Assessment of Symptoms, Pregnancy Outcome, and Health-Related Quality of Life among PCOS women Treated with Myo inositol and Metformin

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Abstract:

PCOS is a complicated endocrine disorder that mostly affects between 5% and 10% of women who are of reproductive age. Obesity, hyperandrogenism, and oligo- or anovulation are frequent clinical PCOS signs.

Objective: the study was designed to evaluate the effect of combining Metformin and Myoinositol; the main insulin-sensitizing drugs on improving symptoms and HRQOLQ in PCOS women.

Materials and Methods: A study was a prospective, interventional, comparative clinical study conducted on 54 patients (aged 18-40 y) who are divided into three groups: group1 patients allocated to receive Myo-inositol(4g), group2 patients allocated to receive Metformin(1g) and group3 patients allocated to receive Myo-inositol(4g) + Metformin(1g) all for 3 months. Baseline and after 3 months, patients' information and health related quality of life were documented.

Result: Metformin and Myoinositol resulted in symptoms improvement within each study groups as (68.8%, 87.5% and 94.1%) for group 1,2 and 3 respectively, only 4 patients from all groups became pregnant. Also, significant change in HRQOLQ in all study groups after three months of treatment were reported.

Conclusion: combining Myoinositol with metformin results in improved PCOS symptoms and pregnancy outcome in addition to improved patient's quality of life.

Key words: Polycystic Ovary Syndrome, Myoinositol, Metformin, Health Related Quality of life.

تقييم الأعراض، نتائج الحمل وجودة الحياة المتعلقة بالصحة بين نساء متلازمة تكيس المبايض، اللواتي يعالجن بالميو اينوزيتول والميتفورمين (PCOS)

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الخلاصة:

متلازمة تكيس المبايض هي اضطراب غدد صماء معقد يصيب في الغالب ما بين ٥٪ و١٠٪ من النساء في سن الإنجاب. تعد السمنة وفرط الأندروجين وقلة الإباضة من العلامات السريرية المتكررة لمتلازمة تكيس المبايض الهدف: صممت الدراسة لتقييم تأثير الجمع بين المتفورمين والميو اينزيتول وهما الادوية الرئيسية التي تحسس الانسولين، على تحسين الاعراض وجودة الحياة لنساء متلازمة تكيس المبايض.

المواد والطرق: كانت دراسة مستقبلية، وتدخلية، ودراسة سريرية مقارنة أجريت على ٥٤ مريضًا (تتراوح أعمارهم بين ١٨-٤٠ عامًا) مقسمة إلى ثلاث مجموعات: المجموعة الأولى المخصصة لتلقي ميو إينوزيتول (٤ جم)، المجموعة الثانية المخصصة لتلقي الميتفورمين (١ جم) ومجموعة ٣ مرضى مخصصة لتلقي ميو إينوزيتول (٤ جم) + ميتفورمين (١ جم) لمدة ٣ أشهر. تم توثيق خط الأساس وبعد ٣ أشهر من المعلومات الخاصة بالمرضى ونوعية الحياة المتعلقة بالصحة.

النتيجة: أدى الميتفورمين والميو اينوزيتول إلى تحسن الأعراض داخل كل مجموعة دراسة حيث (٦٨,٨٪، ٨٧,٥٪ و٩٤,١٪) للمجموعة ١، ٢ و ٣ على التوالي، حمل ٤ مرضى فقط من جميع المجموعات. أيضا، تغيير كبير في HRQOLQ في جميع مجموعات الدراسة بعد ثلاثة أشهر من العلاج.

الاستنتاج: الجمع بين ميو ينوزيتول والميتفورمين يؤدي إلى تحسن أعراض متلازمة تكيس المبايض ونتائج الحمل بالإضافة إلى تحسين نوعية حياة المريض.

الكلمات المفتاحية: متلازمة تكيس المبايض، ميو اينوزيتول، ميتفورمين، جودة الحياة المتعلقة بالصحة.

