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Original article

Impact of traditional Indian practices combined with modern medicine on biochemical and clinical parameters in reproductive-age women with PCOS a comparative interventional study

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ABSTRACT

Background: Polycystic ovarian syndromeis acommon endocrine disorder affecting women of reproductive age. While Modern Medicine Regime of Treatment (MMRT) remains the cornerstone of management, long-term outcomes often remain suboptimal due to the multifactorial and multidimensional nature of aetiology. Traditional Indian systems emphasize holistic health by integrating mind-body practices in adjunct to MMRT.

Objective: We aimed to explore the impact of integrating Mindfulness of Mooladhara Chakra and Novel Yoga (MMNY) alongside Modern Medicine Regimeof Treatment in improving biochemical and clinical parameters of PCOS.

Methods: A total of 131 ultrasound-diagnosed women with PCOS were enrolled in this prospective, comparative interventional study conducted over one year. Group 1 (n=63) received MMRT alone, while Group 2 (n=68) received MMRT along with MMNY interventions. All participants were evaluated at baseline and after one year for biochemical and clinical parameters. Statistical analysis was performed using SPSS software with t-tests, Chi-square, Wilcoxon signed-rank, and Mann-Whitney U tests.

Results: After one year, the intervention group showed statistically significant improvements in biochemical parameters. HDL showed a statistically significant difference between the groups (p=0.020), favouring the intervention group. Acanthosis Nigricans and acne significantly improved in both groups (p<0.001). Hirsutism improved significantly only in the intervention group (p<0.001). No improvement was seen in vitamin A deficiency, skin tags, or telangiectasia.

Conclusion: The observed significant improvements in biochemical and few clinical parameters in the intervention group highlight the holistic benefits of such integrative approaches. While not a replacement for pharmacological intervention, MMNY practices could serve as beneficial adjunct therapies.

Keywords: PCOS, clinical improvement, mindfulness, Kayakalpa yoga, Mooladhara chakra, meditation

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is an endocrinal condition commonly seen in 6 -13% women of reproductive age group.[1] According to Rotterdam criteria for PCOS, if two of the three are present —androgen excess, oligo-anovulation, and/or polycystic ovaries— a diagnosis of PCOS is made.[2]Typical clinical features include central obesity, hirsutism, chronic anovulation, irregular menses resulting in 70% female infertilitymaking it as apublic health issue according to WHO.Though PCOS diagnosis has significantly increased in recent years due to advancements in sonography, laboratory facilities, and routine laparoscopic examination of infertility, 70% of women is still remainundiagnosed demanding increased routine screening under Sustainability Development Goal3.[3-5]

Under MMRT, First-line therapy for PCOS usually is lifestyle modification with changes in diet regime and regular exercise. However, when it is associated with other complications, such as diabetes mellitus, hypertension or infertility, these lifestyle changes alone are not sufficient,when including drugs like metformin, thiazolidinediones, acarbose, naltrexone, orlistat, vitamin D, statins become mandatory and invasive procedures

forassisted reproductive therapies. While it might seem like a lot of treatment options/drugs are available the evidence for real long-term benefit of currently available treatments is very limited.[6]Also, many studies have reported that women with PCOS are dissatisfied with the current standard of careregarding diet / exercise and behavioraladvice and face social stigma with clinical features like hirsutism and inferlity.[7]

Adherence from the patients to MMRT in long run need attitude and behaviour change, which can be possible only with consistent routine practice inculcated in day-to-day lifestyle for a lesser time duration. In addition to this, regulation of biochemical and clinical parameters in PCOD needs inner endocrine gland regulation whichis not achieved by only MMRT [8].To addressthese lacunae in our study, introduction of integratedapproaches such as "Mindfulness of Mooladhara chakra through visualization techniques and practicing Novel yoga in the sitting posture" (MMNY) as an adjuvant to MMRThas been practiced. This is an age-old traditional practice followed by sidhars helping in the regulation of the reproductive gland hormones and increasing sexualvitality and thence enhancing their longevity. Minimal literature has been found in India or elsewhere on this research topic. Our study thus stresses on the Spirit-Mind—Brain-Body approach of preventive medicine addressing the "spiritual dimensions of health", in restoring the HPO axis regulation thereby regulating the biochemical parameters and clinical spectrum.[9]reversing the hormonal imbalance & attaining fertility in PCOD women of reproductive age in a holistic way.

