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Review Article

Role of Seed Cycling in Polycystic Ovarian Syndrome

Tabeen Irfan[2], Kinza Seher[2], Bahisht Rizwan[1*], Sammar Fatima[2] and Affifa Sani[2]

[1]University Institute of Diet and Nutritional Sciences, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan

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***Corresponding Author:**
Bahist Rizwan
University Institute of Diet and Nutritional Sciences, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan
b_rizwan33@hotmail.com

ABSTRACT

Poly-Cystic Ovarian Syndrome (PCOS) is described as an endocrine disorderliness emerging from hormonal inequality and low form of inflammation. PCOS is a metabolic syndrome which includes complex medical treatments which are expensive and has many side effects. **Objective:** To extract a literature that proves that diet has significant role in treatment of PCOS and to investigate the influence of *n*-3 fatty acid in balancing hormones, testosterone, luteinizing hormone (LH) and insulin levels. **Methods:** This review literature is assessed from the precious data from Medline/PubMed, google scholar until November 2020. After going through the published literature and initially 150 articles were included, which were after reducing 98 the duplicates, 22 irrelevant diseases were excluded. However, title and abstract 30-full text articles were eligible were relevant to topic role of seeds cycling containing omega 3 fatty acids on PCOS. Different review papers which contained data related to the role of different seeds i.e. flax seeds, sesame seeds, pumpkin seeds, sunflower seeds separately. **Conclusions:** n-3 fatty acids were the main component among these seeds from plant sources which improves hormonal disturbances and insulin resistance in PCOS patients.

INTRODUCTION

Poly-Cystic Ovarian Syndrome (PCOS) is described as an endocrine disorder emerging from hormonal inequality which disturbs 5 to 18 percent of females who are at the age of reproduction, creating it as a critical communal wellbeing complication keeping in sight of the comorbidities and pervasiveness present in current time. This disorder is described by symptoms like menstrual instability, anovulatory infertility, analytic and biochemical hyperandrogenism, along with some more metabolic demonstration, that results in 30-70 percent females suffering from PCOS [1]. It is identified by the existence of inflated ovaries with numerous tiny cysts and a hyper-vascularized androgen releasing stroma [2]. The analytical evidence consists of irregular menstrual cycle, polycystic ovaries, obesity, infertility, hairy, acne, and hyperandrogenism [3]. PCOS is an analytical analysis described by the existence of some of these characteristics: chronic oligo-ovulation or an ovulation, androgen excess and polycystic ovaries [4]. According to WHO's estimation, polycystic ovary syndrome has targeted 116 million females all around the globe in 2012 [5].

The current review is anticipated to evaluate the outcome of intake of Poly-Unsaturated fatty acids (PUFA) in daily life in the form of dietary seeds that are pumpkin seeds, flaxseeds, sunflower seeds and sesame seeds in PCOS which are more PCOS friendly and has zero side effects, these seeds balances the hormones in the follicle and luteinizing phase of menstruation cycle. The literature from previous studies is summarized in Table 1.

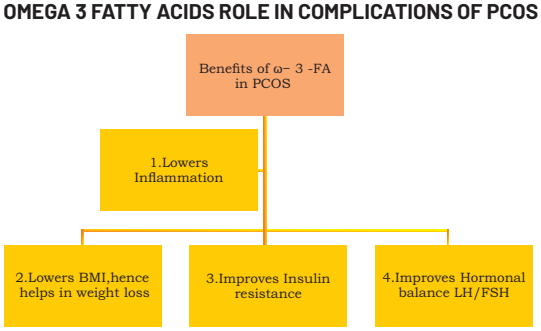

Figure 1: Benefits of including ω**-** 3 FAin diet of polycystic ovary syndrome patients Obesity

Overweight and obesity are noticed in 40-50 percent of

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cases with PCOS and is treated as a leading danger for PCOS. The aggregation of surplus weight leads to dysfunction of adipose tissues which is linked to metabolic syndromes; complexities like insulin resistance in the body [6]. It is pretended that decreased serum omega 3 polyunsaturated fatty acid concentrations, especially DHA are linked with obesity, increased waist circumference in youngsters, and obesity in grownups. Adipose tissue emits adipokines that releases hormones (leptin, adiponectin) and cytokines like IL-6[7].

Essential bioactive components like omega 3 PUFA, shows less or no negative impacts and could be examined as a secure access in relation to other methods of medication. There is a diversity of presumptive mechanism by which PUFA, especially EPA /DHA, could function in remodeling balance of body, inflecting energy metabolism and decreasing body weight. Earlier researches have highlighted that omega 3 polyunsaturated fatty acid can modulate adipocytes

apoptosis[8]. Mutually, it looks that marine source of omega 3 PUFA balances the adipocyte quantity[8]. Multiple studies recorded positive outputs of n-3 utilization in obesity. For example, in Oner and Muderris (2013), BMI was automatically lowered by the daily intake of 1500 mg n-3 for six months[9]. Another study that was regulated in patients with PCOS, they took two grams omega 3 per day for six month,waist size (WC) decreased in sufferers who took n-3 as compared to those who didn't[10]. Identical results were recorded in 2017, where members got two pills of n-3 polyunsaturated fatty acids daily by end of this test, waist circumference was unquestionably reduced in group with n-3 as compared to group without n-3 [11]. The conclusion of combination medication has also advertised favorable effects, for example, BMI lowered automatically following EPA 1800 mg for twelve months[12].

