normal Range | Percentage (%) | Abnormal (High level) | Percentage (%) |
|--------------|--------------|----------------|-----------------------|----------------|
| Androgen     | 9            | 10.2           | 79                    | 89.7           |
| Progesterone | 9            | 10.2           | 79                    | 89.7           |

**Post-intervention**

After pre study questionnaire, the study participants are suggested with diet plan and given counselling to create awareness among the study participants to avoid white poisons and replace them with balanced and organic food items, and ensured to maintained modified diet plan with continuous follow-up for 4 Months, after the study period, the study team again interviewed the participants for post-intervention parameters.

After post study intervention High BMI population are reduced to from 50% to 36.3% due to modification in diet, as depicted in table 5.

**Table 5: Post-study distribution of BMI based on occupation.**

| Post-BMI     | Students | House wives | Working Women | Total | Percentage |
|--------------|----------|-------------|---------------|-------|------------|
| Under Weight | 2        | 2           | 1             | 5     | 5.6        |
| Normal Weight| 11       | 27          | 13            | 51    | 57.9       |
| Over Weight  | 1        | 20          | 11            | 32    | 36.3       |

Table 6, described that post study symptomology of the study population, and also observed reduced incidence of symptoms compared to pre-study.

**Table 6: Comparison of symptom of PCOS (Pre& Post intervention).**

| Symptoms       | Pre-Intervention | Post-Intervention | P value |
|----------------|------------------|-------------------|---------|
| Acne+Hirsutism | 18               | 15                | 0.00    |
| Acne +IRP      | 37               | 27                | 0.05    |
| Hirsutism+IRP  | 19               | 16                | 0.00    |
| Acne+Hirsutism+IRP | 15         | 12                | 0.00    |
Post-intervention of biochemical hormones was also estimated and observed significant reduction in the levels of androgen and Progesterone as shown in figure 4.

| Table 7: Pre & Post study distribution of biochemical hormones. |
|---------------------------------------------------------------|
| **Hormones** | **Pre-study** | **Post study** | **P value** |
|              | Normal Range  | Abnormal (High level) | Normal Range  | Abnormal (High level) |
| Androgen     | 9 (10.2)      | 79 (89.7)              | 67 (76.13)    | 21 (23.86)           | 0.01 |
| Progesterone | 9 (10.2)      | 79 (89.7)              | 73 (82.95)    | 15 (17.04)           | 0.01 |

Figure 3: Comparison of symptom of PCOS (Pre & Post intervention).

Figure 4: Comparative Pre & Post study abnormal values of biochemical hormones.
Discussion

Total number of people who participated in this study was 88 women. In these 88 rural women, only 25(28.4%) educated women had heard about this effect of white poisons. The numbers concluded that 28.4% of women in our study knew about this effect of white poisons. But if we exclude females who are educated, we can say that much fewer women had any kind of knowledge regarding this white poison issue.

Out of these 88 women, 45(51.13%) women are consuming the five white poisons. In answer to question whether there are women who had replaced the five white poisons only 30(34.09%) women responded positively.

A rough data on symptoms was also collected which suggested that majority of women in our study suffered from symptoms including acne, hirsutism and irregular periods. 18 women reported to have acne and hirsutism, 37 women reported to have acne and irregular periods while 19 women reported to have hirsutism and irregular periods, 15 women reported that they have acne, hirsutism and irregular periods.

On the whole 79(89.7%) out of total 88 women reported that they have abnormal levels of androgen and progesterone levels. Weight loss among overweight women has been shown to improve reproductive outcomes by reducing sugar intake [21]. Clark et al. found that even a small weight loss in an ovulatory obese infertile women resulted in improvement in ovulation, pregnancy rate and outcome [22].

Conclusion

The results show that the level of awareness about dietary white poisons in the study population is very low, even in the participants who are literates, in this study we concluded that dietary white poisons may play essential role in management of weight loss, and helps to reduce the symptoms which are very common in the PCOS. We have also observed that by avoiding & replacing the white poisons such as refined rice, wheat, high sugar and salts and pasteurized milk, helps to regulate the biochemical hormones like Androgen and Progesterone which, abnormalities are very common in the PCOS. Hence, we conclude that management of diet helps in the management of PCOS in the study population.

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