

A study to assess the effectiveness of weight-loss intervention on reproductive parameters among women having polycystic ovarian syndrome.

Sowmya Mercy¹, Gincy Mathew², Shervin Ploriya³, Deepa⁴

^{1,2}Professor, College of Nursing St. Martha's Hospital, ³Lecturer, College of Nursing St. Martha's Hospital

⁴Principal, College of Nursing St. Martha's Hospital

How to cite this article: Sowmya Mercy, Gincy Mathew, Shervin Ploriya, Deepa et al A study to assess the effectiveness of weight-loss intervention on reproductive parameters among women having polycystic ovarian syndrome. Volume 8 Number 2 July-December 2022.

Abstract

Introduction: In the recent years hormonal disorders among the young women are drawing their attention due to its major consequences on the health of the women namely infertility, ovarian malfunction, tumors and cysts of the female reproductive system. Polycystic Ovarian Syndrome is of major concern. It requires healthy lifestyle including good habits and balanced diet to treat it effectively. Objectives: 1) To assess the women's regularity of menstrual cycle, status of conception, BMI, waist circumference and clinical hyperandrogenism 2) To implement the weight loss intervention including exercises and balanced diet. 3) To assess the effect of a weight loss intervention on reproductive parameters like regularity of menstrual cycle and status of conception. Methodology: Evaluatory Approach with Randomized Control Trial design was used for the study. The Sample Size was 100, including 50 each in experimental and control group each. Sampling technique used was randomized sampling with a block size of 4. Results: The results depicted significant change in the regularity of Menstrual cycle after intervention in post 3 months and 6 months amongst the experimental group but, there was no statistically significant difference in the proportion of subjects whose status of conception changed from 3 months to 6 months. Conclusion: Lifestyle modifications including prescribed hours of exercises and balanced diet will improve the conception status and regularises the menstrual cycle.

Keywords: Polycystic Ovarian Syndrome, Exercise, Diet, Effectiveness, Weight loss Intervention, Reproductive Parameters, Menstrual Cycle, Conception Status.

Introduction

Polycystic ovary syndrome (PCOS) is a hormonal disorder common among women of reproductive age. Women with PCOS may have infrequent or prolonged menstrual periods or excess male hormone (androgen) levels. The ovaries may develop numerous small collections of fluid (follicles) and fail to regularly release eggs. This condition led to unpredictable hormonal behavior and increases the risk of infertility and co morbid conditions¹.

It is estimated that worldwide, 105 million women between 15 and 49 years of age show PCOS. 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 Srilanka². There are few studies conducted 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.³ The risk for preterm births and preeclampsia appears to be associated with maternal hyperandrogenism⁴. PCOS is the most common cause of anovulatory infertility⁵ and in many countries, it represents the leading cause of female infertility.⁶

PCOS negatively impacts fertility because women with this condition do not ovulate, or release an egg in each month due to an overproduction of oestrogen by the ovaries. Because ovulation does not occur regularly, periods become irregular and increased levels of hormones such as testosterone can affect the egg quality and inhibits ovulation. Ovulation problems are usually the primary cause of infertility in women with PCOS. Due to unbalanced hormones, ovulation and menstruation can be irregular.⁷ Lifestyle change is an important part of any fertility treatment approach for women with PCOS who are overweight or obese.⁸ Many research studies state that lifestyle changes positively affects in reducing the symptoms of polycystic ovarian syndrome^{9,10,11,12}

Objectives

The objectives include:

1. To assess the women's regularity of menstrual cycle, status of conception, BMI, waist circumference and clinical hyperandrogenism
2. To educate weight loss intervention including exercises and balanced diet
3. To assess the effect of a weight loss intervention on reproductive parameters like regularity of menstrual cycle and status of conception.

Methodology

The study used an Evaluatory Approach with Randomized Control Trial design. The Sample Size was 100, including 50 each in experimental and control group. Samples were Married women previously diagnosed to have PCOS with the desire to conceive and receiving treatment at the outpatient department of St. Martha's Hospital, Bengaluru. Sampling technique used was randomized sampling with a block size of 4.

Inclusion Criteria: Women who are

- age group – 21-35 years married women
- have a BMI ≥ 25 kg/m²
- able to read or understand Kannada or Hindi or Malayalam or English
- no other causes of infertility

Exclusion Criteria: Women who are

- Have a medical condition that limit their ability to exercise or intolerant to exercise
- Undergone any abdominal surgery in the past 6 months
- Undergone any miscarriage/abortion/MTP/D&C in the past 6 months
- Suspecting pregnancy
- Plan of care includes any surgical procedure

The tool used for the study included five parts

Tool 1: A) Baseline Variables.

B) Ferriman & Gallwey Tool – which is a standardized method of evaluating and quantifying hirsutism in women.

Tool 2: Anthropometric measurements proforma which includes height, weight, and BMI and waist circumference.