Introduction

Polycystic ovarian syndrome is a heterogeneous endocrine illness that affects many women worldwide who are of reproductive age [1]. PCOS is thought to be the most common endocrine disorder, affecting up to 20% of females who are reproductive age. [2] According to the Rotterdam criteria, polycystic ovaries, oligo- or anovulation, and clinical and/or biochemical hyperandrogenism are three of the important components that must be present in women for PCOS to be diagnosed. [3]

The aetiology of PCOS is thought to be significantly influenced by insulin resistance and compensatory hyperinsulinemia, both of which are more prevalent in both lean and overweight women [4].Although the cellular and molecular processes of insulin resistance in PCOS have not yet been fully understood, they are thought to differ from those of other disorders linked to insulin resistance [5]

Insulin resistance in PCOS approximately from 50% to 80% with severe PCOS and obesity being the most common cases [6]. Due to IR, these women are more susceptible to developing type 2 diabetes, hypertension, dyslipidaemia, cancer, and CVDs [7], as well as PCOS associated with dermatological issues linked to an increase in plasma testosterone levels that cause hirsutism, acne-related alopecia [8].It is notable that IR improvement and circulating insulin decrease are important treatment targets in PCOS. In addition to metformin, Myo inositol is now thought to be another insulin-sensitizing supplement that may be helpful for PCOS patients [9].

Metformin was the first insulin sensitizing medication (ISD) utilized in PCOS research to examine how insulin resistance contributes to the development of the condition.[10] The main effect is a decrease in blood glucose levels [11], brought on by reducing hepatic glucose synthesis , mostly via mildly and momentarily inhibiting the mitochondrial respiratory chain complex [12]. In addition, Metformin's effects on the body include improved peripheral and liver insulin sensitivity, increased insulin-stimulated glucose uptake and utilization by peripheral tissues [13]. Metformin has been shown to treat every symptoms of PCOS in addition to preventing its long-term effects, which is why its proponents consider it to be a necessary drug for women with the condition [14].

Myo inositol is a cyclic carbohydrate with six hydroxyl groups. It was formerly categorized as a B vitamin (vitamin B 8) [15]. One of the most interesting compounds being researched for the treatment of PCOS is myoinositol 16, now thought to be another supplement that increases insulin sensitivity and may help PCOS patients [9]. In various species, myo-inositol and its derivatives serve a variety of functions, including regulating ion channel permeability, phosphate levels, insulin signalling, and the stress response [17]. Due to its involvement in the HPG axis's signalling cascade, myo-inositol plays a crucial part in fertility, it is actually

the second messenger of the follicular-stimulating hormone (FSH) and luteinizing- hormone (LH), which travels a long way from the pituitary gland to other parts of the body, in particular, proper FSH signalling controls the selection of the dominant follicle and permits follicular maturation [18]. The proper maturation of oocytes depends on myo-inositol, and its larger content is recognized as a marker of good oocyte quality in human follicular fluid [19], as a result aids reproduction by restoring ovulation and fertility[20]. The steroidogenesis process is affected by myo-inositol, which also reduces the level of blood testosterone and the synthesis of androgen from theca cells [19].Shown capacity to improve insulin sensitivity, MI has been utilized to prevent and/or treat a number of metabolic diseases connected to IR, including the metabolic syndrome, gestational diabetes mellitus, and polycystic ovary syndrome (PCOS) [9].

An adequate intake of inositol from particular foods and/or supplements is required when the endogenous generation of myo-inositol is insufficient to meet the biological needs of humans as a result of MI serves important and varied functions in the biological processes [21].

This study Focus improving Symptoms of menstrual irregularities, pregnancy outcome, and Health-Related Quality of Life among PCOS women. Metformin is the first insulin sensitizing drug used in the treatment but due to their side effect recent study focus on the use of another more desirable and favourable drug myoinositol the preferred option to be used.

Patients and Method

A total of 54 PCOS patients are at reproductive aged 18-40years were joined in the study through their visit to the public hospital and the exclusive clinic; only 49 patients completed the research. Patients with PCOS were managed by gynecologists, treated in accordance with professional recommendations, and identified using Rotterdam criteria.

The Salah al-Din Health Department in Salah al-Din Governorate agreed to the study, and the scientific and ethical committee gave their approvals. Written consent from the patient was obtained following a thorough explanation of the study's objectives and assurances on the accuracy of the data gathered.

This research was a prospective, interventional, open label randomized, comparative clinical study to explore the efficiency of adding myo-inositol supplement to the standard treatment of PCOS in both married and unmarried women .