Seed cycling:

Pumpkin seeds are extremely nutritious and full of nutraceutical ingredient like palmitic acid, oleic acid, stearic acid and linoleic acid. These essential fatty acids belong to omega 3 or omega 6 category that utilizes incredible nutritional activities and plays essential part in a lot of metabolic pathways [13]. Phytoestrogen supplementation with extract of pumpkin seeds has been recorded to elevate uterine weight, mammary glands, bone density and restrain from hyperlipidemia, the expression of estrogen like actions in ovariectomized female Sprague dawley rats. Pumpkin seeds oil is enriched with vitamin E like a-tocopherol and g-tocopherol which displays affirmative health properties [14].

It is known that estrogen hormones have an essential part in the menstrual cycle, reproduction, inflection of bone density, and cholesterol movement in the body. Phytoestrogen is a polyphenol compound present in plants which utilizes mammalian estrogenic-type properties because of the binding capability with estrogen receivers. Pumpkin seeds oil has verified to incorporate greater percentage of phytoestrogen and sterols like secoisolariciresinol and lariciresinol. Study stated that pumpkin seeds have secoisolariciresinol almost twenty-one milligrams per 100 grams of dry weight and another study discovered two hundred and sixty-five milligrams of phytoestrogens per 100 grams of seeds. Pumpkin seeds supplements were given to rats which manifested anti-atherogenic and hepato-protective results in hypercholesterolemic rats. Another research showed that pumpkin seeds displayed estrogenic-type results like controlling lipid metabolism, bone remodeling, mammary gland and uterus epithelial cells growth [15]. Phytoestrogen factors were the key aspect in prohibiting cardiovascular outputs, lowering total cholesterol, LDL, HDL and triglycerides [16]. It is concluded that phytoestrogens and tocopherols present in pumpkin seeds adds up to their estrogen-type properties.

Intervention element	Intervention subjects	Duration of study	Results	References
1 ml/kg of Flaxseed Oil daily in PCOS	32 female SD rats (6 weeks old)	8 weeks	this examination showed that dietary FO improved PCOS through the sex steroid hormone and is cheap mediation in the control of PCOS	Wang T et al.,2020[52]
flaxseeds powdered in polycystic ovary syndrome consumed either 30 gramsflaxseed powder daily.	forty-one sufferers	12 weeks	More positive effects were seen in the patients with PCOS who consumed flaxseed supplements along with changes in lifestyle as compared to those who just modified their lifestyles. with changes in lifestyle as compared to those who just modified their lifestyles.	Haidari et al.,2020[51]
Pumpkin seed oil	30 rabbits	2 weeks	Body weight was decreased as well as improvements were seen in the serum cholesterol levels.	Zeb and ahmed , 2017 [48]
1000mg omega-3 fatty acids from flaxseed oil containing 400mg α-Linolenic acid plus 400 IU vitamin E supplements (n=34) or placebo (n=34)To the PCOS females	68 women	12 weeks	Insulin resistance and total testosterone levels improved after supplementation	Rehmani et al.,2017[18]
omega-3 supplements with dose of 2 g/day for 6 months (two capsules) to PCOS patients	88 women	6 months	It improved hip/waist ratio, fsh/lsh ratio, improved ovary size, volume of menstruation bleeding and hair growth.	Khani et al.,2017[22]

Table 1: Literature Review on experimental studies on seed cycling

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Flaxseed:

Flaxseed *(Linum usitatissiumum)* is fully enriched with multiple biologically active components, which includes alpha linolenic ALA, dietary fiber and phytosterogenic lignans. Lignin in foods elevates testosterone activity and reduce the bioavailability of free testosterone by elevating sex hormone binding globulin levels [17]. Study was done to see the results of flaxseeds powdered in PCOS. forty-one sufferers consumed either 30 grams flaxseed powder daily along with some changes in lifestyle or just changes in lifestyle for a total of twelve weeks. Anthropometric and biochemical assessments were done in starting and ending of the research. Flaxseed administrated group demonstrated a compelling decline in the body weight, insulin concentration, TG, CRP, leptin and an elevation HDL, and adiponectin. More positive effects were seen in the patients with PCOS who consumed flaxseed supplements along with changes in lifestyle as compared to those who just modified their lifestyles [18].

A study was conducted in which six weeks old female rats were distributed in 4 groups each with 8 rats in them. FO improved estrous cycle and ovary structure and improvised the sex steroid hormone disruption LSH/FSH hormone, estrogen, testosterone, and progesterone, body weight, dyslipidemia and IR [19].