The present study assesses and compares the effectiveness of MMRT alone versus MMRT combined with MMNY in improving specific biochemical markers (FBS, PPBS, TC, LDL, VLDL, TGL, HDL, Haemoglobin, androgens) and clinical symptoms (anaemia, centralobesity, Acanthosisnigricans, Acne, Hirsutism, Vitamin A deficiency, Skin tags, Telangiectasia) among PCOS-affected women over a one-year period.

METHODOLOGY

Study Design:

This was a prospective, comparative interventional study type of study.

Study Population & Area:

The study was conducted among reproductive age women (15-49)women diagnosed with PCOS on USG visiting the Out Patient Department (OPD) at Department of Obstetrics and Gynaecology (Group 1) and the Urban Health Training Centre (UHTC) (Group 2) of a tertiary care hospital in Chennai.

Sample Size:

The required sample size for the study was determined by considering P1 as the proportion of ovulation induction with clomiphene citrate 70% (MMRT) from the previous literature and P2 as the proportion of ovulation induction with a projected additional benefit of 21% because of our intervention i.e. (70+21=91%) (MMRT+MMNY).

Sample size (N=131) was calculated based on anticipated ovulation rate improvement from 70% (MMRT alone) to 91% (MMRT+MMNY), with α=0.05 and power=80%. Zero dropouts were recorded.[10]

Study Protocol:

Women aged between 15-45 years with ultrasound-confirmed PCOD from the two locations were grouped into Group 1 and Group 2, respectively. Systematic random sampling from a sampling frame of 360 eligible subjects was applied to select 63 women in Group 1 and 68 in Group 2. All participants were followed up at baseline, 3, 6, 9, and 12 months.

Group 1 were following only MMRT**.**Group 2 were following MMRT along with our intervention MMNY - Mindfulness of Mooladhara chakra and one cycle of Kayakalpa yoga at sitting posture for 1 year period either by coming to the UHTC or at their home according to their convenience. Both groups were monitored over telephonic conversions and regularly followed up at baseline, three, six, nine and twelve months. Sociodemographic, Biochemical and clinical parameters obtained on day 1 (baseline) and after one year of follow up were compared for the study.

Inclusion Criteria:

Married and unmarried women with ultrasound-confirmed PCOD who provided informed consent were included in the study.

Exclusion Criteria:

Women with negative ultrasound with or without clinical symptoms, those on ovulation induction therapy, or using oral contraceptives were excluded from the study.

Intervention module, training and monitoring:

Intervention module was prepared with the help thepsychiatrist, mindfulness trained expert, and a OBG specialist.Certified trainers conducted initial sessions on MMNY for Group 2. Two peer volunteers supported daily adherence. The principal investigator contacted subjects and volunteers fortnightly. Monthly in-person reinforcement sessions were held.

The MMNY module that consisted of 2 parts (a) Mindfulness visualization technique focused on the Mooladhara chakra and (b) one cycle of Kayakalpa yoga in seated posture. The mindfulness visualization entailed a guided imagery of a red lotus at the base of the spine- Mooladhara, intended to stimulate reproductive vitality.

Mindfulness of mooladhara chakra involves 2 steps visualization technique & breathing technique.[11] Standardized Verbal pre-recorded audio and video instructions were played to the subjects. After watching the audio and video, subjects were instructed to practice the visualization technique at UHTC or at their place if they are unable to attend the centre due to personal reasons. Step 1: All emerging thoughts were tied as a bunch with a knot. Subject can visualize the tied knot as a red dot and the dot moving vertically down from head through the spinal cord to the base of spine, becoming heavy to bloom into red lotus.[12] Subjects were Instructed to visualize the red lotus at the base of spine for 2 minutes. Subjects were Instructed to visualize the red lotus being energized and healing the reproductive and pelvic organs especially ovaries and uterus. Feeling happy for feminism. (10 minute). Step 2: subjects are instructed to Breathe through the red lotus at base of spine (mooladhara chakra) vertically and horizontally (5 breaths vertically, 5 horizontal) (5 minutes).

