



# Personal Experience of Dietary Habits and its Manipulation Effects Appeared on Polycystic Ovary Syndrome Patients

Omaima Abdulrazzaq Zubair

Lecturer at Family and Community Medicine Department-Mosul Medical College -University of Mosul/Iraq

---

## Abstract

Polycystic ovary syndrome can be a frustrating experience for women, a complex syndrome for clinicians and a scientific challenge for researchers, and is a major public health concern.

**Objective:** To describe dietary habits especially water intake among polycystic ovary syndrome cases and to identify its effect on the management plan, in order to generate hypothesis for future intervention study that may help millions of polycystic ovary syndrome patients.

### Patients and Methods:

Ethical approval from the Family and Community Medical Department Committee of Mosul Medical College and patient's approval consents has been obtained to proceed with the study. A case-series design has been adapted. 56 polycystic ovary syndrome women whose age was within 15–45 years were interviewed directly at the gynecology and infertility private clinic in Mosul city using a standardized questionnaire over a period of one year from January 2017-January 2018. All patients were followed for a period of 2, 4, 6 months after starting management plan which concentrate mostly on increasing daily consumption of 8 or more glasses of warm water together with alpha lipoic acid consumption which is a known dietary supplement used for improving ovarian circulation.

**Results:** 98% and 96.4% of the patient's shows dramatic response regarding menstrual irregularity and sonographic improving pictures, respectively after initiation of treatment for 2, 4, 6 months.

**Conclusion:** Although the possibility of genetic predisposing of polycystic ovary syndrome, however dietary behavior and especially therapies that focus on adjusting water intake appeared to have great influence on the development or deterioration of the disease. Further comprehensive analytic or interventional studies needed to support this hypothesis.

**Key Words:** Polycystic Ovary, Syndrome, Dietary Behavior, Case Series, Lipoic Acid.

---

## INTRODUCTION

Polycystic ovary syndrome (PCOS) is one of the most common reproductive disorders; it's also one of the most poorly understood from a dietary management perspective. <sup>(1)</sup> PCOS is a condition that includes hyper-androgenic, amenorrhea and / or anovulation. In addition to fertility concerns, women with PCOS have substantial risk for developing metabolic syndrome and possibly endometrial cancer. <sup>(2)</sup> Global incidence of PCOS ranges between 4% and 20% of women. Young women with PCOS have significant distress related to infertility as well as clinical signs of hyperandrogenism, including severe acne, thinning scalp hair and excess facial and body hair. Obesity among women with PCOS parallels rates of the general population; however the hyper-androgen aspect promotes excess visceral fat in these women. <sup>(3)</sup>

Women with polycystic ovarian syndrome PCOS are intrinsically

insulin resistant and have a high risk of cardiovascular disease and type 2 diabetes. The underlying etiology is still unknown but is believed to be multifactorial. Such a heterogeneity of clinical manifestations of PCOS suggests that the therapeutic strategy should consider the overall features of the patient and therefore include pharmacological and/or non-pharmacological treatments.

Weight loss improves some of these factors, but the optimal diet composition is still unknown. Low-glycemic index (low-GI) diets are recommended without evidence of their clinical effectiveness <sup>(4)</sup>.

Water can aid weight loss by helping to feel full, and it may improve metabolism. Water keeps hormones more balanced. Although the possibility of genetic predisposing of PCOS disease, however environmental influence particularly dietary behavior appeared to have great influence on the development or deterioration of the disease <sup>(5)</sup>.

Insulin-sensitizing compounds such as inositol, a B-complex vitamin, and its stereoisomers (myo-inositol and D-chiro-inositol) have been studied as an effective dietary supplement for PCOS. <sup>(6)</sup>