Sunflower seeds:

Sunflowers are associated to the family *Asteraceae* and is cultivated worldwide because of its nutritional and medicinal values. The sunflower seeds give an immense variety of nutritious compounds such as proteins, fiber, unsaturated fats, vitamin E, iron, selenium, folate, copper, zinc and phytochemicals. It is composed of around 20 percent proteins. 100 grams of sunflower seeds gives 14 grams of carbs, out of which 7 grams are fiber. It is enriched with amino acids like glutamic acid, aspartic acid, cysteine and arginine. The seed have 55-70% of linoleic acid. The antioxidant power of defatted sunflower seed shells is usually because of the components of its phenolic compounds [20,21]. It has linoleic acids which is helpful in treating PCOS.

Sesame seeds:

Sesame seeds are studied as a dominating origin for treating micronutrient deficiencies in modern times. It is extracted from a bell-shaped flower that is of yellowish color at start which is then converted into bluish purple color. It has a nutty sweet smell and it tastes like buttery milk. It is taken as a food element and eatable oilseed. Sesame seeds are a highly enriched source of carbs, Proteins, fats, fibers and also minerals. It is a powerful source of oil from major of its chemical components. It also provides equal number of amino acids, monosaturated fatty acids, Polyunsaturated fatly acids. It is also an antioxidant that displays a compelling result in reducing blood pressure, declination of vessels and minimizing some chronic disorders [55]. Sesame seeds have nutrients that are helpful for patients with PCOS. Its good fats help to balance blood glucose levels. It also has minerals such as calcium, magnesium and zinc.

Seed cycling:

It is a naturopathic treatment which claims to regulate hormones by balancing the estrogen hormone and progesterone hormones in the first and second half of the menstrual cycle, respectively.

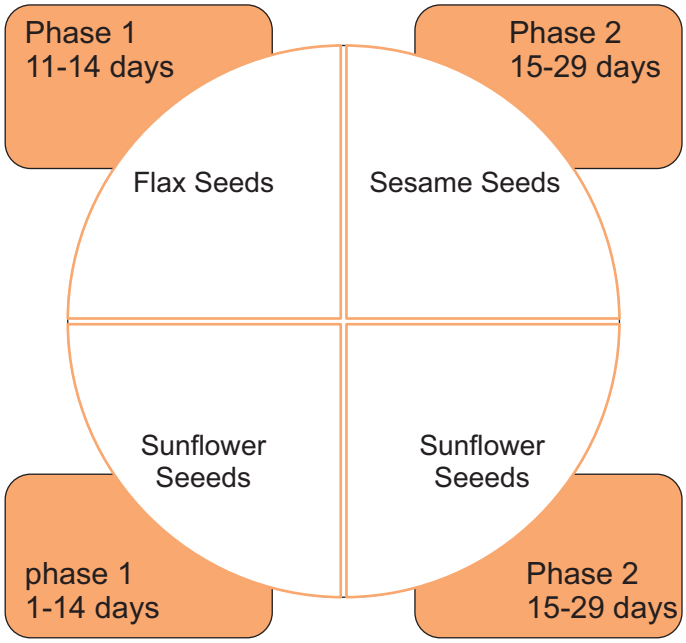

Figure 2: Seed cycling for 3 months improves hormonal imbalance and hence improves PCOS

Hormones in normal cycle

In a typical menstrual cycle, estrogen is produced in the first fourteen days of the follicular phase as ovarian eggs ripe. Levels of FSH and LH elevates right before ovulation, and estrogen level decreases right after ovulation. As the egg is discharged, luteal phase is started, and progesterone and estrogen levels are slowly elevated in a vigilant proportion to backup conception and implantation. They decline again prior to the next menstrual cycle if no implantation takes place. In, PCOS hormonal cycles disturbs and by the use of seed cycling we can reduce the PCOS symptoms.

CONCLUSIONS:

This review gives proof that omega-3 in form of sunflower seeds, flax seeds, pumpkin seeds, sesame seeds when taken in combination in form of powder can be used as a novel medication for PCOS patients. Omega-3 is suggested in the treatment of PCOS by improving IR, high triglycerides, high LDL and low HDL levels. This article altogether proofs that PUFAs works best in the treatment of metabolic and

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hormonal parts of this condition. The current review was to see the impacts of various omega-3 seeds in PCOS. Whilst researches have no direct connection of seed cycling to hormone balance, but they clearly show a relationship among particular ingredients in flaxseeds, pumpkin seeds, sesame seeds and sunflower seeds play a significant role in balancing natural hormonal cycle. In a particular seed cycling contract, you consume 2 tablespoons of ground seeds daily. They can be mixed in the smoothies or can be added as a topping on oatmeal. Idealists suggests to take seeds in raw and fresh ground form. **Phase One:** During first phase, that lasts for 2 weeks, you consume a tablespoon of flaxseed and pumpkin seeds each. **Phase Two:** During second phase, that also lasts for 2 weeks, sunflower seeds and sesame seeds are consumed. To see the results seed cycling should be done for 3 months. Hence concluded, omega-3 unsaturated fats can be another way to deal with PCOS without any side effects.

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