One cycle of Novel yoga in the sitting posture (Kayakalpa yoga): one cycle of novel yoga uses 10 Ashwini mudras, which is contraction and relaxation of perineal muscles followed by contract of perianal sphincter during moola bandha and an ojus breath,[13] which is one cycle of inspiration followed by expiration in tongue folded touching the base of upper palate. (5 minutes)

Sixty-eight participants were called a “Nandambakkam Novel yoga” practicing group. Two volunteers, were selected from the group; to routinely monitor, these participants and they were motivating the participants.

The Kayakalpa sequence included Ashwini mudras and ojus breathingaddressed in our study as novel yoga. Participants were provided audio-visual instructions and practiced either at home or at the UHTC.

Data collection procedure:

Data was collected from both groups using structured and pilot-tested questionnaire. It included demographic data, clinical symptoms, and biochemical lab reports. Biochemical parameters and Clinical features like central obesity, acne, hirsutism, and acanthosisnigrans,hirsutism were graded on standard scales. Blood sample collection was done with the help of trained nurses in central lab of SMMCH&RI and with the help of public health nurse at Urban Health Training Centre. Blood samples from UHTC were sent to the SMMCH&RI central lab for laboratory investigations following necessary cold chain during transportation. Briefly, after Blood samples were collected and analysed at a central laboratory, maintaining cold chain and quality control. All data were collected at baseline and after one year.

After overnight fast, blood samples from all participants were collected and processed by a single trained lab technician by standardized techniques to ensure consistency and accuracy.

Both abdominal and transvaginal scan was done at the radiology department of SMMCH&RI for 2 groups at 10^{th} to $14^{th\ day}$ of their menstrual cycle to check the regularity of ovulation and ovarian volume. Adolescents’ girls were excluded from transvaginal scan and were not assessed for regularity of ovulation and ovarian volume.

Assessment of the study parameters:Demographic parameters include age, education, occupation, Socio-economic status, physical activity levels, menarche, marital status, fertility status and prior treatment for infertility were self-reported by subjects and data collected with a questionnaire.

Biochemical parameters analyzed are: FBS, PPBS, TC, LDL, VLDL, TGL, HDL, Hb,Mean total cholesterol, mean high-density lipoprotein (HDL) and mean non-HDL cholesterol of defined population in mmol/l.

Clinical parameters analysed are: Anaemia, central obesity,Acanthosis Nigrans, Acne, Skin tags, Hirsutism, Vitamin A deficiency, Telengectesia. According to ICD 10 Acanthosis nigricans (L83) is a darkening of the skin into velvety patches, that usually occurs in skin fold area such as neck, axilla, groin. Acanthosis nigricans typically occurs in individuals younger than the age of 40 years and is associated with insulin-resistance in PCOD cases[15]. The principal investigator herself clinically examined every individual subjectin grading of the same.

Grading of Acne Vulgaris in our study was mainly based on the degree of inflammation due to presence of excess of androgens in 70% of PCOD cases and this grading framework will be helpful in diagnosing the severity of acne in primary health care community setting and initiate early timely appropriate interventions & treatment of the same. Grade I (Mild): Comedones only; no inflammation. Grade II (Moderate): Papules and pustules with some inflammation. Grade III (Moderately Severe): Numerous inflammatory lesions with nodules; early scarring. Grade IV (Severe): Widespread nodulocystic lesions; scarring common[16].

Operational definition of Hirsutism is taken as the "presence of terminal hair with male pattern distribution in women" and primarily assessed using the "Ferriman-Gallwey scale", standard method based on a visual scoring system which evaluates hair growth in nine body areas androgen-sensitive body regions: the upper lip, chin, chest, upper and lower back, upper and lower abdomen, upper arm, and thighs. Each area is scored from 0 (no hair) to 4 (extensive hair growth), with the total score indicating severity:0-7: Normal hair growth8-14: Mild hirsutism 15 or more: Moderate to severe hirsutism.[17]

Statistical Analysis:

The data was entered into Microsoft Excel and analysed using SPSS software. The Kolmogorov-Smirnov test assessed data normality. Independent sample t-tests and paired t-tests were used for normally distributed variables. Mann-Whitney U and Wilcoxon signed-rank tests were used for non-parametric comparisons. Chi-square and Fisher's exact test were used for categorical variables.

Ethical clearance:

Ethical clearance was obtained from the Institutional Ethics Committee Ref. No. IEC R.NO.82/IEC-SMMCHRI/Approval/Proposal.