#### PATIENTS AND METHODS

The study was approved by the Family and Community Medical Department Committee of Mosul Medical College. Patients attending at a gynecology and infertility private clinic of the investigator in Mosul city who were within the reproductive age (15-45 years) and follow the inclusion criteria were included in the study. The inclusion criteria were cases their ages range between 16 and 45 years presented by any symptoms of PCOS including menstrual irregularity, oligomenorrhea, amenorrhea and/or menorrhagia, persistent spotting, infertility, history of diabetes, hirsutism. <sup>(7)</sup> All cases should be confirmed by visualization of trans-abdominal and/ or trans-vaginal ultrasound which has been considered for diagnosis of PCOS by assessment of ovarian volume and morphology. Ultrasound diagnosis had at least 2 features of PCOS like increase size of ovary and /or small multiple follicles at the outline of the ovaries were considered positive. As ultrasound examination of such cases is easy, available, cheap and less invasive than hormonal assessment, it is commonly used in patients with suspected PCO. Ovarian volume was calculated from measurements of the largest and widest diameters of the ovaries in the transverse and sagittal planes. Total follicle count should include follicles more than 2 mm in diameter. Follicle distribution pattern is judged whether follicles were predominantly distributed in a "peripheral" pattern or heterogeneously ("Even") throughout the stroma <sup>(8-15)</sup>. The exclusion criteria were women who have history of hormonal contraception use, fertility medications in the three months prior enrollment.

All patients have been personally interviewed and approval consent to enroll in the study has obtained directly and all of them had complete medical charts.

Full medical history have been taken from patients and all the questionnaire elements have been asked carefully to be followed by proper explanation of the disease characteristics and possible causes using diagram or pictures to make perfect clarification to the patients according to their educational level. Later on possible outcome and available management plan were introduced.

Cases selected over a period of one year from January 2017-january 2018.

Majority of cases (95%) were followed up over a period of 2-4-6 months interval with recurrent ultrasonography follow up at each visit (each patient about 4-5 visit) to find out the improvement or deterioration of the cases and proper evaluation of clinical symptoms have been done to change or alleviated the treatment plan accordingly. The questionnaire form included the socio demographic characteristics of cases as age, marital status, fertility state, and other questions about eating habits and their life style assessment, all information were recorded from patient themselves. Cases dietary habits were assessed using guidelines of healthy food pyramid of the USA. <sup>(16)</sup>

#### Management plan

All patients have been advised to drink more than 8 glasses of warm water every day which equal about 2 liters together with taking dietary supplement of alpha lipoic acid 300 mg once daily for at least 2 months which has been proved to enhance the ovarian function through improving ovarian circulation <sup>(17)</sup>.

The respondent rate were 96.42% as all patients were cooperative and agreed to the treatment plan except for 2 patients who didn't follow the advice of drinking warm water in spite of regular medicine intake.

#### RESULTS

Fifty six cases of PCOS have been included. Menstrual irregularity were encountered from 66% of the cases oligomenorrhea, amenorrhea, or persistent spotting. 98% was complaining from acne and hirsutism. Just less than half (48%) have infertility either primary or secondary infertility, where 42% of cases complaining from obesity table (1).

Considering dietary habits, 62.5% used to consume healthy diet regarding variety of food types including (fruits and vegetables, whole grain and cereals, dairy group of milk and its derivatives, meat, fish and egg). However the amount of each type difficult to be determined over long period of time. While 51.6 % consume unhealthy diet more than recommended daily amount mentioned by food health pyramid (oil, unhealthy snacks, beverages, oily food, sugar and salt, canned food). The diminish amount of water intake where the commonest habit reported by almost all of them (none or one glass, two-four glasses/day) which constitute 76.7%, 19.6 % respectively as appeared in table 2.

Table (1) Demographic and clinical features of study cases

Characteristics	No.	%
Age		
15-20	4	7.1
21-30	6	10.8
31-40	42	74.76
41 and >	4	7.1
Marital status		
Married	27	48.06
Unmarried	29	51.6
BMI		
19-29	32	56.9
29 and >	24	42.7
(fertility Status)		
Primary infertility	10	17.8
Secondary infertility	17	30
No fertility problem	29	51.7
<b>Family history PCOS or menstrual irregularity history of relatives</b>		
Yes	22	39.2
No	34	60.7
Diabetes status		
Yes	0	0
No	56	10
Hirsutism and acne		
Yes	55	98.2
No	1	1.78
Patients menstrual irregularity		
Yes	37	66.07
No	19	33.92

\*Healthy diet indicate the consumption of recommended amount of each food group according to food guide pyramid including (fruits and vegetables, whole grain and cereals, dairy group of milk and its derivatives, meat, fish and egg).