Tool 3: Weight loss information module which is an informational booklet which includes in-detail about the exercises and diet plan for the weight reduction.

Tool 4: Intervention daily log (IDL)

Tool 5: Menstrual cycle tracker

Samples were already diagnosed following the Rotterdam criteria by the treating gynecologist and were receiving routine care. The samples were randomized into experimental and control groups by block randomization. The subjects were assessed for clinical hyperandrogenism using the Ferriman-Gallwey Hirsutism tool along with self-reporting of history of acne and alopecia. The participants in the experimental group received the weight loss intervention programme consisting of diet and exercise. The diet was prescribed in consultation with the nutritionist as per the calorie requirement proposed by ICMR 2010 for the pre-study weight & BMI. The exercises were demonstrated by certified physiotherapist at the physiotherapy department. The participants were prescribed an exercise schedule fulfilling 150 mins/week. All participants were provided with an informational booklet to be used as a guide. The control group received routine care which included drug therapy, only verbal counselling of importance of diet, exercise and weight loss. For analysis and interpretation of data frequency and

percentage distribution were used to describe baseline variables, primary and secondary outcomes of the study both in experimental and control group and also at various time points of the study. McNemar statistics and Wilcoxon signed rank statistics were used to compare the primary and secondary outcomes of the study at various time points. Chi square and Fisher exact test was used to find the association between the primary and secondary outcomes of the study with selected Baseline variables.

Results

Section I: The results show that 44% of the subjects were in the age group of 25 to 29 years in experimental group whereas, 38% of the women were in control

Group, Majority (76%) of the subjects in experimental group and (66%) of the control group were belonging to Hindu religion, majority (60%) and (52%) were Home makers both in experimental and control group respectively.

Majority experimental group (88%), Control Group (86%) were not having children, experimental group (86%), Control group (90%) were having irregular cycles, experimental group (42%), control group (50%) were diagnosed with PCOS for 1 to 5 years, Majority 94% in experimental group and 96% in control group were not performing any exercises and none of them were following any prescribed diet plan.

Section II: Findings related to Reproductive Parameters (Primary outcomes) at various time points.

Table 1: Comparison of regularity of menstrual cycle within the experimental groups at different time points

EXPERIMENTAL GROUP							
Time point	Regularity of menstrual cycle	Pre-test				McNemar statistic	p-value
		Regular		Irregular			
		f	%	f	%		
Post-3 months (n=46)	Regular	7	15.2	9	19.6	15.481	0.004
	Irregular	0	0	30	65.2		
Post- 6 months (n = 20)	Regular	1	5	16	80	0.186	< 0.001
	Irregular	0	0	3	15		
Post-9 months (n = 9)	Regular	1	11.1	8	88.9	0	0
	Irregular	0	0	0	0		

Table 1 depicts there is a significant change in the regularity of Menstrual cycle after intervention in post 3 months and 6 months amongst the experimental group at 0.004 and < 0.001 levels of significance respectively.

Table 2: Comparison of status of conception within the experimental groups at different time points

EXPERIMENTAL GROUP							
Time point	Status of Conception	Pre-test				McNemar statistic	p-value
		Yes		No			
		f	%	f	%		
Post-3 months (n = 46)	No	46	100	46	100		
	Yes	0	0	0	0		
Post-6 months (n = 20)	No	14	70	1	5	0.741	1.000
	Yes	4	20	1	5		
Post-9 months (n = 9)	No	5	55.6	1	11.1	0.563	1.000
	Yes	3	33.3	0	0		

Table 2 shows that there were changes in the status of conception but there is no statistically significant difference in the proportion of subjects whose status of conception changed from 3 months to 6 months in experimental.

Section III Comparison of primary outcome between the experimental and control groups at different time points

Table 3: Comparison of regularity of menstrual cycle between the control and experimental groups at different time points.

Regularity OF Menstrual Cycle		Groups				p-value
		Control		Experimental		
		f	%	f	%	
Pre-test	Regular	5	10	7	14	0.538
	Irregular	45	90	43	86	
Post – 3 Months	Regular	8	21.1	16	34.8	0.166
	Irregular	30	78.9	30	65.2	
Post – 6 months	Regular	6	27.3	17	85.0	<0.001
	Irregular	16	72.7	3	15.0	
Post – 9 Months	Regular	3	33.3	9	100	0.003
	Irregular	6	66.7	0	0	

Table 4: Comparison of status of conception between the control and experimental groups at different time points

Conception Status		Groups				p-value
		Control		Experimental		
		f	%	f	%	
Pre-test	No	5	10	7	14	0
	Yes	0	0	0	0	
Post – 3 Months	No	35	92.1	43	93.5	0.80
	Yes	3	7.9	3	6.5	
Post – 6 months	No	20	90.9	15	75	0.16
	Yes	2	9.1	5	25	
Post – 9 Months	No	7	77.8	6	66.7	0.59
	Yes	2	22.2	3	33.3	

Table 3 and 4 shows there were no significant improvements in the regularity of menstrual cycle and status of conception between the experimental group at various time points except for regularity of menstrual cycle at post 6 months observation at <0.001 level of significance.