RESULTS

A total of 131 participants, with63 inGroup Iand 68 inGroup II were included in the study. In Group 1, the mean age was 22.76 ± 3.82 years, with ages ranging from 15 to 32 years. In Group 2, the mean age was similar at 22.78 ± 3.79 years, also ranging from 15 to 32 years (figure 1).

At baseline, there were no statistically significant differences between the two groups in FBS, PPBS, TC, LDL, VLDL, TGL, and Hb. However, HDL levels showed a statistically significant difference between the groups ($p=0.020$), favouring the intervention group.

After one year, the intervention group (Group 2), which followed both modern medicine regime of treatment and traditional practices MMNY showed statistically significant improvements in multiple biochemical parameters (Table 2).

Acanthosis Nigricans and acne significantly improved in both groups ($p<0.001$), though these were likely influenced by overall metabolic improvements. Hirsutism improved significantly only in the intervention group (Group 2) ($p<0.001$), whereas Group 1 did not show a statistically significant change ($p=0.066$). No improvement in vitamin A deficiency, skin tags, or telangiectasia were observed (Table 3).

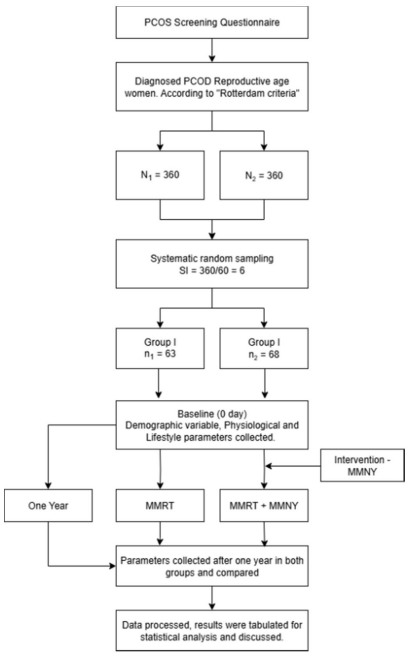

Figure 1. CONSORT FLOW diagram

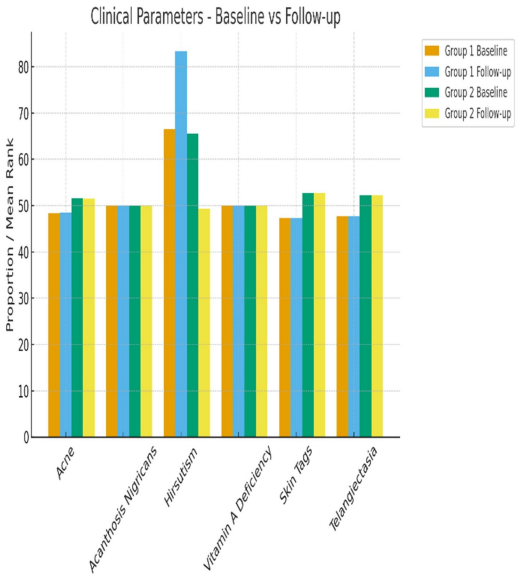

Figure 2 . Component bar chart with clinical features

Table 1: Distribution of Sociodemographic characteristics of the study participants at baseline (N=131)

Variable	Category	Intervention group (n=68) n (%)	Control group (n=63) n (%)	p-value
Age (years)	Mean ± SD	22.78 ± 3.79	22.76 ± 3.82	0.979[e]
Education	High school	18 (26.47)	20 (31.75)	0.809[e]
	Higher secondary	24 (35.29)	16 (25.40)	
	Middle school	10 (14.71)	11 (17.46)	
	Home	3 (4.41)	3 (4.76)	
	Undergraduate	13 (19.12)	13 (20.63)	
Occupation	Home	48 (70.59)	41 (65.08)	0.788[e]
	House keeping	3 (4.41)	2 (3.17)	
	Shop	3 (4.41)	2 (3.17)	
	Student	6 (8.82)	12 (19.05)	
	Tailor	3 (4.41)	2 (3.17)	
	Teacher	3 (4.41)	2 (3.17)	
	Other work	2 (2.94)	2 (3.17)	
Socio-economic status[a]	Lower class	2 (2.94)	2 (3.17)	1.000[e]
	Upper lower	9 (13.24)	9 (14.29)	
	Lower middle	55 (80.88)	50 (79.37)	
	Upper middle	2 (2.94)	2 (3.17)	
Marital status	Married	46 (67.65)	43 (68.25)	1.000[e]
	Unmarried	22 (32.35)	20 (31.75)	
Age at marriage[b](years)	Mean ± SD	20.34 ± 2.92	20.05 ± 2.05	0.582[f]
Age at menarche (years)	Mean ± SD	12.04 ± 0.97	11.92 ± 0.94	0.461[f]
Number of children in the family[c]	None	30 (68.18)	28 (66.67)	1.000[e]
	One	11 (25.00)	11 (26.19)	