Unhealthy diet refer to consumption of a lot amount more than recommended in food guide pyramid (oil, unhealthy snacks, beverages, oily food, sugar and salt, canned food).

\*All food items have been roughly estimated, where yes indicate recommended amount while no refer to more or less than the recommended amount.

After a period 2-4-6 months of follow up, 96.4% of participants exhibited dramatic sonographic improvement among those who consumed a lot of warm water over a period of at least 2 months accompanied by the recommended amount of alpha lipoic acid drug, irrespective of other diet changes. This improvement has accompanied by menstrual regularity among 98.2% of participant, table (3).

Table 2 Dietary behavior among study cases

Dietary Behavior	No	%
Healthy diet		
Yes	35	62.5%
No	21	37.4
Unhealthy diet		
Yes (recommended)	27	48.1
No	29	51.6
No of glass of water per day		
No or one glass of water/day	43	76.7
2-4	11	19.6
4-6	0	0
6-8	2	3.5
8 and >	0	0
Life Style		
Active	16	28.5
Sedentary	40	71.4

Table 3 Follow up features of cases after the patient drink at least 8 glasses of warm water for at least 2 months with alpha lipoic acid

	Ultrasonography	Menstrual symptoms	Body weight
<b>Water with alpha lipoic acid</b>	Improved 52(92.8)	Improved 55 (98.2%)	Decreased 9 (16.07)
	Not 2 (3.57)	Not 1 (1.78)	Not 47(83.92)
<b>Water with alpha lipoic acid+Glucophage*</b>	Improved 3 (5.3)	Improved 0 (0)	Improved 1 (1.78)
	Not 1 (1.78)	Not 4 (7.14)	Not 4 (7.14)
<b>alpha lipoic acid alone</b>	Improved 0	Improved 0	Improved 0
	Not 2	Not 2	Not 2

\*Only 4 patients were included in Glucophage treatment added treatment under their desire.

Mostly all cases 96.4% shows normal sonographic appearance of ovaries after 6 months of follow up, table (4).

TABLE 4 Sonographic changes of patients after follow up

Sonographic changes		
after 2 month	Mildly resolved*	12 (21.4%)
After 4 month	Moderate resolve*	32(57.14)
After 6 months	Mostly resolved*	54(96.4)

\*Ovarian size has decreased, no. of peripherally arranged follicles disappeared and stromal heterogeneity have decreased. (Normal healthy ovary).

### DISCUSSION

In the present study majority of patients shared symptoms of menstrual irregularity, hirsutism and infertility problem which . These are common symptoms reported by several studies. <sup>(18-23)</sup> Unhealthy diet eating behavior together with sedentary life style where reported from about half of cases. Studies hypothesized that the prevalence of eating disorders is higher in women with PCOS than healthy women. The results are shocking. Across the board, women with PCOS are over four times more likely to report disordered eating behaviors than healthy women. (24-26) another point of view, limited number of studies suggest that dietary intake in PCOS patient is similar to that of women without PCOS irrespective of BMI. <sup>(27, 28)</sup>

There are emerging global data that women with PCOS have different baseline dietary intakes compared with women without PCOS.

Due to its multifactorial nature, the precise etiology of PCOS has not yet been completely elucidated, but some risk factors can be alleviated <sup>(29)</sup>. Interestingly, 96.7% of present study cases reported drinking water less than recommended for their age and sex for years before current examination. The recommended daily consumption for water should be at least 2000 ml/day which equal 8 glasses. <sup>(30)</sup> Some epidemiological data suggests water might have differential metabolic effects when consumed as water alone rather than water contained in caffeinated or flavored or sweetened beverages. <sup>(31, 32)</sup>

All patients were advised to drink 8 glasses of warm water every day with a combination of alpha-lipoic acid (300 mg) twice daily for at least 2 months (8 weeks).

Warm water is a well-known detoxifying agent and improves digestion. <sup>(33)</sup> No changes of life style or diet were required from

the patients. Majority of patients were comply with treatment plan and those show dramatic sonographic improvement of ovarian size and shape appeared gradually within 2 months and those have been followed to reach normal shape within 6 months period.