The accepted patients were divided into three major categories: Group 1: 18 PCOS patients received Myo-inositol 4 g once daily after meals for three months; Group 2: 18 PCOS patients received Metformin 1 g daily after meals for three months. Group 3 consists of 18 PCOS patients who received treatment for three months using Myo-inositol 4 g once daily after meals along with Metformin 1 g once daily after meals.

Patient information in the patients' sheet involving socio-demographic and disease characteristics was taken before intervention, in addition to subjective assessment which include, PCOS symptoms and quality-of-life before treatment and after three months of treatment .

Transvaginal ultrasound

Every participant in the study underwent transvaginal ultrasonography, a pelvic examination of the female, on days 10 and 12 of their cycle to monitor ovulation (ovarian size and endometrial thickness).[22]

Health-Related Quality of life Questionnaire (HRQOL)

Health-Related Quality of life Questionnaire for PCOS patients had evaluated using the English version of Cronin et al.23, and then translated into Arabic language by researcher to evaluate PCOS women and

determines the physical and psychological aspects of life quality. This questionnaire sheet to evaluate PCOS women composed of 26 questions, which reduced and categorized into 5 sections to include: body hair (5), weight (5), emotion (6), infertility (5), and menstrual problems (5). Each response is given a seven-point Likert scale, with seven denoting the best scenario and one denoting the worst.24 This questionnaire were taken at baseline and after 3 months of treatment.

Result

PCOS patients' sociodemographic and clinical characteristics .

Table (1) presents PCOS patients' sociodemographic and clinical characteristics of 54 female participants, including 18 patients in group 1 (33.3%) ,18 patients in group 2 (33.3%) and 18 patients in group 3(33.3%). Total age range for all patients were between 18-40 years with the mean age of 24.39 ± 5.48 (18-35 year) for group 1 patients, 28.11 ± 6.02(18-40 year) for group 2 patients and 32.44 ± 5.62(22-40 year) for group 3 patients, there is a statistically highly significant difference found between study groups with respect to age ($P > 0.01$) .

Among PCOS women, 55.6% were married and 44.4% were single distributed between the 3 groups. Considering the patients residence there were (77.8%) of group 1 patients, (77.8%) of group 2 patients and (66.7%) for group 3 patients as urban in residence. The others were among rural residence, Positive PCOS family history was observed in (33.3%) for group1 participant, (55.6%) of group 2 patients and (44.4%) of group 3 patients. There is no significant variance in the study group's family's history .

The duration of the symptoms for patients in groups were as follows: group 1(55.6%), group 2 (27.8%) and group 3 (22.2%) for less than 2 years duration, and duration of 2-10 years represented as (38.8%) of group 1, (66.7%) of group 2 and (77.8%) of group 3. The least number of women had duration more than 10 years. There was a statistically significant difference between the study group with respect to high calories diet as p value > 0.05. PCOS women that eat high caloric diet represent as 77.85%, while the remaining 22.2% did not consume high caloric diet.

Table (1): patients' sociodemographic and clinical characteristics

Study-variables	Study groups			Total (N=54)	P-value
	Group 1 (N=18)	Group 2 (N=18)	Group 3 (N=18)		
Age (years)	24.39 ± 5.48 (18-35)	28.11 ± 6.02 (18-40)	32.44 ± 5.62 (22-40)	28.31 ± 6.51 (22-40)	**<0.01****
Residence Urban	14 (77.8)	14 (77.8)	12 (66.7)	40 (74.1)	0.792[NS]
Rural	4 (22.2)	4 (22.2)	6 (33.3)	14 (25.9)	
Total	18 (100.0)	18 (100.0)	18 (100.0)	54 (100.0)	
Family History Positive	6 (33.3)	10 (55.6)	8 (44.4)	24 (44.4)	0.407[NS]
Negative	12 (66.7)	8 (44.4)	10 (55.6)	30 (55.6)	
Total	18 (100.0)	18 (100.0)	18 (100.0)	54 (100.0)	
High calories diet Positive	7 (38.9)	17 (94.4)	18 (100.0)	42 (77.8)	<0.01**
Negative	11 (61.1)	1 (5.6)	0 (0.0)	12 (22.2)	
Total	18 (100.0)	18 (100.0)	18 (100.0)	54 (100.0)	
Duration of symptoms < 2 years	10 (55.6)	5 (27.8)	4 (22.2)	19 (35.2)	0.094[NS]
2-10 years	7 (38.8)	12 (66.7)	14 (77.8)	33 (61.1)	
>10 years	1 (5.6)	1 (5.5)	0 (0.0)	2 (3.7)	
Total	18 (100.0)	18 (100.0)	18 (100.0)	54 (100.0)	