	Two	3 (6.82)	3 (7.14)	
Number of years since last childbirth[d] (Years)	One	4 (28.57)	5 (35.71)	0.87[e]
	Two	8 (57.14)	6 (42.86)	
	Three	1 (7.14)	1 (7.14)	
	Four	1 (7.14)	2 (14.29)	
Any fertility treatment prior to conception[d]	Yes	8 (44.44)	10 (71.43)	0.165[e]
	No	10 (55.56)	4 (28.57)	

a Modified Kuppuswamy Socio-economic Scale

b Computed for 50 in Intervention group and 43 in the Control group

c Computed for 44 in Intervention group and 43 in the Control group

d Computed for 14 in Intervention group and 14 in the Control group

e Chi-Square test of significance

f independent t-test

Table 2: Biochemical Parameters in PCOS cases

Variable	**Group 1**			**Group 2**			**p-value**	
	Baseline (Mean rank)	**Follow up (Mean rank)**	**p value**	**Baseline (Mean rank)**	**Follow up (Mean rank)**	**p value**	**Baseline**	**Follow up**
FBS	64.4	70.9	0.671[a]	67.4	61.38	**<0.001[a]**	0.641[c]	0.147[c]
PPBS	65.09	70.9	0.585[a]	66.85	61.4	**<0.001[a]**	0.791[c]	0.153[c]
HbA1c	65.02	71.73	0.961[a]	66.91	60.69	**<0.001[a]**	0.775[c]	0.095[c]
Hemoglobin	65.4	55.1	**0.009[a]**	66.5	76.0	**<0.001[a]**	0.875[c]	**0.002[c]**
Tc	68.2	69.4	0.865[a]	63.9	62.85	**0.002[a]**	0.523[c]	0.324[c]
Triglycerides (TG)	63.4	65.6	0.649[a]	68.3	66.2	**<0.001[a]**	0.457[c]	0.928[c]
LDL	70.7	73.06	0.991[a]	61.6	59.46	**<0.001[a]**	0.168[c]	0.092[c]
HDL	76.18	69.83	0.203[a]	56.57	62.45	**<0.001[a]**	**0.020[d]**	0.264[c]
Androgens (Mean)	43.98	40.58	0.272[b]	47.01	46.57	**0.019[b]**	0.272[c]	**0.019[c]**

a. Wilcoxon signed rank testpaired-t test c.Mann Whitney U test

d. Independent sample t test

Table 3:Clinical parameters in PCOS cases

Variable		Group 1			Group 2			p-value	
Items	**Grades**	**Baseline**	**Follow up**	**p value**	**Baseline**	**Follow up**	**p value**	**Baseline**	**Follow up**
Acne	0	48.4%	48.5%	**<0.001**[a]	51.6%	51.5%	**<0.001**[a]	0.999[a]	0.987[a]
	1	50.0%	47.6%		50%	52.4%			
	2	47.1%	46.2%		52.9%	53.8%			
	3	42.9%	0%		57.1%	0%			
	4	50.0%	0%		50%	0%			
Acanthosis Nigrans	0	50.0%	50.0%	**<0.001**[a]	50.0%	50.0%	**<0.001**[a]	0.998[a]	0.996[a]
	1	47.8%	47.8%		52.2%	52.2%			
	2	47.9%	47.1%		52.1%	52.9%			
	3	48.0%	50%		52.0%	50%			
	4	42.9%	42.9%		57.1%	57.1%			
Hirsuitism (Mean rank)		66.48	83.3	0.066	65.5	49.4	**<0.001**[c]	0.888[b]	**<0.001**[b]
Vitamin A Deficiency	Yes	50%	50%	1[d]	50%	50%	1[d]	0.844[a]	0.853[a]
	No	47.7%	47.7%		52.3%	52.3%			
Skin Tags	Yes	47.3%	47.3%	1[d]	52.7%	52.7%	1[d]	0.668[a]	0.668[a]
	No	52.4%	52.4%		47.6%	47.6%			
Telengtesia	Yes	47.7%	47.7%	1[d]	52.3%	52.3%	1[d]	0.853[a]	0.853[a]
	No	50.0%	50.0%		50.0%	50.0%			

a- Chi-square test
b- Mann-Whitney U test
c- Wilcoxon signed rank test
d- Mc Nemar test