The possible explanation of this hypothesis is that more than 60% of the human body is made of water. Just like periodically changing water in a fish tank, water in the body should be replenished by fresh, clean water. This replenishment cleanses the body of toxins and nourishes the cells, tissues and organs. The toxins come from either ingested toxic chemicals or from the by-products of metabolism and hormonal reactions. The liver converts many of these into water-soluble chemicals which are expelled through urine by the kidneys, have you heard the expression "the solution to pollution is dilution?" If not expelled on time, the toxins accumulate in various parts of the body and cause disease. One of these important parts of the body was ovaries as the accumulation of toxic material in the cortex lead to diminish its action and inhibit maturation or rupture of follicle and further PCOS development. Many studies correlates the diet with PCOS but no significant relationship was observed between PCOS and unhealthy behaviors <sup>(33-35)</sup> as they include manipulation of diet in general with no emphasis on water intake. The present study gives rise for further well controlled intervention study to evaluate this effect.

Furthermore, recently alpha lipoic acid has well known dietary supplement for improving PCOS symptoms by increasing ovum quality and pregnancy rate increasing rate <sup>(36-37)</sup>. In spite of the presence of family history as a genetic predisposing factor for development of PCOS in 39% among study population; however, after implementation of management plan may lead to vanquish its effect.

The short coming and criticism of the present study is the small sample size, non-representative and not include of control cases to make comparison which make the association more clear, as this study was just to generate hypothesis. Further comprehensive case control or well design cohort study or randomized control trial needed to support my hypothesis. PCOS is an endocrine disorder and the pathophysiology of which remains unclear. <sup>(38)</sup> I hope by my study help the scientist to find the possible pathophysiology of the disease. However larger more detailed studies are required to confirm and explore these results.

**CONCLUSION:**

Although the possibility of genetic predisposing of polycystic ovary syndrome, however dietary behavior and especially therapies that focus on adjusting water intake appeared to have great influence on the development or deterioration of the disease. Further comprehensive analytic or interventional studies needed to support this hypothesis.

**ACKNOWLEDGMENT:**

My deep sincerely thanks to all faculties of Family and Community Medicine Department who gave me endless support to proceed with my study. I would like to thanks the radiologists who help me by taking accurate ultrasound diagnosis throughout the study period.

Finally my thanks go to all cooperative patients who were comply with the study plan and follow all the instructions carefully.

**REFERENCES**

[1] Polycystic Ovarian Syndrome and Eating Disorder Quality of Life: A Pilot Study. *Journal of Fertilization: In Vitro - IVF-Worldwide, Reproductive Medicine, Genetics & Stem Cell Biology*. ISSN: 2375-4508.

[2] McCartney C; Marshall J. Polycystic Ovary Syndrome. *The New England Journal of Medicine*. 375(1):54–64, 2016.

[3] Dunne N. Polycystic Ovarian Syndrome Conference. *Endocrinol Metab Syndr* ,2015.

[4] Rodino IS., Byrne S., Sanders KA (2016) Disordered eating attitudes and exercise in women undergoing fertility treatment. *Aust N Z J Obstet Gynaecol* 56: 82-87.

[5] Teede HJ, Misso ML, Deeks AA, Moran LJ, Stuckey BG, et al. (2011) Assessment and management of polycystic ovary syndrome: summary of an evidence-based guideline. *Med J Aust* 195: S65-112.

[6] Garg D.and Reshef Tal. Inositol Treatment and ART Outcomes in Women with PCOS. *Int J Endocrinol*. 2016

[7] Azziz R, Woods KS, Reyna R, Key TJ, Knochenhauer ES, Yildiz BO. The prevalence and features of the polycystic ovary syndrome in an unselected population. *J Clin Endocrinol Metab*. 2004; 89:2745.

[8] Swanson M. , Sauerbrei E. , Cooperberg P. . Medical implications of ultrasonically detected polycystic ovaries *J Clin Ultrasound*, 9 (1981), pp. 219-222

[9] Nicolini U. , Ferrazzi E. , Bellotti M. , Travaglini P. , Elli R. , Scaperrotta R. The contribution of sonographic evaluation of

ovarian size in patients with polycystic ovarian disease. *J Ultrasound Med*, 4 (1985), pp. 347-351

[10] Orsini L. , Venturoli S. , Lorusso R. , Pichinotta V. , Paradisi R. , Bovicelli L. Ultrasound findings in polycystic ovarian disease. *J Ultrasound Med*, 4 (1985), pp. 341-351.