Data presented as Mean ± SD, (N) number of patients, Percentage (%), NS: No significant differences (P>0.05),*mean significant difference. **(P0.01) is regarded as high significant. ANOVA Test used to compare means between three groups. Pearson Chi-square was used to find the association between study groups and (marital status, depression and family history). Fisher-exact test used to find the association between study groups and other study variable

Effect of study intervention on symptoms improvement and pregnancy outcomes

There was no significant difference in symptoms improvement among the study groups post treatment (P>0.05). Symptoms improvement within each study groups noticed as (68.8%, 87.5% and 94.1%) for group 1,2 and 3 respectively. While the remaining patients in the study groups still have a menstrual irregularity.

This is just There were 4 patients from all groups who became pregnant, hence, no significant difference in pregnancy occurrence among the three study groups (P>0.05).

Table (2): Effect of study intervention on symptoms improvement and pregnancy outcomes

Study variable	Study group			P-value
	G1 **N=18**	**G2** **N=18**	**G3** **N=18**	
Symptoms improvement	(Mean ± SD)	(Mean ± SD)	(Mean ± SD)	
Improve	11 (68.8)	14 (87.5)	16 (94.1)	0.141^{NS}
Not improve	5 (31.2)	1 (6.66)	1 (5.9)	
Total	16 (100.0)	15 (100.0)	17 (100.0)	
Pregnancy outcome	(Mean ± SD)	(Mean ± SD)	(Mean ± SD)	
Positive	2 (33.3)	1 (14.3)	1 (6.3)	0.138^{NS}
Negative	4 (66.7)	6 (85.7)	15 (93.7)	
Total	6 (100.0)	7 (100.0)	16 (100.0)	

Categorical data was presented as frequency and percentage. NS: No significant differences, (N)mean number of patients (P>0.05) The connection between study groups and study variables was determined using the Fisher-exact test

Effect of study intervention on Health-Related Quality of life Questionnaire (HRQOL) of polycystic ovarian syndrome.

There was no significant difference in emotion among the three study groups before and after three months of intervention (p < 0.05). While there was a substantial improvement in emotion status in group 1, present as (3.8%) (p > 0.05), also there was a highly significant improvement of emotion status(p<0.01) in group 2 present as (9.6%) and (19.2%) of group 3 patients.

Concerning body hair, there were no significant differences among the three study groups at baseline and after three months of treatment (p < 0.05). At the same time, there was a significant reduction of body hair within each group after treatment (p > 0.05) which existed as group 1 (8.1%), group 2 (20.4%) and group 3 (16.7%).

The mean differences in weight among groups 1, 2 and 3 in pre-treatment were highly significant (p<0.01) and post-treatment present a significant difference (p < 0.05). There was a substantial decrease in weight in group 1(3.7%) besides a highly significant reduction in group 2, group 3 present as (20.6%) and (24.5%) respectively (p <0.01) as a result of improvement of insulin sensitivity of metformin and in combination with MI which cause decreasing body weight.

Concerning infertility there was no significant difference among the three groups at baseline and after 3 months treatment (p > 0.05). There was no significant difference in infertility in group 1 and 2 (p > 0.05) after intervention. The important difference present only in group 3 patient after 3 months of treatment (p <0.01).

Finally, concerning menstrual problems, no significant difference was observed in the comparison of the three groups before and after three months of treatment (p < 0.05). There were a highly significant improvement and resolution of the menstrual problem (<0.01) in each study group, which presented as (13.7%,21.3% and 28.7%) for group 1, 2 and 3 patients, respectively. {Equal number of patients were compared within the same group pre- and post-treatment}