DISCUSSION

The socio-demographic characteristics between the two groups were well-matched, with no significant differences in age, education, occupation, socioeconomic status, marital status, or age at menarche. This uniformity strengthens the validity of comparisons between the intervention and control groups

The modest decrease in FBS observed in Group 2, though not statistically significant, may be clinically meaningful, especially in the context of early insulin resistance reversal. Also, the post-prandial glucose levels improved marginally in Group 2. This further supports the hypothesis that lifestyle modifications in Group 2 had a stabilizing effect on glucose metabolism. A study by Bhowal RR et al.reports on the efficacy of mindfulness-based programs' impact on reducing the glucose levels associated with PCOS. This is similar to the present study findings.[18]

Hb levels improved significantly in both groups, but the improvement was more marked in Group 2 ($p<0.001$). The increase in haemoglobin levels in both groups may be attributed to improved dietary compliance and better systemic health due to holistic practices. Wang jjet al.and Virtanen et al found a correlation between Hb level and glucose levels in PCOS Patients.[19,20]

Total Cholesterol, HDL, and triglycerides (TGL) improved significantly ($p=0.002$ and $p<0.001$, respectively). HDL improved significantly within Group 2 ($p<0.001$), though between-group difference at 1 year was not significant. HDL improved significantly within Group 2 ($p<0.001$), though between-group difference at 1 year was not significant. All the lipid profiles in our study showed the high significance at all lipid profile levels. Wild RA et al; showed in his study that Dyslipidaemia is common in PCOS. Beyond known alterations in triglycerides and HDL-cholesterol, women with PCOS have higher LDL-cholesterol and non-HDL-cholesterol,

regardless of BMI. It is highly recommended that all PCOS women screened for dyslipidaemia including LDL-cholesterol and non-HDL-cholesterol determinations, for effective cardiovascular risk prevention.[21]

Clinical Parameters significantly improved from baseline 42.1% to 52.9% after a year of follow up. Acanthosis Nigricans significantly improved in both groups ($p<0.001$), though these were likely influenced by overall metabolic improvements. Khan et al. in their study found that AN in adolescent girl with PCOS is another clinical marker of obesity but not an indicator of underlying insulin resistance or glucose intolerance. Also, a strong correlation with AN and BMI was reported.[22]Elevated AN was strongly associated with elevated fasting glucose, systolic blood pressure, and diastolic blood pressure, and with decreased HDL in nondiabetic subjects. In diabetic subjects, elevated AN was associated with elevated total cholesterol. Acne: In our study, acne significantly improved in both groups ($p<0.001$), though these were likely influenced by overall metabolic improvements. Shareef et al. in their study found strong correlation between acne and PCOS. The prevalence of PCOS have been 30% and it does not show any statistically significant age, marital status and menstrual regularity. Strong association have been observedwith higher BMI, presence of Hirsutism and higher waist circumference.[23]

Hirsutism improved significantly only in the intervention group (Group 2) ($p<0.001$). Most of the authors reviewed about correlation between Hirsutism and PCOS among which Spritzer et al. from analysing the studies most women with PCOS and hirsutism also have higher than reference values for serum androgen levels, some of them may not present with biochemical hyperandrogenism, representing a challenge to the diagnosis of PCOS. Most patients with PCOS present with clinical features of hyperandrogenism, which are relatively inexpensive to assess and require only skilled vigilant clinicians.[24] In our study, there has been no much difference in both groups on Vitamin A deficiency. It does not show any statistically significant results here. Shen et al. has found in his study that higher concentrations of vitamins E, D, and A were suggested to be associated with a decreased risk of hyperlipidaemia. Increased vitamins K and B12 levels were linked to a lower obesity risk and increased vitamins A, D, E, K, and B12 levels and a reduced risk of PCOS.[25]

This study evaluated the efficacy of integrating traditional practices—specifically mindfulness and Kayakalpa yoga and novel yoga MMNYwith standard modern medical care (MMRT) in improving biochemical and clinical parameters over one year. The findings suggest that the integrative approach led to significantly better outcomes in several biochemical markers and clinical manifestations compared to standard MMRT alone.