[11] Robert Y. , Dubrulle F. , Gaillandre L. , Ardaens Y. , Thomas-Desrousseaux P. , L. Lemaitre. Ultrasound assessment of ovarian stroma hypertrophy in hyperandrogenism and ovulation disorders: visual analysis versus computerized quantification. *Fertil Steril*, 64 (1995), pp. 307-312

[12] Lakhani K. , Purcell W. , Fernando R. , Hardiman P. Ovarian volume and polycystic ovaries *Eur J Ultrasound*, 7 (1998), pp. S21-S22.

[13] Jonard S. , Robert, Y. Dewailly D. **Revisiting the ovarian volume as a diagnostic criterion for polycystic ovaries**. *Hum Reprod*, 20 (10) (2005), pp. 2893-2898.

[14] Lam M., Johnson R. , Raine J. . Three-dimensional ultrasound features of the polycystic ovary and the effect of different phenotypic expressions on these parameters *Hum Reprod*, 22 (12) (2007), pp. 3116-3123

[15] Lam P, Raine Fenning M, Cheung L, Haines C. Three-dimensional ultrasound features of the polycystic ovary in Chinese women. *Ultrasound Obstet Gynecol* (2009): 34; 196–200. published online in Wiley InterScience ([www.interscience.wiley.com](http://www.interscience.wiley.com)). <http://dx.doi.org/10.1002/uog.6442>.

[16] Ali H., Elsadawy M. Khater N. Ultrasound assessment of polycystic ovaries: Ovarian volume and morphology; which is more accurate in making the diagnosis?! *The Egyptian Journal of Radiology and Nuclear Medicine* 2016. Volume 47, Issue 1 :347-350.

[17] U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary guidelines for Americans, The Food Guide Pyramid 2017 -Center for Nutrition Policy and Promotion.

[18] Rago R<sup>1</sup>, Marcucci I<sup>2</sup>, Leto G<sup>3</sup>, Caponecchia L<sup>2</sup>, Salacone P<sup>2</sup>, Bonanni P<sup>2</sup>, Fiori C<sup>2</sup>, Sorrenti G<sup>2</sup>, Sebastianelli A<sup>2</sup>. Effect of myo-inositol and alpha-lipoic acid on oocyte quality in polycystic ovary syndrome non-obese women undergoing in vitro fertilization: a pilot study. *J Biol Regul Homeost Agents*. 2015 Oct-Dec; 29(4):913-23.

[19] Franks S. Polycystic ovary syndrome: a changing perspective. *Clin Endocrinol (Oxf)*, 31 (1989), pp. 87-120.

[20] Azziz R. , Woods K. , Reyna R. , Key T. , Knochenhauer E. , Yildiz B. T he prevalence and features of the polycystic ovary syndrome in an