Table (3): Effect of study intervention on Health-Related Quality of life Questionnaire (HRQOL) of polycystic ovarian syndrome

variables	Study groups						P-value
	G1		G2		G3		
Emotion	N	(Mean ± SD)	N	(Mean ± SD)	N	(Mean ± SD)	
Pre treatment	18	(24.72 ± 7.58)	18	(25.00 ± 7.90)	18	(21.33 ± 5.64)	0.236[NS]
Post treatment	16	(25.69 ± 5.56)	15	(27.67 ± 7.55)	17	(26.06 ± 6.14)	0.665[NS]
P-value	0.002*		<0.01**		<0.01**		
% Of change	3.8%		9.6%		19.2 %		
Body hair	N	(Mean ± SD)	N	(Mean ± SD)	N	(Mean ± SD)	
Pre treatment	18	(19.72 ± 9.23)	18	(16.39 ± 7.77)	18	(18.83 ± 7.37)	0.453[NS]
Post treatment	16	(21.44 ± 8.20)	15	(20.60 ± 5.94)	17	(22.59 ± 5.10)	0.689[NS]
P-value	0.014*		0.01**		0.002*		
% Of change	8.1%		20.4%		16.7%		
Weight	N	(Mean ± SD)	N	(Mean ± SD)	N	(Mean ± SD)	
Pretreatment	18	(25.83 ± 10.01)	18	(15.78 ± 7.21)	18	(15.50 ± 7.49)	<0.01**
Post treatment	16	(26.81 ± 10.20)	15	(19.87 ± 6.31)	17	(20.53 ± 6.46)	0.031*
P- value	0.002*		<0.01**		<0.01**		
% Of change	3.7%		20.6%		24.5%		
Infertility	N	(Mean ± SD)	N	(Mean ± SD)	N	(Mean ± SD)	
Pre treatment	18	(23.33 ± 6.13)	18	(24.50 ± 7.80)	18	(19.89 ± 8.08)	0.161[NS]
Post treatment	16	(25.13 ± 6.53)	15	(24.53 ± 8.37)	17	(23.24 ± 7.69)	0.764[NS]
P-value	0.054[NS]		0.678[NS]		<0.001*		

% Of change	7.2%		0.1%		14.4%		
Menstrual problem	N	(Mean ± SD)	N	(Mean ± SD)	N	(Mean ± SD)	
Pre treatment	18	(20.28 ± 5.88)	18	(20.00 ± 6.90)	18	(18.28 ± 6.45)	0.602[NS]
Post treatment	16	(23.50 ± 4.70)	15	(25.40 ± 4.00)	17	(25.65 ± 3.69)	0.284[NS]
P-value	0.01**		<0.01**		<0.01**		
% Of change	13.7%		21.3%		28.7%		

Data are displayed as mean SD, number of patients (n) No significant differences (P>0.05), *(P0.05) are regarded as significant differences, and **(P0.01) are regarded as highly significant differences. Three groups' means were compared using the ANOVA test (pre and post treatment). The means of the two paired readings were compared using the paired t-test (for each group)

Discussion

Polycystic ovary syndrome is a hyperandrogenic condition linked to serious health issues25. Recent research suggests that MI acts as an insulin sensitizer, may enhance the metabolic profile of PCOS 26. Several clinical studies reported exploring the role of MI supplement in combination with metformin, but to the best search, no study used such a combination among Iraqi PCOS women.

Patients' Demographic and Disease Characteristics

In the current study, all patients have the clinical and biochemical features of PCOS syndrome and are in the reproductive age range 18-40y, with a positive family history of approximately (44.4%) of all study group patients and most of them presented with a duration of symptoms of 2-10 years. This result is consistent with Tehrani et al., who reported that (45%) of PCOS patients had a positive history in their families 27. This is because first-degree relatives of PCOS patients have a higher risk of developing PCOS due to the hereditary component of PCOS and the family clustering of metabolic and reproductive problems 28, more than 70% of PCOS aetiology is hereditary 29 among first-degree female relatives, the prevalence of PCOS is increased by 5 to 6 times 30.

More than (77.8%) of PCOS patients in the three study groups of the current study had positive high-calorie diets. Women with high fat, sugar, and low antioxidant diets are more likely to develop PCOS than participants without these risk factors 31. Also, one of the most significant characteristics of PCOS is obesity, which affects between 61 and 76% of sick women 32. The current finding presented that the majority (74%) of PCOS patients were overweight or obese, whereas just (25.9%) were considered to be of average weight. A previous study also stated that more than half of participants were obese 33. A hallmark of central obesity is an increase in waist circumference, which is caused by hyperinsulinemia, insulin resistance, and hyperandrogenaemia which modify lipolysis and lipogenesis and decrease adipocyte differentiation30. primarily central or abdominal obesity, occurs as a result of an unhealthy lifestyle, especially nowadays habits of most people, which include excessive fast-food intake and irregular eating patterns that cause significant changes in blood glucose levels, which increase the risk of hormonal imbalance and the development of PCOS 28.