Importantly, our study also revealed dermatological benefits. Acanthosis nigricans and acne showed significant improvement in both groups, likely secondary to improved insulin sensitivity and overall metabolic balance. However, hirsutism showed significant improvement only in Group 2 ($p<0.001$), suggesting a potential hormonal regulatory role of the traditional practices. Previous studies have highlighted the role of stress-induced cortisol dysregulation in hyperandrogenic manifestations such as hirsutism. Mindfulness-based practices are known to modulate the hypothalamic-pituitary-adrenal (HPA) axis, thereby potentially influencing androgen levels.

The lack of improvement in vitamin A deficiency, skin tags, and telangiectasia may be due to the chronic nature of these conditions and their multifactorial aetiology. These findings align with other studies that report while yoga and lifestyle change improved insulin resistance and inflammation, they had limited effects on non-metabolic skin conditions.

A major strength of the present study is its interventional design and one-year follow-up, allowing sufficient time to observe longitudinal changes. The integration of physiological,biochemical and clinical factors provides a comprehensive picture of patient outcomes.

The limitations of the study include the reliance on self-reported data for some clinical parameters which may be subject to reporting bias. Additionally, some clinical outcome measures lacked statistical output (e.g., obesity, Telengectesia, Skin tags and Vitamin A deficiency), which weakens the strength of inferences about overallclinical improvement.

Very few studies are available that compare the effectiveness of traditional practices with currently available standard medical care. Further studies with larger sample sizes, detailed clinical outcome data are warranted to confirm and expand on these findings.

Conclusion

The observed significant improvements in biochemical and few clinical parameters in the intervention group(Group 2)highlight the holistic benefits of such integrative approaches. While not a replacement for pharmacological intervention, MMNY practices could serve as beneficial adjunct therapies.