- unselected population. *J Clin Endocrinol Metab*, 89 (6) (2004), pp. 2745-2749.
- [21] Barth JH, Yasmin E, Balen AH The diagnosis of polycystic ovary syndrome: the criteria are insufficiently robust for clinical research. *Clin Endocrinol (Oxf)* (2007); 67: 811-815. [https://www.cnpp.usda.gov/sites/default/files/archived\\_projects/FGP\\_Pamphlet.pdf](https://www.cnpp.usda.gov/sites/default/files/archived_projects/FGP_Pamphlet.pdf)
- [22] Lujan ME, Chizen DR, Pierson RA. Diagnostic Criteria for Polycystic Ovary Syndrome: Pitfalls and Controversies. *J Obstet Gynaecol Can*. 2008 Aug;30(8):671–679.
- [23] Fauser BC, Tarlatzis BC, Rebar RW, Legro RS, Balen AH, et al. Consensus on women's health aspects of polycystic ovary syndrome (PCOS): the Amsterdam ESHRE/ASRM-Sponsored 3rd PCOS Consensus Workshop Group. *FertilSteril* (2012) 97: 28-38.
- [24] Boyle J., Teede H. Polycystic ovary syndrome – an update. *Austr Family Phys*, 41 (10) (2012), pp. 752-756.
- [25] Freizinger M, Franko DL, Dacey M, Okun B, Domar AD The prevalence of eating disorders in infertile women. *FertilSteril* (2010) 93: 72-78.
- [26] Amsterdam European Society of Human Reproduction and Embryology/American Society of Reproductive Medicine-Sponsored Third PCOS Consensus Workshop Group. Consensus on women's health aspects of polycystic ovary syndrome (PCOS). *Hum Reprod* 2012;27:14–24.
- [27] Rodino IS, Byrne S., Sanders KA. Disordered eating attitudes and exercise in women undergoing fertility treatment. *Aust N Z J Obstet Gynaecol*(2016); 56: 82-87.
- [28] Wright CE, Zborowski JV, Talbott EO, McHugh-Pemu K, Youk A. Dietary intake, physical activity, and obesity in women with polycystic ovary syndrome. *Int J Obes Relat Metab Disord* 2004; 28:1026–32.
- [29] Joshi B , Mukherjee S ,Patil A , Purandare A , Chauhan S , and Vaidya R. A cross-sectional study of polycystic ovarian syndrome among adolescent and young girls in Mumbai, India *Indian J Endocrinol Metab*. 2014 May-Jun; 18(3): 317–324.
- [30] Conway G. , Honour J. , Jacobs H. Heterogeneity of the polycystic ovary syndrome: clinical, endocrine and ultrasound features in 556 patients. *Clin Endocrinol (Oxf)*, 30 (1989), pp. 459-470
- [31] Popkin BM. , Anci KD and Rosenberg IH. . Water, Hydration and Health. *Nutr Rev*. 2010 Aug; 68(8): 439–458.
- [32] Stookey JD, Constant F, Gardner C, Popkin B. Replacing sweetened caloric beverages with drinking water is associated with lower energy intake. *Obesity*. 2007;15:3013–3022.
- [33] Stookey JD, Constant F, Gardner C, Popkin BM. Drinking water is associated with weight loss. *Obesity*. 2008;16:2481–2488.
- [34] Patwardhan B , Warude D ,Pushpangadan P ,and Bhatt N. Ayurveda and Traditional Chinese Medicine: A Comparative Overview. *Evid Based Complement Alternat Med*. 2005 Dec; 2(4): 465–473.
- [35] Turner-McGrievy G1, Davidson CR, Billings DL. Dietary intake, eating behaviors, and quality of life in women with polycystic ovary syndrome who are trying to conceive. *Hum Fertil (Camb)*. 2015; 18(1):16-21.
- [36] Farshchi H. , Rane A. , Love A. & Kennedy R. L. Diet and nutrition in polycystic ovary syndrome (PCOS): Pointers for nutritional management. *Journal of Obstetrics and Gynaecology*, 2007; Volume 27, - Issue 8.
- [37] Sedigheh S , Ali Akbari S, Afrakhteh M, Taraneh E, Alavi Majd H & Mahmoodi Z. Comparison of Lifestyle in Women With Polycystic Ovary Syndrome and Healthy Women. *Global Journal of Health Science*; Vol. 7, No. 1; 2015 ISSN 1916-9736 E-ISSN 1916-9744.
- [38] Genazzani AD, Despini G, Santagni S, Prati A, Rattighieri E, Chierchia E and Simoncini T. Effects of a Combination of Alpha Lipoic Acid and Myo-Inositol on Insulin Dynamics in Overweight/Obese Patients with PCOS. *Endocrinology & Metabolic Syndrome*; 2014 ISSN: 2161-1017.
- [39] Cianci A, Panella M, Fichera M, Caruso S. D-chiro-Inositol and alpha lipoic acid treatment of metabolic and menses disorders in women with PCOS. *Gynecological Endocrinology*; 2015: 31(6):1-4 .
- [40] Zhang J, Liu XF, Liu Y, Xu LZ, Zhou LL, Tang LL, Zhuang J, Li TT, Guo WQ, Hu R3, Qiu DS, Han DW. Environmental risk factors for women with polycystic ovary syndrome in china: a population-based case-control study. *J Biol Regul Homeost Agents*. 2014; 28(2):203-11.