Section IV: Finding association of primary outcome with selected Baseline variables

There is no significant association found between the regularity of menstrual cycle with any of the baseline variables during post 3 months, post 6 months and post 9 months observation except for religion and diagnosis of PCOS during the post 3 months observation.

Conclusion

There is enough evidence that poly cystic Ovarian Syndrome is one of the commonest problems faced by young adults and women and it has become a leading cause of menstrual irregularities and many women don't conceive even due to PCOS. The reasons are many for PCOS for example obesity, food habits, lifestyle, stress etc. But, it is having been proven by evidence-based studies that, lifestyle modifications including prescribed hours of exercises and balanced diet will improve the conception status and regularises the menstrual cycle. As a part of the study the researcher developed an informational booklet on exercises to be performed and a balanced diet plan to

be followed by a woman diagnosed with Poly Cystic Ovarian Syndrome.

Conflicts of Interests: There is no conflicts of interest of any kind.

Funded By: Rajiv Gandhi University of Health Sciences, Jayanagar 4th 'T' Block, Bengaluru

Ethical Clearance Obtained By: Institutional Ethics Committee, St. Martha's Hospital

References

1. Endocrinal Diseases.Polycystic ovaries. National health portal India..Available at <http://www.nhp.gov.in>
2. Archana Singh, K. Vijaya and Kaparti Sai Laxmi. Prevalence of polycystic ovarian syndrome among adolescent girls: a prospective study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2018 Nov; 7(11):4375-4378 www.ijrcog.org
3. Beena Joshi, Srabani Mukherjee, 1 Anushree Patil, Ameya Purandare,2 Sanjay Chauhan, and Rama Vaidya. 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
4. Anderson Sanches MeloRui Alberto FerrianiPaula Andrea Navarro. Treatment of infertility in women with polycystic ovary syndrome: approach to clinical practice. *Clinics (Sao Paulo)*. 2015 Nov; 70(11): 765-769.Published online 2015 Nov. doi: 10.6061/clinics/2015(11)09
5. Afsaneh Khademi, MD, Ashraf Alleyassin, MD Marzieh Aghahosseini, MD, Leila Tabatabaefar, MD, and Mehrnoosh Amini, MD. The Effect of Exercise in PCOS Women Who Exercise Regularly. *Asian J Sports Med*10.5812/asjasm.34874
6. Nutritionist reveal the best diet plan and health tips for PCOD.Times of India.available at India times .com
7. Anjali Choudhary*, Shweta Jain, Priyanka Chaudhari. Prevalence and symptomatology of polycystic ovarian syndrome in Indian women: is there a rising incidence. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology* Choudhary A et al. *Int J Reprod Contracept Obstet Gynecol*. 2017 Nov; 6(11):4971-4975 www.ijrcog.org.
8. William C. Dodson, Allen R. Kunselman, Christy M. Stetter, Carol L. Gnatuk and Stephanie J., PA; Penny M. Kris-Etherton, Nancy I. Williams and Jennifer Fleming , Park, PA; and Kelly C. Allison, David B. Sarwer, Christos Coutifaris and Anuja Dokras. , "A Randomized Controlled Trial of Preconception Interventions in Infertile Women with Polycystic Ovary Syndrome," *Journal of Clinical Endocrinology & Metabolism*. published online at <http://press.endocrine.org/doi/10.1210/jc.2015-2778>
9. Elmenim SO, Emam AM. Effect of lifestyle changes on symptoms of polycystic ovarian syndrome in obese girls. *IOSR Journal of Nursing and Health Science*. 2016;5(3).
10. Abazar E, Taghian F, Mardanian F, Forozandeh D. Effects of aerobic exercise on plasma lipoproteins in overweight and obese women with polycystic ovary syndrome. *Advanced biomedical research*. 2015;4.
11. Vizza L, Smith CA, Swaraj S, Agho K, Cheema BS. The feasibility of progressive resistance training in women with polycystic ovary syndrome: a pilot randomized controlled trial. *BMC sports science, medicine and rehabilitation*. 2016 Dec;8(1):1-2.
12. Kiel IA, Lionett S, Parr EB, Jones H, Røset MA, Salvesen Ø, Vanky E, Moholdt T. Improving reproductive function in women with polycystic ovary syndrome with high-intensity interval training (IMPROV-IT): study protocol for a two-centre, three-armed randomised controlled trial. *BMJ open*. 2020 Feb 1;10(2): e034733.

Citation: Sowmya Mercy, Shervin Ploriya, Gincy Mathew, Sr. Deepa. A study to assess the effectiveness of weight-loss intervention on reproductive parameters among women having polycystic ovarian syndrome.