References

1. World Health Organization Factsheet https://www.who.int/news-room/fact-sheets/detail/polycystic-ovary-syndrome
2. Smet ME, McLennan A. Rotterdam criteria, the end. *Australas J Ultrasound Med*. 2018;21(2):59-60. Published 2018 May 17. doi:10.1002/ajum.12096
3. Rajbanshi I, Sharma VK, Tuladhar ET, Bhattarai A, Raut M, Dubey RK, et al. Metabolic and biochemical profile in women with polycystic ovarian syndrome attending tertiary care centre of central NEPAL. BMC Womens Health. 2023 Apr 28;23:208.
4. Vaidya A, Yadav S, Vaidya A. A Study on the Clinical and Hormonal Profile of Polycystic Ovarian Syndrome Patients attending a Tertiary Care Hospital: A Descriptive Cross-sectional Study. JNMA J Nepal Med Assoc. 2020 Nov;58(231):875–8.
5. Duleba AJ. Medical management of metabolic dysfunction in PCOS. *Steroids*. 2012;77(4):306-311. doi:10.1016/j.steroids.2011.11.01
6. Rao VS, Cowan S, Armour M, Smith CA, Cheema BS, Moran L, et al. A global survey of Ethnic Indian women living with polycystic ovary syndrome: Co-morbidities, concerns, diagnosis experiences, quality of life, and use of treatment methods. Int J Environ Res Public Health. (2022) 19:15850. doi: 10.3390/ijerph192315850 [DOI] [PMC free article] [PubMed] [Google Scholar]
7. Peña AS, Teede H, Hewawasam E, Hull ML, Gibson-Helm M. Diagnosis experiences of adolescents with polycystic ovary syndrome: Cross-sectional study. Clin endocrinology. (2022) 96:62–9. doi: 10.1111/cen.14604 [DOI] [PubMed] [Google Scholar]
8. Elghobashy M, Lau GM, Davitadze M, Gillett CDT, O'Reilly MW, Arlt W, et al. Concerns and expectations in women with polycystic ovary syndrome vary across age and ethnicity: findings from PCOS Pearls Study. Front Endocrinol (Lausanne). (2023) 14:1175548. doi: 10.3389/fendo.2023.1175548
9. Rao V, Pena A, James A, et al. The role of meditation and mindfulness in the management of polycystic ovary syndrome: a scoping review. *Front Endocrinol (Lausanne)*. 2024;15:1295705. Published 2024 May 16. doi:10.3389/fendo.2024.1295705
10.Nambiar SS. Clomiphene Citrate versus Letrozole for Ovulation Induction in PCOS: A Comparative Study. J South Asian Feder Obst Gynae. 2018;10(4 Suppl 2):384–399.
11.Best CK. A chakra system model of lifespan development. *Int J Transpers Stud*. 2010;29(2):11–27.
12.Patel V, Menezes H, Menezes C, Bouwer S, Bostick-Smith CA, Speelman DL. Regular Mindful Yoga Practice as a Method to Improve Androgen Levels in Women With Polycystic Ovary Syndrome: A Randomized, Controlled Trial. J Am Osteopath Assoc. 2020 Apr 14. doi: 10.7556/jaoa.2020.050. Epub ahead of print. PMID: 32285088.
13.Editor IJOART. PSYCHO PHYSIOLOGICAL EFFECT OF VETHATHIRI MAHARISHI'S KAYAKALPA YOGA ON PCOS – CLINICAL TRIAL. (IJOARTorg) - International Journal of Advancements in Research & Technology. 2013;1
14. Lee Y, Siddiqui WJ. Cholesterol Levels. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2025 Jul 28]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK542294/
15.2025 ICD-10-CM Diagnosis Code L83: Acanthosis nigricans [Internet]. [cited 2025 Jul 28]. Available from: https://www.icd10data.com/ICD10CM/Codes/L00-L99/L80-L99/L83-/L83.
16.Carmina E, Dreno B, Lucky WA, Agak WG, Dokras A, Kim JJ, et al. Female Adult Acne and Androgen Excess: A Report From the Multidisciplinary Androgen Excess and PCOS Committee. J Endocr Soc. 2022 Feb 6;6(3):bvac003.
17. Lumezi BG, Berisha VL, Pupovci HL, Goçi A, Hajrushi AB. Grading of hirsutism based on the Ferriman-Gallwey scoring system in Kosovar women. Adv Dermatol Allergol Dermatol Alergol. 2018 Dec;35(6):631–5.

18.Bhowal RR, Asia AA, Asia AA. Efficacy of mindfulness meditation to improve quality of life in young women with polycystic ovarian disease. Natl J Physiol Pharm Pharmacol. (2024), [cited July 09, 2025]; 14(10): 2035-2040. doi:10.5455/njppp.2024.14.05190202420052024
19.Ha LX, Du YD, Qu XX, Wang JJ. Correlation Between Hemoglobin Levels and Polycystic Ovary Syndrome Metabolic Disorder. Diabetes Metab Syndr Obes. 2023 Sep 28;16:3019.
20.Virtanen N, Pesonen E, Saarela U, Hurskainen E, Arffman RK, Koivunen P, et al. Association of hemoglobin levels with metabolic traits in women with PCOS. Acta Obstet Gynecol Scand. 2025 Feb;104(2):357–67.
21. Wild RA, Rizzo M, Clifton S, Carmina E. Lipid levels in polycystic ovary syndrome: systematic review and meta-analysis. Fertil Steril. 2011 Mar 1;95(3):1073-1079.e1-11.
22. Khan B, Basu R. Acanthosis nigricans in adolescents with polycystic ovary syndrome. Int J Reprod Contracept Obstet Gynecol. 2022 Feb 25;11(3):765–9.
23. Prevalence and pattern of PCOS in women presenting with acne, a hospital based prospective observational study | International Journal of Research in Medical Sciences [Internet]. [cited 2025 Jun 20]. Available from: https://www.msjonline.org/index.php/ijrms/article/view/4442
24. Spritzer PM, Marchesan LB, Santos BR, Fighera TM. Hirsutism, Normal Androgens and Diagnosis of PCOS. Diagnostics. 2022 Aug 9;12(8):1922.
25.Shen JY, Xu L, Ding Y, Wu XY. Effect of vitamin supplementation on polycystic ovary syndrome and key pathways implicated in its development: A Mendelian randomization study. World J Clin Cases. 2023 Aug 16;11(23):5468–78.