The clinical symptoms of PCOS, such as hirsutism, acne, and weight gain, can impair self-esteem and negatively impact mood. Additionally, infertility has been linked to significant psychological stress and lowers the quality of life for the affected women 34.

Effect of study intervention on symptoms improvement and pregnancy outcomes

The most prevalent gynaecological symptom of PCOS is irregular menstruation; oligomenorrhea is seen in up to 85%–90% of women with the condition, although PCOS can also be present in up to 30%–40% of amenorrheic patients 35. The present study found oligomenorrhea affects 40.7% of all study groups.

The current study showed a notable improvement in menstrual cycle in all PCOS patients on the 3 study medications (68.75%, 87.5%, and 94.1%) respectively. Overall, 83.7% of patients reported an improvement in their menstrual cycle, whereas 16.3% continue to report irregularities. After receiving Myoinositol for six months, Qamar et al. observed a 73% improvement in menstrual cycle 36. Another previous three arm study treated similarly to the current intervention reported significant improvement among all treated PCOS women 37.

Moreover, there was a positive pregnancy outcome after three months of treatment with the current intervention. Two patients received myoinositol, one received metformin monotherapy, and one received myo-inositol- metformin combination.

According to a study, the myoinositol group had a more significant percentage of ovulation (36.1%) and conception (8.6%) than the metformin group (27.6% and 5.7%) 38. Also, others found that without the use of any ovulation-inducing medication, myoinositol in infertile women with PCOS led to conception in 57.14% of the women 39.

Changes in Health-Related Quality of Life Questionnaire after Study Intervention

The PCOS Health-Related Quality of Life Questionnaire (PCOSQ) is the only available specialized tool to assess QOL in this population 40; it also refers to the combination of physical, psychological, and social effects of a certain disease or its treatment 41. For clinicians and patients, it is equally, measuring HRQoL for PCOS patients at baseline and after the of various treatment techniques is instructive and helpful in identifying the usefulness of each treatment approach from the patients' point of view 42.

The present study is one of the attempts to determine a change in the HRQoL questionnaire of PCOS women before and after treatment which was translated into Arabic and categorized into five sections: body hair, weight, emotion, infertility, and menstrual problems.

The HRQoL in women with various PCOS phenotypes was studied in a comparative cross-sectional study by Fatemeh et al. conducted on 239 PCOS patients. Phenotypes A and B showed lower scores in the hirsutism subgroup, and Phenotypes D and C showed higher scores in the acne and menstruation subgroups 43. In another study to establish the reliability of a German version of PCOSQ, the emotional subscale, infertility subscale, menstrual difficulties subscale, and overall PCOSQ score did not show any floor or ceiling effects. With 33.3% of the patients achieving the maximum score on each subscale, the hair and weight subscales also demonstrated significant ceiling effects 44.

In the present study, psychological features categorized as emotion include (Depression, quickly Tired, low self-esteem as a result of having PCOS, Fear of getting cancer, worried about having PCOS, and self-conscious as a result of having PCOS) show decreased questionnaire score before treatment and then after treatment a significant improvement among all PCOS patients received various treatment including myo-inositol alone.

Also, body hair and body weight improved with decreasing BMI and regular menstruation after the study intervention (P-value< 0.01). Higher levels of anxiety and sadness may be linked to clinical characteristics of PCOS, such as hirsutism,

obesity, or infertility, mainly because these characteristics interfere with outward appearance and social norms 24. Increase in insulin sensitivity and decreasing hyperandrogenism, will cause decreasing excess and undesirable body hair, and hence, improving psychological and quality of life.

Infertility in current study is not a substantial question because approximately 44.4% of patients in the study groups are unmarried, and 56.67% of married patients have children due to their clinical features and metabolic features disturbances, which need special supervision and treatment.

Conclusions

In conclusion, combining Myoinositol with metformin significantly improves symptoms and quality of life, especially in emotion, body hair, weight and menstrual irregularities; combination treatment provides a synergistic effect in improving patient symptoms. Compared to metformin, Myoinositol has greater patient compliance, is more well-tolerated, and is the best medication to complement existing standard therapies.

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